



Cloud Computing – Revision Notes

● Definition of Cloud Computing (NIST)

Cloud computing is a model that enables on-demand access to a shared pool of configurable computing resources (networks, servers, storage, applications, services) with minimal management or provider interaction.

◇ Essential Characteristics of Cloud Computing

1. **On-demand Self-Service** – Users can provision resources as needed, automatically.
2. **Broad Network Access** – Accessible via standard platforms (mobile, laptops, etc.).
3. **Resource Pooling** – Multi-tenant model, dynamic resource allocation.
4. **Rapid Elasticity** – Auto-scaling up/down as per demand.
5. **Measured Service** – Usage is metered (bandwidth, storage, etc.).

◇ Common Characteristics

- Massive Scale
- Resilient Computing
- Homogeneity
- Geographic Distribution
- **Virtualization**
- **Service Orientation**
- Low-Cost Software
- Advanced Security

● Service Models

1. **SaaS (Software as a Service)**
 - Access provider's apps via browser (e.g., Gmail, Google Docs)
 - No control over infrastructure.
2. **PaaS (Platform as a Service)**
 - Deploy apps using provider-supported tools/languages (e.g., Google App Engine).
 - Control over apps but not infrastructure.
3. **IaaS (Infrastructure as a Service)**
 - Provision computing resources like storage, servers (e.g., AWS, FlexiScale).
 - Full control over OS, storage, and apps.

● Deployment Models

1. **Private Cloud** – Used by a single organization (e.g., Hyper-V).
2. **Public Cloud** – Available to general public (e.g., Google Drive).
3. **Community Cloud** – Shared by organizations with a common goal.
4. **Hybrid Cloud** – Combination of multiple cloud types (e.g., cloud bursting).

● Cloud & Virtualization

- **Virtual Machines (VMs)** run multiple OS instances on one physical system.
- **Hypervisors** manage VMs (e.g., VMware, Xen, KVM).
- VMs allow easy testing, legacy system support, clean OS installs, etc.

◇ Cloud Storage

- Remote data storage with local caching on user devices.
- Example: **Amazon EC2** (compute) and **Amazon S3** (storage).

● Cloud-Sourcing

Advantages:

- High-scale, low-cost providers
- Anytime/anywhere access
- Scalability
- Minimal IT focus needed

Concerns:

- Performance, SLAs
- Data control & privacy
- No standard API (SOAP vs REST)
- Compliance & trust issues

☑ Advantages of Cloud Computing

- Lower PC costs
- Improved performance
- Reduced software cost
- Unlimited storage
- Instant updates
- Increased data reliability

- Easier collaboration
- Latest version availability
- Device independence

✗ Disadvantages

- Requires continuous internet
- Limited features offline
- Performance may lag
- Potential **data security risks**
- Stored data may be lost