



## INTRODUCTION TO CLOUD COMPUTING

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### ABSTRACT

In today's era every organization wants to implement Cloud Computing to fulfill their needs of computing. The Cloud computing is a fastest growing area in every sector like IT industry, Government organizations etc. The Cloud computing emerges as a new computing paradigm which aims to provide computation, software, data access, and storage services that do not require end-user knowledge of the physical location and configuration of the system that delivers the services. The intent of this paper is to have a review on cloud computing, its working, its use in various sectors, deployment models and services.

### Keywords

Cloud computing, Working, Services, Deployment models, Business sector, Requirements.



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## Introduction

Cloud Computing has become IT industry buzz word: in which users store or move out their data to “Cloud” and then access them in pervasive ways. Storing the data online rather than storing on home computer or on laptop makes the use of cloud computing service. Cloud computing refers to the delivery of computing resources over the internet. Instead of saving the data on our hard-drive, we can use this service over the internet known as cloud computing to store the data online. We can use the cloud computing in our daily life also . We may experience that some of the cloud computing services will make our life easier as long as we explore the services.

## Cloud Computing

Cloud computing is a type of computing that relies on sharing the computing resources rather than having the local servers or personal devices to handle applications. In cloud computing, the word cloud is used as a metaphor for "the Internet," so the phrase *cloud computing* means "a type of Internet-based computing," where different services — such as servers, storage and applications — are delivered to an organization's computers and devices through the Internet [1]. Cloud service is also very useful in our personal and professional life as we can use the same in our business. Online business applications is the biggest example . This model allows to access the information and computer resources from anywhere where network connection is available. When you create a document with application softwares like notepad ,MS-Word etc. ,these softwares that reside on your computer and saves this document in your email ,then you will be able to access that same data online if internet access is there.

## How Cloud Computing works?

To understand exactly how cloud computing works, let's consider that the cloud consists of layers -mainly the back end layers and the front end layers. The front layers are the parts you see and interact with. When you access your profile on your Gmail account for example, you are using software running on the front end of the cloud. The back end consists of the hardware and the software architecture that delivers the data you see on the front end.

Because the computers are set up to work together, the applications can take advantage of all that computing power as if they were running on one particular machine. Cloud computing also allows for a lot of flexibility. Depending on the demand, you can increase how much of the cloud resources you use without the need for assigning specific hardware for the job, or just reduce the amount of resources assigned to you when they are not necessary[2].

## Cloud computing services

Depending upon the requirements ,cloud computing services are deployed. There are three types of cloud computing services that you can subscribe to: Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS).

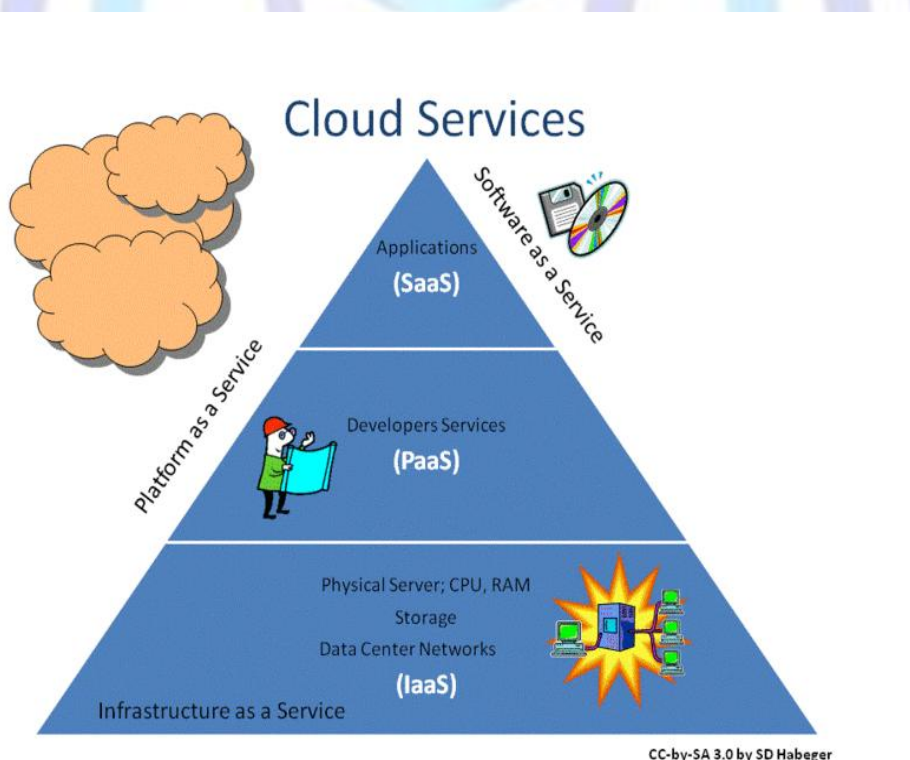
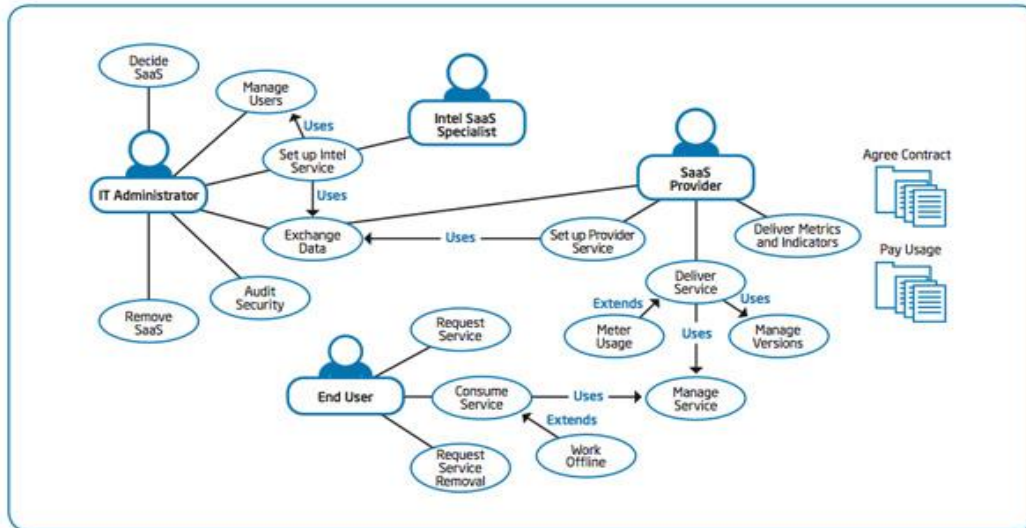


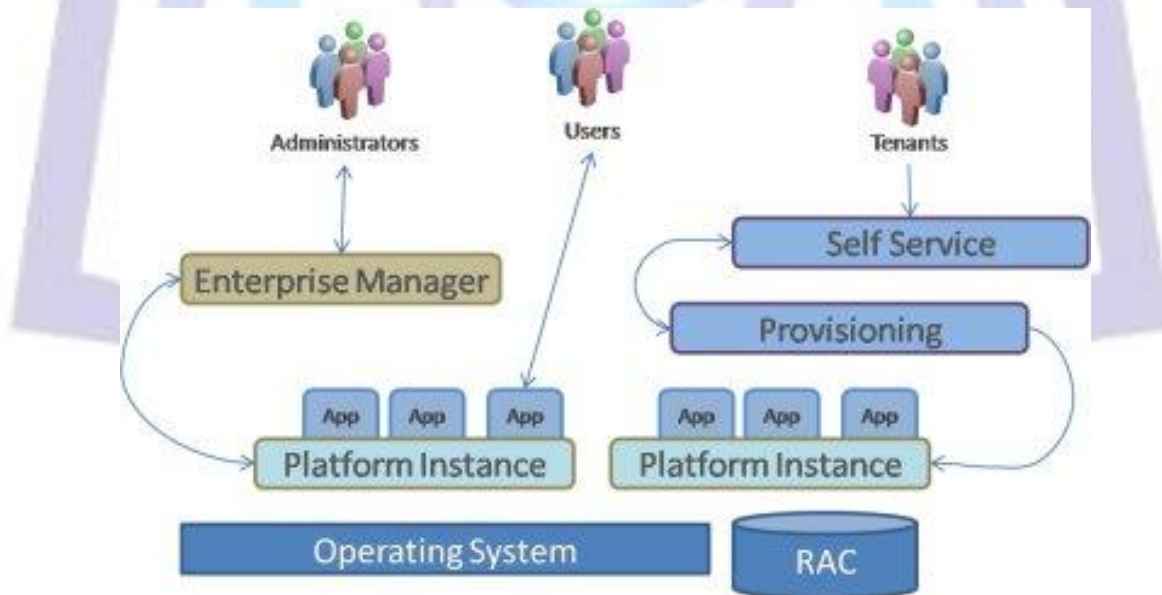
Fig 1.Cloud Computing Service models

- SaaS-** At the highest level is Software as a Service. SaaS delivers an application to a consumer or business user through a web browser client. The business logic and data for the application run on a server living somewhere on the network, not through an application running on the user's computer. The software is normally sold to the end user via a subscription, as opposed to a one time, upfront license fee[3]. The services on the application layer can be seen as an extension of the ASP (application service provider) model, in which an application is run, maintained, and supported by a service vendor[5].Figure 2 shows Software as a service stack.



**Fig2. Software as a service stack for enterprise**

- PaaS-PaaS** is a middleware layer which provides dynamic scalability, database backups. Platform as a service is another model which also supplies all the resources required to develop the applications and services completely over the internet without having any requirement of installing or downloading the software. PaaS is also known as a Cloudware [6].PaaS makes the use of dedicated APIs. Platform as a Service offers a general support of specific set of programming languages, computing, storage infrastructure and also development platform layer. One popular Platform-as-a-Service is the Google app engine



**Fig3.Platform as a Software Stack**

- IaaS-** Infrastructure as a service is one of the fundamental service models of cloud computing alongside SaaS and PaaS. It is also known as Resource Clouds and it provides organizations with computing resources along with servers, networking, storage and data centre space on pay per use basis. Using this service model, you manage your applications, data, operating system, middleware and runtime. The service provider manages your virtualization, servers, networking and storage. This allows you to avoid expenditure on hardware and human capital; reduce your ROI risk; and streamline and automate scaling[4].Below figure shows the infrastructure as a service stack



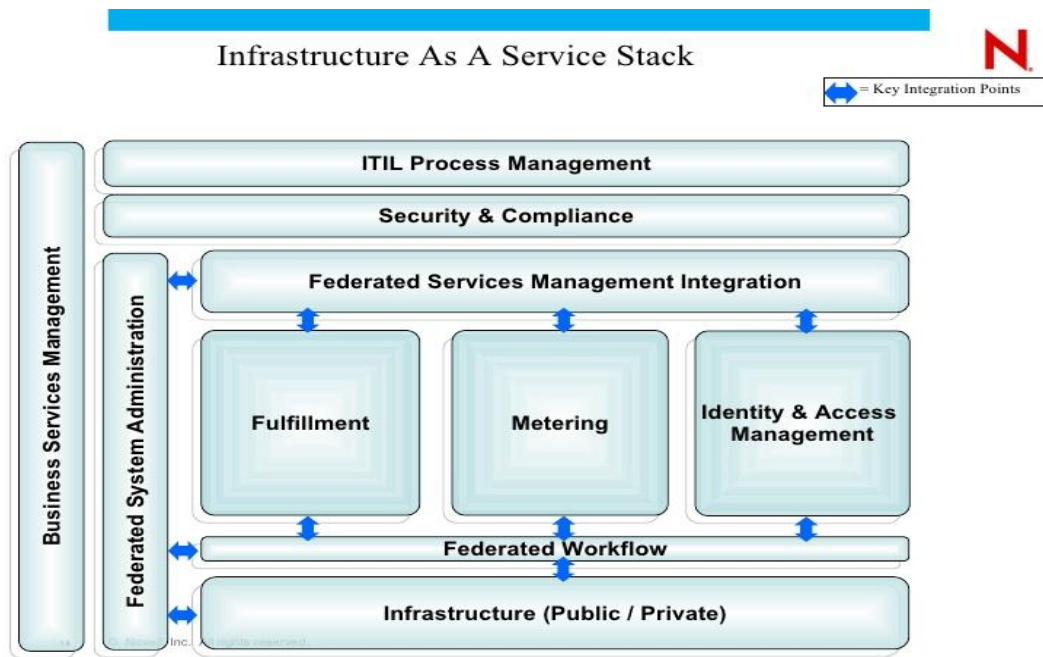


Fig4. Infrastructure as service stack

### Cloud Computing Deployment Models

A large pool of resources are connected with the help of cloud computing technology. This technology simplifies the infrastructure and provides dynamic scalability for data and files storage. There are four different deployment models of cloud computing with special characteristics that one can use in his organization according to his needs.

1. **Public cloud**-A public cloud is a cloud computing model in which services and infrastructure are provided to various clients. Examples of public clouds are Google cloud, Google App Engine. This service is provided by vendor as free of charge or on pay per user license policy. This is best suited for business requirements. This model helps to reduce capital expenditure and bring down operational IT costs[7].
2. **Private cloud**-A private cloud is a cloud computing in which IT resources are provided to only one customer or dedicated to one organization which is thus not shared between different organizations. Security is a key purpose for using private clouds. Private Cloud may be hosted exclusively in the data center of an external provider, then referred to as outsourced Private Cloud.
3. **Hybrid cloud**-A hybrid cloud is a cloud environment comprised of two or more different cloud deployment models. Hybrid deployment architectures can be complex and challenging to create and maintain due to the potential disparity in cloud environments and the fact that management responsibilities are typically split between the private cloud provider organization and the public cloud provider[8].
4. **Community cloud**-In this Community model, cloud service model is shared by several organizations whose access is limited to a specific community. This community model helps to further reduce costs as compared to private clouds. The main goal of this model is to show the benefits of a public cloud with the added level of privacy, security, and policy compliance usually associated with a private cloud. Community clouds can be either on-premise or off-premise.

### Types of Cloud Deployment Models

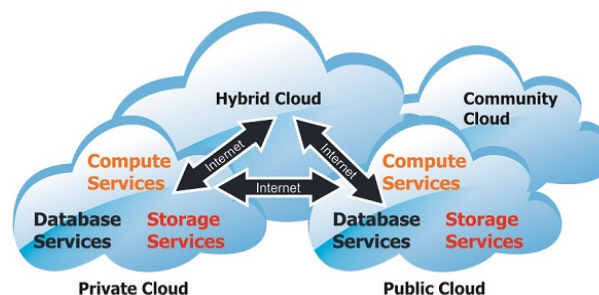


Fig5. Types of Cloud Deployment Models



## Cloud Computing in Business

As we have discussed that cloud computing is playing a vital role in business sector in today's era. There are some of the benefits of this technology for which it is used in business sector.

**1. Ease of use**-Saving and accessing the number of files on the Cloud is easy that makes an attractive option for business owners. With saving the files online data is always secured.

**2. File Storage**-Business sector is emerging as small businesses are using their images, audio, video to enhance their marketing activities. These files take space when stored on hard-disk which can be costly. The Cloud allows you to shift the storage of large files off of your local system, saving local storage for the files you need to access every day.

**3. Choice of applications.** This allows flexibility for cloud users to experiment and choose the best option for their needs. Cloud computing also allows a business to use, access and pay only for what they use, with a fast implementation time[9].

**4. Flexibility**-Cloud computing provides flexibility by allowing users to switch applications easily and fastly. Employers can provide the specific rights to different employees according to their designation or responsibilities.

**5. Productivity**-Increased productivity is the second main reason for using cloud computing. It provides a more productive environment for collaborative working, and improves productivity by enabling participants in a business ecosystem to share processing logic.

**6. Quality**-The main reason for using cloud computing is that it provides better quality IT. But that depends from one enterprise to another: an enterprise with an inefficient IT department is likely to find cloud a more attractive proposition than one whose IT department provides a superb service.

**7. New Business Opportunities**-Cloud Computing provides new opportunities in business by giving provision of added services.

## Cloud Requirements

It requires a lot of skills to identify the cloud requirements. Firstly the elements are identified for a specific cloud system with its structure in the system. After then user's desire capabilities and functions are translated into proposed cloud computing system. Moreover there should be proper procedure to understand what the customer wants, analyzing them, evaluating feasibility, specifying the solution, validating the specification and managing the requirement as it is transformed into an operational system. Requirements in cloud are classified into three parts.

**1. Basic Requirement**-The basic requirement for this cloud computing are data security, portability, elasticity, manageability, federated system. Having a federated system helps customers to move their data/applications across different cloud service providers and prevents customer locking.

**2. Content Requirement**-This requirement includes what would be the location of the data server, how the workloads will be balanced, the security of data. A consumer should only pay for those services that they consume.

**3. Operational Requirement**-This requirement includes the availability of data that it should always be available, maintenance of data, interoperability of clouds. Interoperability of applications across different cloud services has led to creations of standard APIs.

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