

Functioning of Cloud Computing, Cloud Architecture, Cloud Storage, Cloud Services – SaaS, IaaS, PaaS, DaaS and VDI etc.

Functioning of Cloud Computing

1. Infrastructure as a service (IaaS) and platform as a service (PaaS)
2. Private cloud and hybrid cloud
3. Test and development
4. Big data analytics
5. File storage
6. Disaster recovery
7. Backup

Cloud Computing Architecture

Cloud Computing is an emerging technology which is skyrocketing nowadays. This technology is often used by big companies as well as the startups as it is flexible for both. Every company is in need to store the data so they require cloud to store their information. The data is secured and can access anytime and from anywhere.

Cloud Computing architecture basically comprises of the two parts. They are the front-end and the back-end. The front end is the end which uses by the user and the back-end manages by the host. Both the end connects to each other with the means of internet.

Front End

- The front end is the side of computer user or client.
- It involves the interfaces and the applications that are necessary to access the Cloud Computing system.

Back End

- The back end is the cloud section of the system.
- It involves all the resources which are necessary to give Cloud computing services.
- It includes huge data storage, virtual machines, security mechanism, services, deployment models, servers etc.
- To give built-in security mechanism, traffic control and protocols is the responsibility of the back end.

Components of Cloud Computing Architecture

There are the following components of cloud computing architecture -

1. Client Infrastructure

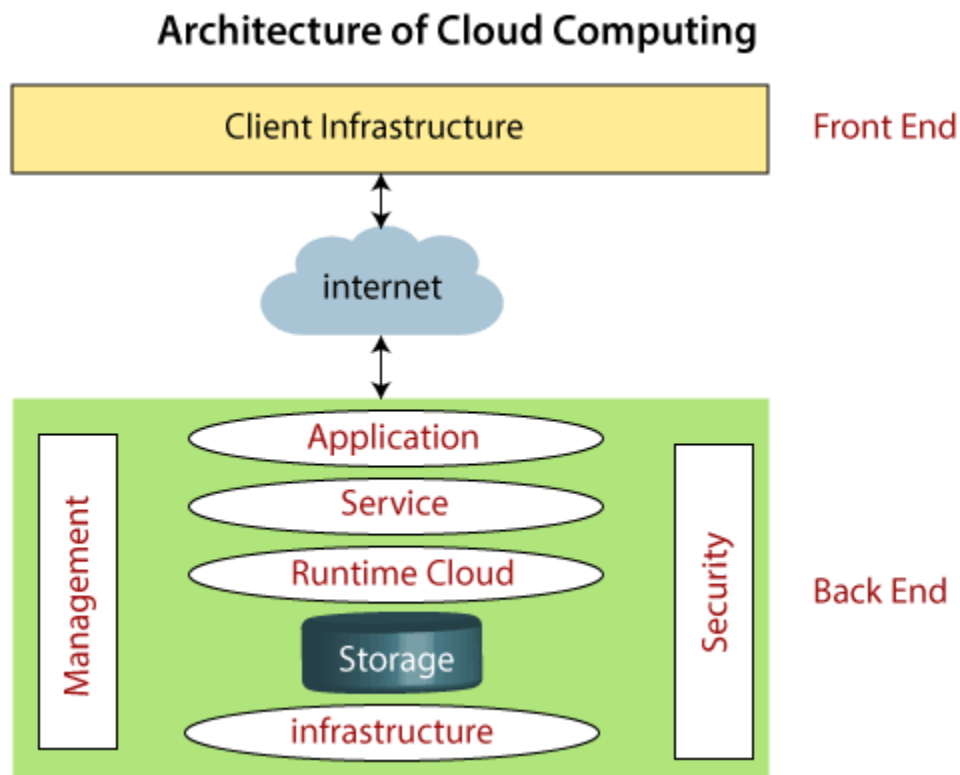
Client Infrastructure is a Front end component. It provides GUI (Graphical User Interface) to interact with the cloud.

2. Application

The application may be any software or platform that a client wants to access.

3. Service

A Cloud Services manages that which type of service you access according to the client's requirement.



Cloud storage

Cloud storage service, construct to produce applications, services and organizations with access to offsite storage capability that may provision instantly are versatile in scaling automatically at runtime and is globally accessible. An Infrastructure as a Service (IaaS) service model delivers scalable, flexible and redundant storage capability through net services API, online interfaces and thin client applications.

Cloud Storage also benefits the user by providing remote access with the help of internet. The storage services are very quick to access. Cloud information is often held on, altered and retrieved from a remote cloud storage server over the web below a utility computing model.

Cloud storage is a service which enables saving the data on offside storage system. This data is managed by third-party. This data is accessible by a web services API.

Storage Devices

Following are the categories of storage devices:

1) Block Storage Devices – This type of devices provide raw storage to the clients. This raw storage is separated for creating volumes. A volume is a recognizable unit of data storage.

2) File Storage Devices – The file storage devices are provided to the client in the form of files for maintaining its file system. Storage data is accessed using the Network File System(NFS).

Storage Classes of cloud

Following are the categories of storage classes:

1) Unmanaged Cloud Storage

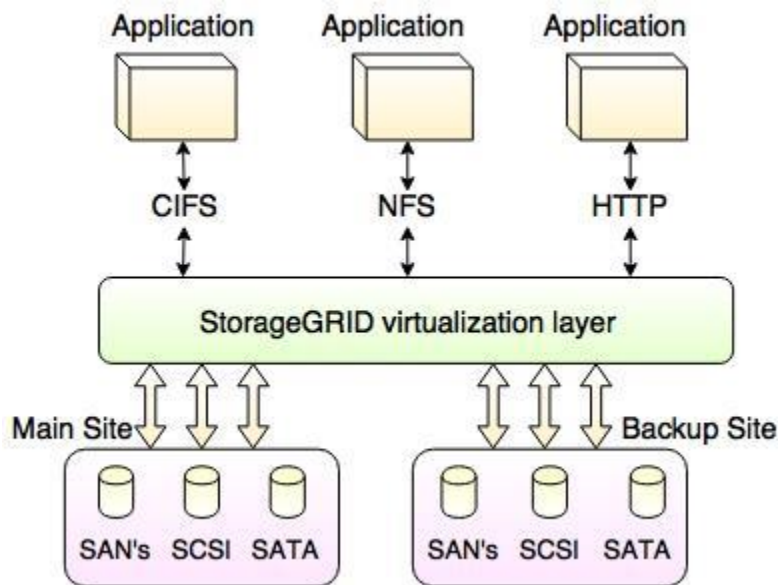
- The storage is preconfigured for the customer, this is known as **unmanaged cloud storage**.
- The customer cannot format or install his own file system or change drive properties.

2) Managed Cloud Storage

- Managed cloud storage provides the online storage space on-demand.
- This system shows the user like raw disk that the user can partition and format.

Creating cloud storage System

- The cloud storage system stores many copies of data on many servers at the various locations.
- The data is stored at various locations so that if one system fails it can change the pointer location to where the object is stored.
- The cloud provider uses the virtualization software to aggregate the storage assets into cloud storage system. This system is called as **StorageGRID**.
- StorageGRID creates a virtualization layer which fetches storage from various storage devices into a single management system.
- It manages the data from CIFS and NFS file system over the Internet.



Above diagram shows how the StorageGRID virtualizes the storage into storage cloud.

Cloud Services

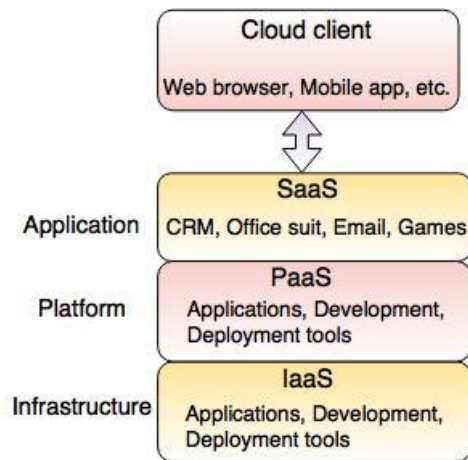


Fig. - Categories of Cloud Computing

1) Software-as-a-Service (SaaS)

- SaaS is known as '**On-Demand Software**'.
- It is a software distribution model. In this model, the applications are hosted by a cloud service provider and publicized to the customers over internet.
- In SaaS, associated data and software are hosted centrally on the cloud server.
- User can access SaaS by using a thin client through a web browser.
- CRM, Office Suite, Email, games, etc. are the software applications which are provided as a service through Internet.
- The companies like Google, Microsoft provide their applications as a service to the end users.

Advantages of SaaS

- SaaS is easy to buy because the pricing of SaaS is based on monthly or annual fee and it allows the organizations to access business functionalities at a small cost, which is less than licensed applications.
- SaaS needed less hardware, because the software is hosted remotely, hence organizations do not need to invest in additional hardware.
- Less maintenance cost is required for SaaS and do not require special software or hardware versions.

Disadvantages of SaaS

- SaaS applications are totally dependent on Internet connection. They are not usable without Internet connection.
- It is difficult to switch amongst the SaaS vendors.

2) Platform-as-a-Service (PaaS)

- PaaS is a programming platform for developers. This platform is generated for the programmers to create, test, run and manage the applications.
- A developer can easily write the application and deploy it directly into PaaS layer.
- PaaS gives the runtime environment for application development and deployment tools.
- Google Apps Engine(GAE), Windows Azure, Salesforce.com are the examples of PaaS.

Advantages of PaaS

- PaaS is easier to develop. Developer can concentrate on the development and innovation without worrying about the infrastructure.
- In PaaS, developer only requires a PC and an Internet connection to start building applications.

Disadvantages of PaaS

- One developer can write the applications as per the platform provided by PaaS vendor hence the moving the application to another PaaS vendor is a problem.

3) Infrastructure-as-a-Service (IaaS)

- IaaS is a way to deliver a cloud computing infrastructure like server, storage, network and operating system.
- The customers can access these resources over cloud computing platform i.e Internet as an on-demand service.
- In IaaS, you buy complete resources rather than purchasing server, software, datacenter space or network equipment.
- IaaS was earlier called as Hardware as a Service(HaaS). It is a Cloud computing platform based model.
- HaaS differs from IaaS in the way that users have the bare hardware on which they can deploy their own infrastructure using most appropriate software.

Advantages of IaaS

- In IaaS, user can dynamically choose a CPU, memory storage configuration according to need.
- Users can easily access the vast computing power available on IaaS Cloud platform.

Disadvantages of IaaS

- IaaS cloud computing platform model is dependent on availability of Internet and virtualization services.

Desktop as a Service (DaaS)

With DaaS, clients get a virtual desktop and the provider provides all back-end services that would have usually been provided by application software. Some of the advantages of DaaS include:

- Migration to another platform is easy
- DaaS is easy to use compared to other models
- The DaaS service is highly personalized and customizable

DaaS is ideal for small organizations that have limited resources, but still find cloud computing necessary. It may, however, not be the right fit for larger corporations looking for a more involved IT infrastructure. Such companies would be better off using IaaS or the **Private Cloud** which is more suited to a larger corporation's needs.

VDI

Virtual desktop infrastructure (VDI) has been around for a long time and traditionally was the only way to run a virtual desktop. Slap a server in the datacenter, load it up with virtualization software, turn on some machines, and you're good to go.

Since VDIs are centrally located the IT team is responsible for managing them. That means the hardware, software, licensing, and deployment are all handled in-house. Latency is minimal, the IT department has complete control, and even if access to the internet goes out work can still get done. But that's not to say VDI doesn't have its drawbacks. While it's convenient to manage hardware and software internally VDI systems require dedicated IT staff to handle all possible contingencies. Hardware failure, software issues, and anything else that could go wrong has to be handled in-house, and that can get expensive.