4. Introduction to cloud

- **Cloud computing** - It is the delivery of computing services like servers, storage, doloboses, networking, software, analytics, intelligence and more over the internet.
  - alternative to the on-premise datarentre.
  - Instead of manage everything, such as purchasing & installing hardware, virtualization installing os and other application & configuring. He can access these services from various providers, such as AWS, Microsoft Azure, GCP and oracle cloud
- It has revolutionized the way we access IT services offering a **flexible**, **scalable**, **cost-effective** alternative to traditional IT setup.

* **Traditional Architecture:**

- comprises physical hardware & software components
- incl. data centers, servers, networking hardware, enterprise applications

Problems:

- pay the rent for the data center
- pay for power supply, cooling and maintenance
- adding and replacing HW takes time
- limited scaling
- Hiring a team to monitor infrastructure
- dealing with disasters (earthquake, power shutdown, fire)

oud computing includes some form of virtualized IT infrastructure -

that is abstracted using special software so that it can be pooled & divided irrespective of physical hardware boundaries.

Ex. single hardware server divided into multiple servers.

* overcome the problems of traditional architecture:
  - Lower IT costs.
  - Improved agility and time-to-value.
  - Scale more easily & cost-effectively.

* characteristics:
  - on-demand, self-service: No human intervention needed to get resources.
  - Broad network access: access from anywhere.
  - resource pooling: Provider shares resources to customers.
  - Rapid Elasticity: Get more resources quickly as needed.
  - Measured service: Pay only for what you consume.

* Why cloud:

Benefits of Cloud computing:

1. More flexible.
2. Reduced infrastructure cost
3. Higher security & Availability.
4. Backups & recovery.
5. No location constraints.
6. Highly scalable
7. Fault Tolerance - High.

Cloud service model:

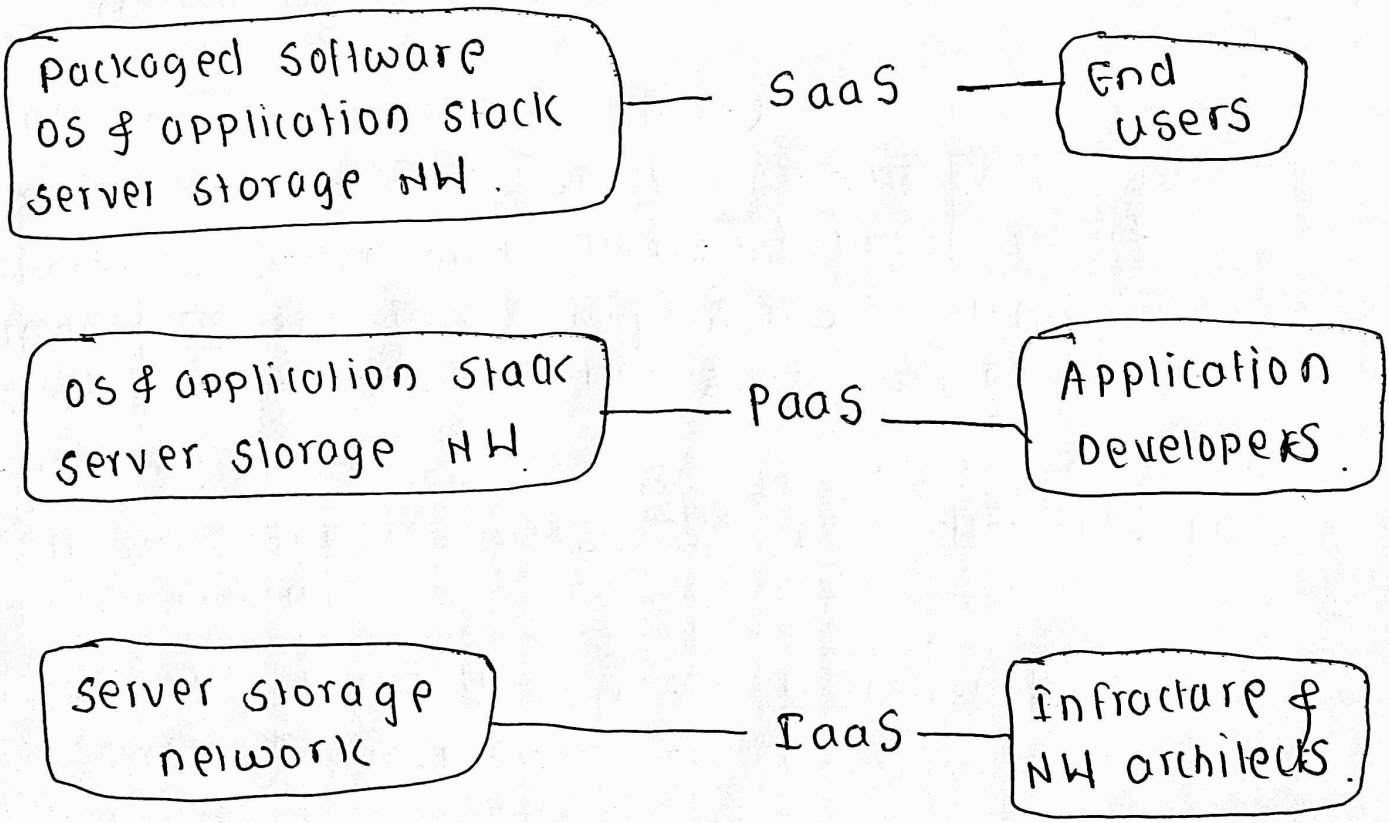
- 3 Types of service models.
- Each provides different levels of control, flexibility, and management.

1. Infrastructure As a Service (IaaS)
   - most flexible
   - rents HW & contains basic building blocks for IT
   - Gives complete control over the HW. (servers, VMs, Storage, Networking & OS)
   - provides best level of flexibility and management control over IT resources.
   - Ex. EC2, S3 (From AWS)
     Providers like AWS rent out storage and computing capacities on their servers.

2. Platform As a service (Paas)
   - provides ready to use development environment.
   - helps to create applications quickly without managing the underlying infrastructure.
   - Don't have to install the OS, Web server or even patching.
   - Can scale the resources and new features to your service.
   - Ex. Elastic Benstalk or Lambda from AWS
     Oracle Database cloud service from oracle cloud.
     Companies can rent predefined platforms for software development.
     The provider deals with administration of the underlying service servers.

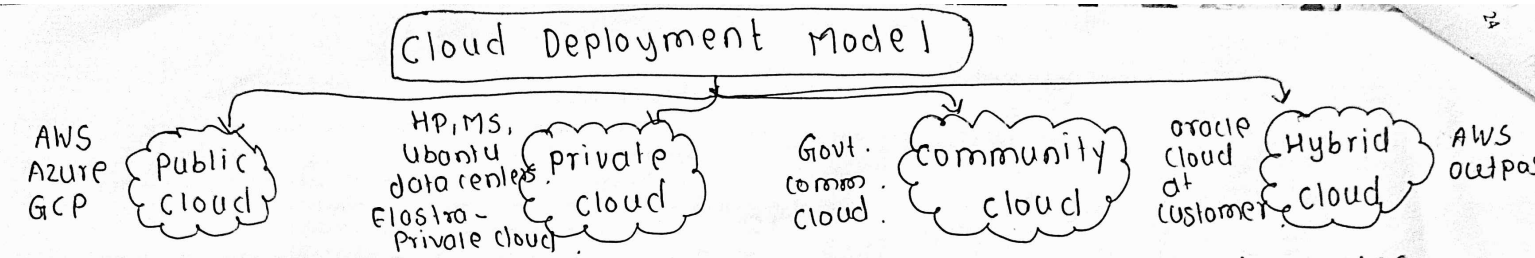
3. Software As a Servile (SaaS)

- provides complete product.
- that runs and fully managed by service provider.
- Software - hosted online, made available to customers on a subscription basis or for purchase.
- Don't need to worry about, how service is maintained / how underlying infrastructure is maintained.
- Ex. Microsoft office 365., Gmail
  interesting for private users
  cloud based complete software application.



comporision.

Cloud Deployment Model



- accessible to general public
- services over the internet.
- Pay-per-use basis.
- Third-party providers handle infrastructure, maintenance & security.

ADV: Scalability, Cost-effective, High availability.

DisAdv: Security concerns, less customization, Potential outages.

- dedicated to single organization
- Greater control over data, security & compliance.
- on-premises / third party provider.

ADV: Enhanced security, customization, compliance.

lim: cost, maintenance, fixed scalability.

- Group of organizations
- Shared concerns.
- combines benefits of private & public clouds (some)

ADV: cost sharing, Enhanced collaboration Security & privacy.

lim: Limited usage Higher costs. Complex management.

- integrates public & private clouds.
- Shared data & applications.
- offers flexibility & balance.

ADV: Flexibility, cost efficiency, Scalability.

Lim: Complex integration, security, management overhead.

- Its growing in demand and popularity.

How to choose:

organizations can better align their IT strategies with business goals,

Ensuring optimal performance, security and cost efficiency.

Selecting deployment model depends upon:

1. Scalability

   rapid scalability - public or hybrid clouds.

2. Security & privacy -

   highly sensitive data - private or community clouds.

3. cost.

   non-sensitive data, dynamic workloads

   cost effective - public clouds.

4. compliance.

   strict regulatory requirements. private or community cloud.

5. Flexibility -

   balance, utilizing both private and public cloud advantages - Hybrid cloud.