

Cloud Computing and Service Models

Cloud Computing

Cloud computing refers to the delivery of various services over the internet. These services include storage, databases, servers, networking, software, analytics, and intelligence. Instead of owning computing infrastructure or data centers, companies can rent access to anything from applications to storage from a cloud service provider.

Cloud computing models can be broadly categorized into:

- **IaaS (Infrastructure as a Service)**
- **PaaS (Platform as a Service)**
- **SaaS (Software as a Service)**

Key Benefits of Cloud Computing

- **Cost-effective** – Pay-as-you-go pricing.
- **Scalability** – Easily scale up or down as needed.
- **High Availability** – Redundant systems reduce downtime.
- **Flexibility** – Access from anywhere.
- **Security** – Providers invest heavily in securing infrastructure.

IaaS – Infrastructure as a Service

Infrastructure as a Service (IaaS) provides virtualized computing resources over the internet. It offers fundamental infrastructure such as virtual machines (VMs), storage, load balancers, and networks.

Key Characteristics of IaaS

- Fully self-service for accessing and monitoring computers, storage, networking.
- Resources are scalable and can be adjusted as needed.

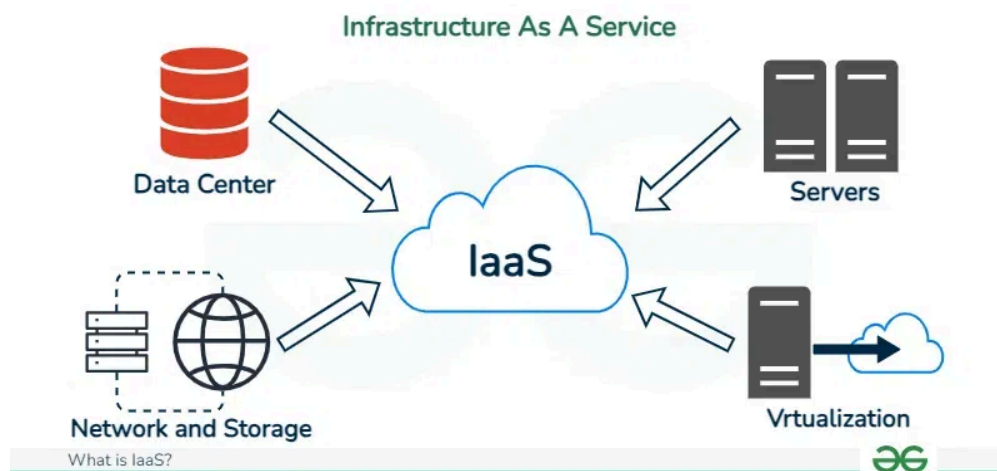
- Users manage OS, applications, data; provider manages infrastructure.

Examples of IaaS

- Amazon Web Services (AWS EC2)
- Microsoft Azure Virtual Machines
- Google Compute Engine

Benefits of IaaS

- **Cost Saving:** No need to buy physical hardware.
- **Scalability:** Scale resources as needed.
- **Flexibility:** Choose your OS, applications.
- **Quick Deployment:** Provision new servers in minutes.



PaaS – Platform as a Service

Platform as a Service (PaaS) provides a platform allowing customers to develop, run, and manage applications without the complexity of building and maintaining infrastructure.

Key Characteristics of PaaS

- Offers a ready-to-use development environment.

- Includes OS, databases, web servers, and tools.
- Developers only manage their code and data.

Examples of PaaS

- Google App Engine
- Microsoft Azure App Service
- Heroku

Benefits of PaaS

- **Faster Development:** Ready-to-use tools and services.
- **Focus on Code:** No need to manage hardware or OS.
- **Integration:** Built-in support for databases, messaging systems, etc.
- **Collaboration:** Multiple developers can work easily on the same app.



SaaS – Software as a Service

Software as a Service (SaaS) delivers software applications over the internet, on a subscription or pay-per-use basis. Everything is managed by the provider including applications, data, runtime, and infrastructure.

Key Characteristics of SaaS

- Accessible via web browser.
- No installation or maintenance needed.
- Centralized management and updates.

Examples of SaaS

- Gmail
- Microsoft 365
- Dropbox
- Salesforce

Benefits of SaaS

- **Easy Access:** Use from any device with internet.
- **No Maintenance:** Updates and infrastructure handled by provider.
- **Scalable:** Add/remove users easily.
- **Low Entry Cost:** Subscription-based with minimal upfront cost.

