

Unit-III

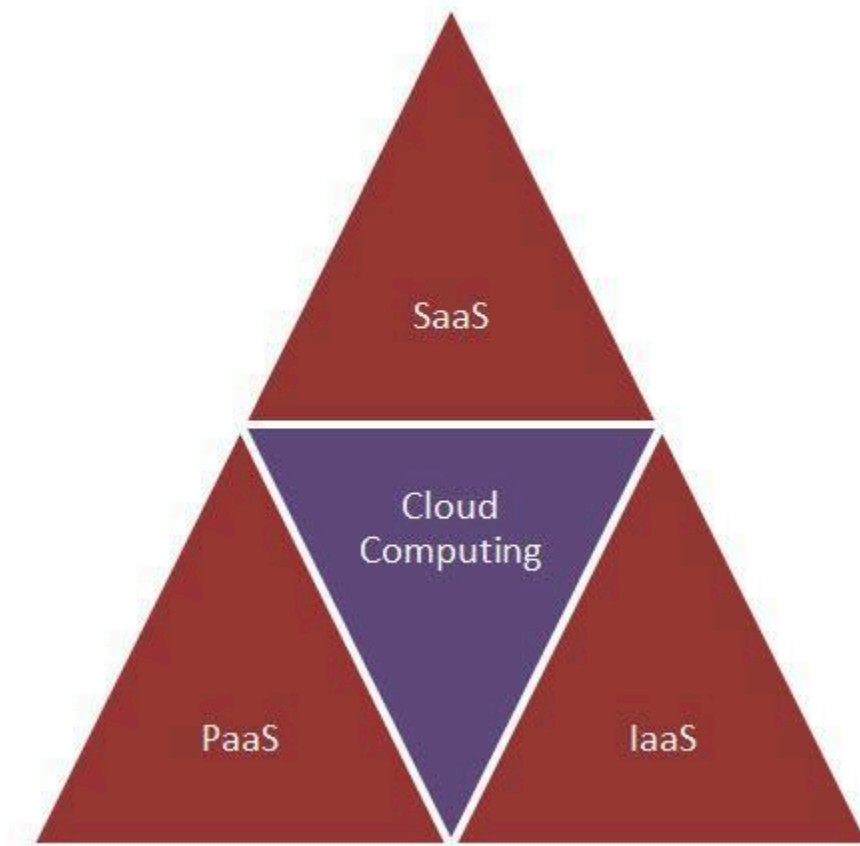
Cloud Service Models and Cloud Deployment Models

1-Cloud Service Models

There are the following three types of cloud service models -

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

Different business use some or all of these components according to their requirement.



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

Software as a Service enables the user to use the deployed applications running on the cloud infrastructure. The consumer is not responsible for managing the underlying infrastructure and the applications. SaaS or software as a service is a software distribution model in which

applications are hosted by a vendor or service provider and made available to customers over a network (internet). SaaS is becoming an increasingly prevalent delivery model as underlying technologies that supports **Service Oriented Architecture (SOA) or Web Services**. Through internet this service is available to users anywhere in the world.



Traditionally, software application needed to be purchased upfront & then installed it onto your computer. SaaS users on the other hand, instead of purchasing the software subscribes to it, usually on monthly basis via internet.

Anyone who needs an access to a particular piece of software can be subscribe as a user, whether it is one or two people or every thousands of employees in a corporation. SaaS is compatible with all internet enabled devices.

Many important tasks like accounting, sales, invoicing and planning all can be performed using SaaS.

SaaS is also known as "**on-demand software**". It is a software in which the applications are hosted by a cloud service provider. Users can access these applications with the help of internet connection and web browser.

Characteristics of SaaS

There are the following characteristics of SaaS -

- Managed from a central location
- Hosted on a remote server
- Accessible over the internet
- Users are not responsible for hardware and software updates. Updates are applied automatically.
- The services are purchased on the pay-as-per-use basis

Example: BigCommerce, Google Apps, Salesforce, Dropbox, ZenDesk, Cisco WebEx, ZenDesk, Slack, and GoToMeeting.

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

Platform as a Service allows the consumer to deploy applications on the cloud infrastructure. A consumer is not responsible for the underlying cloud infrastructure.

Platform as a service, is referred as PaaS, it provides a platform and environment to allow developers to build applications and services. This service is hosted in the cloud and accessed by the users via internet.

To understand in a simple terms, let compare this with painting a picture, where you are provided with paint colors, different paint brushes and paper by your school teacher and you just have to draw a beautiful picture using those tools.

Platform Computing can be compared to your painting class where the teacher gives you paints, brushes etc as a platform to create your painting



PaaS services are constantly updated & new features added. Software developers, web developers and business can benefit from PaaS. It provides platform to support application development. It includes software support and management services, storage, networking, deploying, testing, collaborating, hosting and maintaining applications.

PaaS cloud computing platform is created for the programmer to develop, test, run, and manage the applications.

Characteristics of PaaS

There are the following characteristics of PaaS -

- Accessible to various users via the same development application.
- Integrates with web services and databases.
- Builds on virtualization technology, so resources can easily be scaled up or down as per the organization's need.
- Support multiple languages and frameworks.
- Provides an ability to "**Auto-scale**".

Example: AWS Elastic Beanstalk, Windows Azure, Heroku, Force.com, Google App Engine, Apache Stratos, Magento Commerce Cloud, and OpenShift.

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

Infrastructure as a Service provides virtual computing resources such as storage, server, virtual machines and network over the internet. A third party provider provides this infrastructure to the consumer.

IaaS (Infrastructure As A Service) is one of the fundamental service model of cloud computing alongside PaaS(Platform as a Service). It provides access to computing resources in a virtualized environment “the cloud” on internet. It provides computing infrastructure like virtual server space, network connections, bandwidth, load balancers and IP addresses. The pool of hardware resource is extracted from multiple servers and networks usually distributed across numerous data centers. This provides redundancy and reliability to IaaS.



IaaS(Infrastructure as a service) is a complete package for computing. For small scale businesses who are looking for cutting cost on IT infrastructure, IaaS is one of the solutions. Annually a lot of money is spent in maintenance and buying new components like hard-drives, network connections, external storage device etc. which a business owner could have saved for other expenses by using IaaS.

Characteristics of IaaS

There are the following characteristics of IaaS -

- Resources are available as a service
- Services are highly scalable
- Dynamic and flexible
- GUI and API-based access

- Automated administrative tasks

Example: DigitalOcean, Linode, Amazon Web Services (AWS), Microsoft Azure, Google Compute Engine (GCE), Rackspace, and Cisco Metacloud.

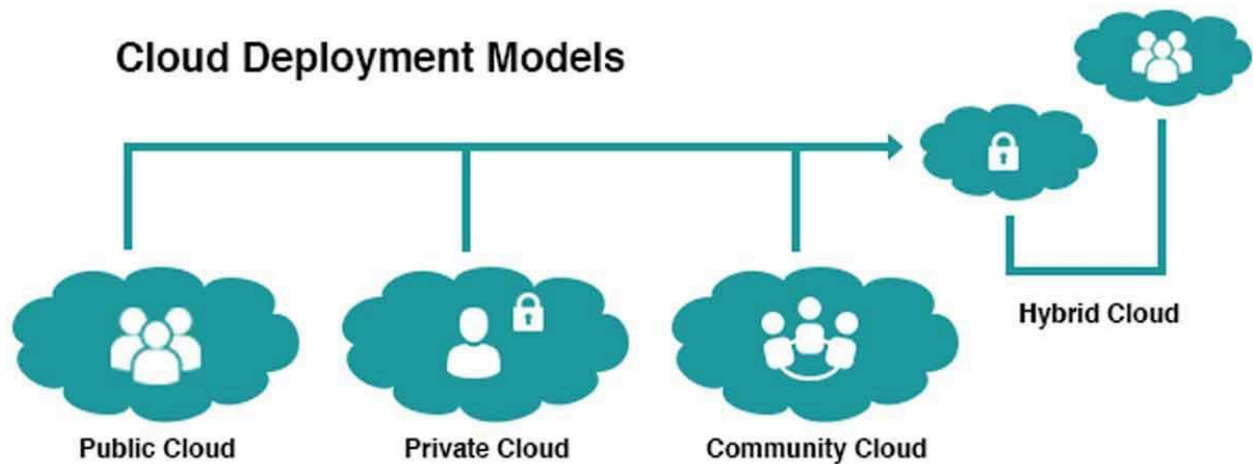
Difference between IaaS, PaaS, and SaaS

The below table shows the difference between IaaS, PaaS, and SaaS –

IaaS	PaaS	SaaS
It provides a virtual data center to store information and create platforms for app development, testing, and deployment.	It provides virtual platforms and tools to create, test, and deploy apps.	It provides web software and apps to complete business tasks.
It provides access to resources such as virtual machines, virtual storage, etc.	It provides runtime environments and deployment tools for applications.	It provides software as a service to the end-users.
It is used by network architects.	It is used by developers.	It is used by end users.
IaaS provides Infrastructure.	only PaaS provides Infrastructure+Platform.	SaaS provides Infrastructure+Platform+Software.

2-Cloud Deployment model:

A cloud deployment model **represents a specific type of cloud environment**, primarily distinguished by ownership, size, and access. There are four common cloud deployment models: Public Clouds; Community Clouds; Private Clouds; and Hybrid Clouds.



1. Public Cloud

As the name suggests, this type of cloud is generally hosted for the client/ users which can access the cloud services very easily. The public cloud is better suited under commercial purposes for load management. This type of cloud is economical due to the very low cost of their services. IBM, Google, Amazon, Microsoft, etc. are examples of companies offering public cloud installations.

The **public cloud** allows systems and services to be easily accessible to the general public. Public cloud may be less secure because of its openness.

2. Private Cloud

As the name suggests this type of cloud is generally hosted on the enterprise's premises. The idea of this type of cloud came into the picture because many of the organization is having concerns regarding security issues of the public cloud. So they came up with the idea of a private cloud, which is under the control of only specific executives. This type of cloud is also termed as corporate or internal.

The **private cloud** allows systems and services to be accessible within an organization. It is more secured because of its private nature.

3. Community Cloud

The **community cloud** allows systems and services to be accessible by a group of organizations.

This type of cloud is very much similar to the private cloud, unlike private cloud this type of cloud is used and maintained by the group of organization that requires similar types of services.

Since organizations have consistent security, privacy, and performance requirements, this multi-tenant data center architecture helps organizations achieve their specific goals. A community model is therefore particularly suitable for organizations working on joint projects. In this case, a central cloud facilitates the development, management, and implementation of the project. In addition, all users share the costs.

4. Hybrid Cloud

The **hybrid cloud** is a mixture of public and private cloud, in which the critical activities are performed using private cloud while the non-critical activities are performed using public cloud.

This type of cloud is simply the combination of two or more cloud servers, i.e. private, public or community combined in a single architecture, but which remains a single individual unit. This configuration is commonly used by large companies. Important data is generally preferred in a private cloud and public domain support services, such as search, email, blogs, CRM, etc.

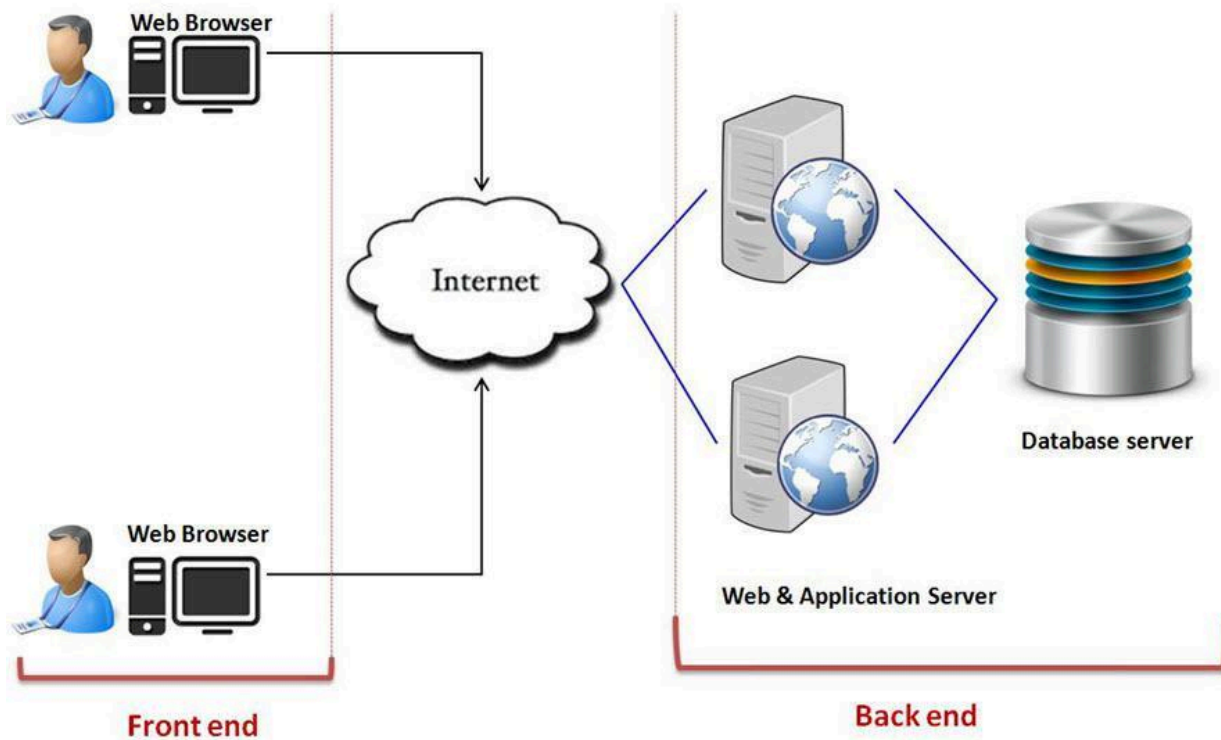
Difference between deployment models and service models:

Cloud deployment models describe the way in which resources are provided in the cloud. The deployment model based on the IaaS and the PaaS service model is called the public cloud. A public cloud is an offer from a service provider (for example, Microsoft Azure), that can be accessed by the public.

What is Cloud Computing Architecture?

Cloud Computing Architecture is a combination of components required for a Cloud Computing service. A Cloud computing architecture consists of several components like a front-end platform, a back-end platform or servers, a network or internet service, and a cloud based delivery service.

Let's have a look into Cloud Computing and see what Cloud Computing is made of. Cloud computing comprises of two components front end and back end. Front end consist client part of cloud computing system. It comprise of interfaces and applications that are required to access the Cloud Computing or Cloud Programming platform.



While back end refers to the cloud itself, it comprises of the resources that are required for cloud computing services. It consists of virtual machines, servers, data storage, security mechanism etc. It is under providers control.

Cloud computing distributes the file system that spreads over multiple hard disks and machines. Data is never stored in one place only and in case one unit fails the other will take over automatically. The user disk space is allocated on the distributed file system, while another important component is algorithm for resource allocation. Cloud computing is a strong distributed environment and it heavily depends upon strong algorithm.