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## A Survey on Cloud Computing

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**Abstract:** Nowadays as Computing technology plays an important role in internet of services. Cloud Computing is referred to a most recent emerging paradigm of computing utilities. In this paper we provide an introduction to cloud computing, several cloud service models and deployment models. It also explore about the characteristics, challenges of cloud computing.

**Keywords:** Cloud Computing, Cloud Service models, Cloud deployment models, Characteristics

### I. INTRODUCTION

As cloud computing is the newest term for the long-dreamed vision of computing utilities. The cloud provides on-demand network access to a centralized pool of configurable computing resources that can be rapidly provisioned and released with minimal management effort or service provider interaction. Nowadays Cloud computing is rapidly changing the internet service enabling the small organization to build mobile application for users. Cloud computing is a significant advancement in the delivery of information technology and services. Cloud computing builds off a foundation of technologies such as grid computing, which includes clustering, server virtualization and dynamic provisioning, as well as SOA shared services and large-scale management automation. Cloud computing is referred to a model of network computing where program or application runs on a connected servers rather than on a local computing device. Cloud computing relies on sharing of resources to achieve coherence. By this cloud computing is the broader concept of converged infrastructure and shared services.

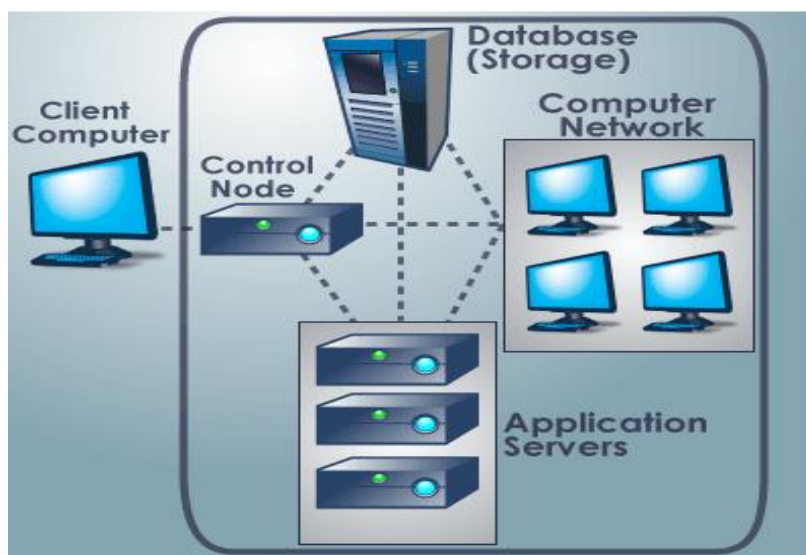


Fig 1: Cloud Computing

### II. CHARACTERISTICS OF CLOUD COMPUTING

A cloud computing technology is quite often used these days as it is an emerging term of computing utilities. Cloud options are enticing various industries across the board to know its importance characteristics and software offerings. The main characteristics that cloud computing offers today are:

- i) **On-demand self service:** Provision computing capabilities, computer service such as network, email, application. It also provision server service without requiring human interaction with each service provider.

- ii) **Broad network access:** Cloud capabilities are available over the network. It can access business management solution using their tablets, smart phone, laptops, and office computers. Network access includes private cloud that operates within a company's firewall, public clouds or a hybrid cloud.
- iii) **Resource pooling:** The provider's computing resource are pooled to serve multiple consumers using a multi tenant model, with different physical and virtual resources dynamically assigned and reassigned according to the consumer demand. The cloud enables to enter and use data within the business management software hosted in the cloud at a same time, at any time and from any location.
- iv) **Rapid elasticity:** The cloud is flexible and scalable to submit needs. The capacity and can be shrinked very quickly. The self service and resource pooling make rapid elasticity possible. The service provider can automatically allocate more or less resources from the available pool.
- v) **Measured service:** cloud computing resource usage can be measured, controlled, and reported providing transparency. Cloud systems automatically control and optimize resource use.

### III. CLOUD SERVICE MODEL

Cloud computing is a term that describes a broad range of services. Since the cloud is a collection of services, organizations choose where, when, and how they use cloud computing.

In this paper we explain the three different types of service models:

1. Software as a Service (SaaS)
2. Platform as a Service (PaaS)
3. Infrastructure as a service (IaaS)

#### 1. Software as a Service (SaaS) model

SaaS is software that is developed over internet. It is a delivery model where the software and the associated data are hosted in a cloud environment by a third party such as Cloud Service Provider (CSP). It provides an application to customers either as a service on demand. It is mainly accessed through web portal and service oriented architecture based on some of the web service technologies.

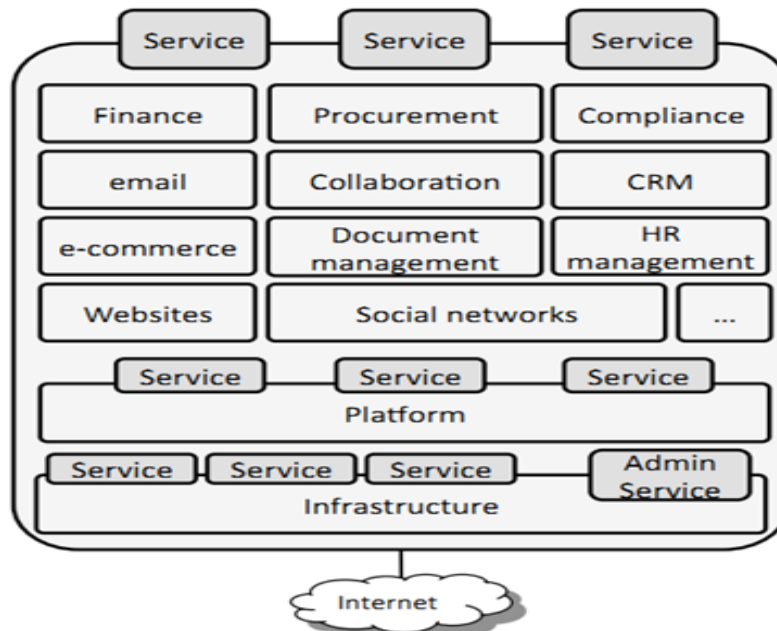


Fig 2: Software as a Service (SaaS) model architecture

#### 2. Platform as a Service (PaaS) model

Is a computing platform that allows creation of web applications easily without the complexity of maintaining the software. Is a delivery model where a CSP provides an online software development platform for an organization. It comprises the environment for developing and provisioning cloud applications. Cloud platform tend to represent a compromise between complexity and flexibility that allows applications to be implemented quickly and loaded in the cloud without much configuration.

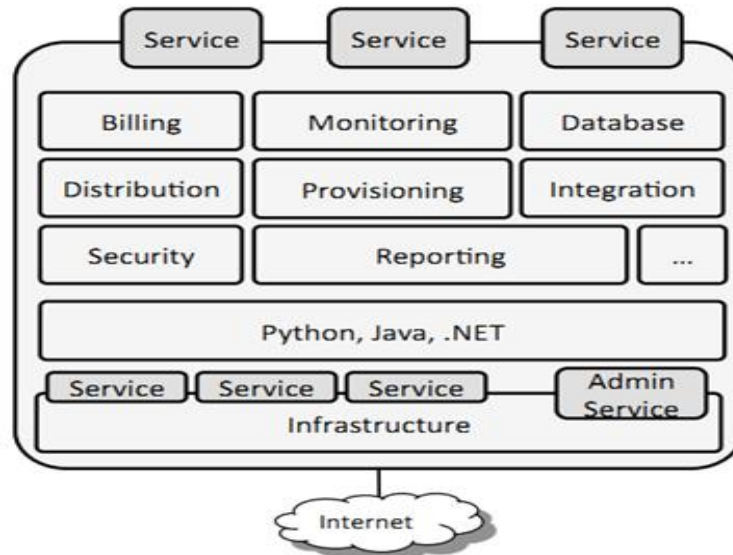


Fig 3: Platform as a Service (PaaS) model architecture

**3. Infrastructure as a Service (IaaS) model:** This model is used to access essential IT resources. These essential IT resources include services that are linked to resources of computing, data storage and the communications channel. It is a delivery model where CSP provide the necessary hardware and software upon which a customer can build a customized computing environment. This service model, manages an applications, data operating system, middleware and runtime. The service provider manages the virtualization, servers, networking and storage.

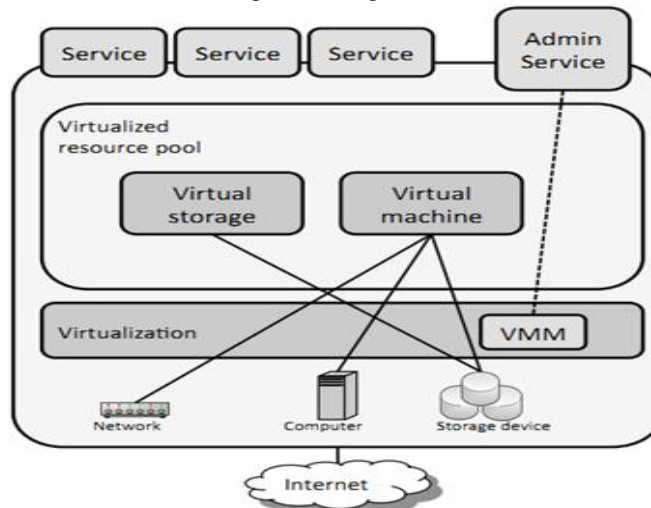


Fig 4: Infrastructure as a Service (IaaS) model architecture

Based on the particular needs these three service model can be used for different purpose. The below table shows combinations of these models depending on their particular needs

Service Model	Who Uses It	Available Services	Why Use It
SaaS	Members	Applications such as email, word processing and customer relation management tools	Complete business tasks typically performed locally on a computer
PaaS	Developers	Services to facilitate communication and monitoring	To run a cloud application for a particular platform
IaaS	IT Managers	Computing resources, data storage resources, and the communications channel.	Build a customized computing environment

Table 1: Cloud computing service models geared for different purpose

#### IV. CLOUD DEPLOYMENT MODEL

Depending on the organizational structure, the provisional location and also based on their specific business, operational, and technical requirements the cloud services can be deployed in different ways. Mainly there are four primary cloud deployment models they are:

1. Public Cloud
2. Private Cloud
3. Community Cloud
4. Hybrid Cloud

##### 1. Public Cloud

The public cloud deployment model represents true cloud hosting. In this model services are rendered over a network that is open for public use. Here service can be provided by a vendor free of charge or on the basis of a pay-per-user license policy. In this model cloud infrastructure is available to the general public and is owned by a third party cloud service provider (CSP). This model is best suited for business requirements, utilize interim infrastructure for developing and testing applications. It reduces capital expenditure and brings down operational IT costs.

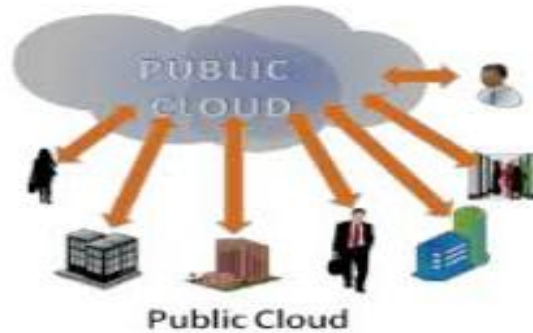


Fig 5: Public Cloud Deployment Model

##### 2. Private Cloud

A private cloud deployment model is owned by a single organization. In this model cloud infrastructure operated solely for a single organization, managed internally or by a third-party, and is hosted either internally or externally. Private cloud makes use of virtualization solutions and focus on consolidating distributed IT services often within data centers belonging to the company. In this model the enterprise retains full control over corporate data, security guidelines and system performance.



Fig 6: Private Cloud Deployment Model

##### 3. Community Cloud

In this model organizations with similar requirements share a cloud infrastructure. In this model cloud infrastructure is procured jointly by several agencies or programs that share specific needs such as security, compliance, or jurisdiction. It is a generalization of a private cloud, as private cloud is being accessible by one certain organization. The CSP manage community cloud. This model helps to reduce costs as compared to a private cloud.



Fig 7: Community Cloud Deployment Model

#### 4. Hybrid Cloud

Hybrid cloud is a composition of two or more clouds that remain distinct entities but are bound together, offering the benefits of multiple deployment models. Hybrid cloud can also mean the ability to connect collocation, manage dedicated services with cloud resources. Hybrid deployment models are complex and require careful planning to execute and manage especially when communication between two different cloud deployments is necessary.

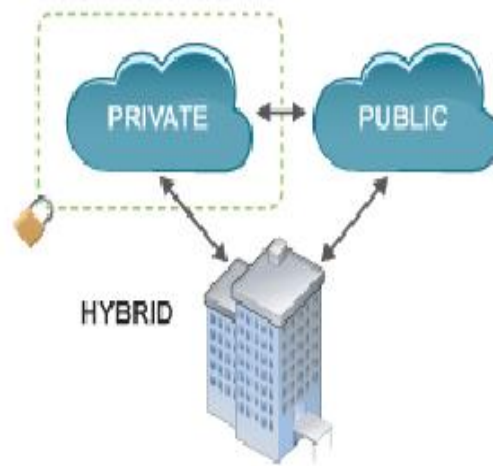


Fig 8: Hybrid Cloud Deployment Model

#### V. CLOUD COMPUTING CHALLENGES

Cloud computing A cloud computing is emerged as an important solution offering enterprises a cost effective model to ease their computing needs. Because of this emergence technologies, cloud computing has placed many challenges in different aspects. Some of these challenges are:

- ✚ **Security and Privacy:** This aims to provide data security protection through cloud. This security and privacy issues can be overcome by employing encryption, security hardware and security application.
- ✚ **Portability:** It is the ability to move applications and its associated data between one cloud provider and another or between public and private cloud environments.
- ✚ **Interoperability:** Application on one platform should be able to incorporate services from another platform. The incorporation is made possible through web services.
- ✚ **Computing Performance and Bandwidth Cost:** More money is spent for the bandwidth rather than that spent for the hardware. In order to deliver data intensive applications on cloud requires high network bandwidth, which results in high cost. If delivery of data is done at low bandwidth, then it does not meet the required computing performance of cloud application.

- ✦ **Reliability and Availability:** It is necessary for cloud systems to be reliable and robust because most of the businesses are now becoming dependent on services provided by third-party.

## VI. CONCLUSION

Cloud computing is a new paradigm of computing utilities that promises to provide more flexibility, less expense, and more efficiency in IT services to end users. Firstly this paper presents an introduction to cloud computing and discusses about characteristics of a cloud computing. Secondly focused on the different types of service models such (SaaS, PaaS, IaaS) used for specific application. Thirdly this paper presents how the cloud services can be deployed. Lastly about some of the key challenges of cloud computing.

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