

# Quality of Service in cloud computing

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**Abstract-** Cloud computing is the computing on rented system resources using internet technology. The various types of system resources (Hardware and software) are available on clouds. The cloud service providers make the provision of hardware and software resources for the cloud users. Cloud computing has many benefits including cost reduction and ease of use. The main features of cloud computing are elasticity, reliability, availability and virtualization. Quality of service means that the cloud resources must be delivered to the customers on demand and within time frames to minimize delay. The cloud users are increasing very fast; hence requirement of internet bandwidth is also increasing. It is the responsibility of cloud service provider to meet user's requirement. In this paper I will discuss the quality of services that are crucial in terms of cloud computing.

**Keywords-** Cloud computing, Quality of service, Cloud services

## I. INTRODUCTION

In cloud computing computer resources such as computer hardware, software, networks, database and computing time are provided on pay per use basis to the cloud users. In cloud computing the cloud user do not have direct access to cloud resources instead cloud resources are provided in form of services. Cloud computing is a technique or model in which all computer resources are made available to the user on pay per use basis. A cloud user can buy any computer resource as per his/her requirement for limited period of times. The cloud users can pay only how much resources are consumed by them and for how much time they have used them. Cloud can be deployed differently as per requirements of cloud users. The cloud deployment model can be categorized as private cloud, public cloud, community cloud and hybrid cloud. There are various services which are provided on cloud by cloud service provider such as Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), Network as a Service, Security as a Service (SaaS), Communication as a Service, etc.

### A. Cloud Deployment Models-

First I discuss the different types of cloud deployment models as follows:

#### ❖ *Public cloud-*

A public cloud is design in such a way that it is always available for public to meet their service demands. Anyone can buy cloud resources from this type of cloud. It differs from the public cloud in that all the cloud resources and applications are managed by the organization itself, similar to Intranet functionality. Use of services on the private cloud can be much more secure than that of the public cloud because of its specified internal exposure. Only the organization and designated stakeholders may have access to a specific Private cloud.

#### ❖ *Private cloud-*

A private cloud is designed for a specific organization to meet its requirements. In private cloud only the person of that organization can use private cloud and avail services available on private cloud. Shared infrastructure, remote hosting, and dynamic licensing and provisioning are strong attraction for a company. Public cloud implementation can be a big help in removing the problem of infrastructure maintenance by IT organizations.

#### ❖ *Community cloud-*

It can be think of residing somewhere between a private cloud and a public cloud, community cloud describes a shared infrastructure that is employed by and supported by multiple companies

#### ❖ *Hybrid cloud-*

A hybrid cloud is combination of two or more clouds. The participants of this cloud may private cloud, public cloud or community cloud. It is defined by NIST as "a composition of two or more

clouds (private, community, or public) that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability.

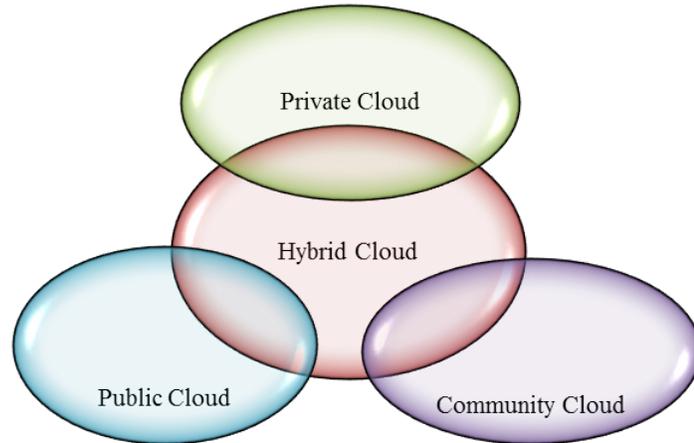


Figure 1. Cloud deployment models

*B. Cloud Service Model-*

❖ *Software as a Service (SaaS)-*

The application software are provided to the cloud user as a service in Software as a Service (SaaS). The cloud users buy the applications or software as per their requirements through this service model. This model allows customers to use applications available on the cloud. The customers have no control over system platform and infrastructure.

❖ *Platform as a Service (PaaS)-*

In these types of service model, platform is provided to cloud users so that cloud users can install and run their software on that platform. This type of model allows customers to use hosting environment including programming language, database, libraries, application tools, etc.

❖ *Infrastructure as a Service (IaaS)-*

In this type of service model infrastructure is provided to the cloud users so that the cloud users can use cloud's infrastructure. The cloud infrastructure includes processing power, network, storage etc. This service allow cloud customer to run and deploy their various software on cloud infrastructure. In this model customers have full control over application and infrastructure.

❖ *Security as a Service-*

In security as a service the security management of the organization is handled by cloud service provider. The cloud service provider is responsible to tackle all the threads and security issues of the organization which buy security as a service from cloud service provider.

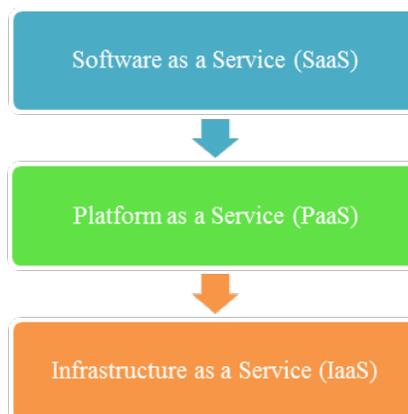


Figure 2. Cloud service models

## II. QUALITY OF SERVICE

Quality of service is the key feature of a cloud to maintain trust of cloud customers. The cloud users must obtain cloud services when required without delay. The users of the clouds are increasing day by day and hence this need a greater internet bandwidth. A cloud can host thousands of clients at any given time. These clients may have different types of services requirements which may involve different types of resources. Service level agreement (SLA) is an agreement between cloud vendor and cloud customer. SLA defines the quality of service which will be delivered to cloud customers. The cloud vendor must maintain the quality of service to maintain cloud customer needs. Availability, elasticity, scalability, performance and cost saving are the prime attributes of QoS defined in SLA. Parameters of QoS are as follows:

### A. Availability of cloud service–

*Availability can be defined as capacity of cloud to deliver services continuously without any interruption or delay.*

### B. Scalability of cloud service –

Scalability is the capacity of cloud to sustain if work load increases by making use of additional resources. Scalability is the ability of cloud to increase resources and up gradation of techniques to meet customer's requirements.

### C. Elasticity of Cloud –

Elasticity is the ability of the cloud to dynamically increase or decrease resources allotted to the cloud users as per their requirements. It allows cloud users to use cloud resources flexibly to save money.

### D. Security of cloud service –

Security in cloud concern at different levels such as security of infrastructure, security of platform and user's data stored at data centers.

### E. Cost –

It is to compare to check totally different costs of services as they provide variety of options and so have got several dimensions. However, an equivalent supplier offers completely various Virtual Machines that can meet users' requirements.

### F. Confidentiality–

The information of cloud user should be kept safe and secure. Information store in database can not be accessed by unauthorized users intentionally or unintentionally.

### G. Integrity-

The data stored in cloud database must not be changed accidentally or intentionally. The Integrity is the guarantee that message sent will be the message receives by destination machine.

## III.CONCLUSION

**Cloud computing is a very important and crucial paradigm for IT organizations and IT users. Cloud computing fulfil cloud user's need by outsourcing computer hardware and software resources. The cloud users search for cloud vendors who can meet their quality of service parameters. In this paper I discuss the various parameters of quality of service (QoS) in cloud computing. QoS is defined in SLA which is an agreement between cloud user and cloud vendor. Cloud users can trade off between QoS and cost of service to meet their requirements.**

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