

## Challenging Computing Techniques – An overview of Cloud Computing

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### Abstract:

Cloud computing is an Internet-based computing, whereby shared resources, software and information are provided to computers and other devices on-demand, like electricity. It is a new generation of computing that utilizes distant servers for data storage and management, allowing the device to use smaller and more efficient chips that consume less energy than standard computers. In this paper we have discussed about cloud computing concept, services provided by cloud computing, characteristics, architecture, categories and advantages of cloud computing.

**Keywords:** Cloud Computing

### 1. Introduction

“Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction”.

Cloud computing is a mechanism that enables management of computing and IT infrastructure to be consolidated in one or more data centers to reduce the overall cost of operating computing facilities. If break this definition further down, Cloud Computing is nothing but a computing technology that provides organizational abilities to access software and hardware resources from a virtual space. Commonly referred to as the ‘cloud’, a metaphor for the Internet, this technology facilitates delivery of common business applications online that are accessed from the Internet. This technology is expected to revolutionize the way data is stored and managed. Since the software and data are stored on Internet (remote or in the cloud) servers, the cloud also curbs the exponential expenses incurred on maintaining high end data servers.

Cloud computing actually works very well for the ‘unconnected’. They can use any manner of small applications/ programmes/ software to edit images, video, power points, excel sheets, etc which might not be available on local machines (either cyber cafes or desktops in schools etc). Opposite to what is believed by critics that Cloud Computing is limited by the availability of internet, it’s very useful for remote areas. People can use all sorts of computer applications and manage data without

being shifted to metros. It can be even in a small town. The features of cloud are;

- A set of applications managed and hosted externally by a specialist partner
- Delivered over a secure high quality network
- Operational in weeks not months
- Available anywhere with an internet connection, even when on the move

### 2. Cloud Computing Services

The services which are provided by cloud computing are mainly classified into four main categories, they are;

**Infrastructure-as-a-Service (IaaS):** Infrastructure can be provided as a service. Amazon web services can be provided as example. Where the users application interface access the virtual servers and storage hosted by Amazon to read books online.

**Platform-as-a-Service (PaaS):** Platform in the cloud is a set of application or software which runs on platform which is hosted in the cloud. The users execute the application in the platforms hosted by the cloud provider through the platform or application program interface.

**Software-as-a-Service (SaaS):** In software as a service model provides both hardware and software infrastructure

and provides a front end for the users to interact with the system through the front end portal.

**Hybrid cloud:** Here a part of the infrastructure is hosted inside the organization and the other part is hosted in a public cloud. The organization will use the public cloud for storage and use their infrastructure for other applications.

Cloud computing has a very distinct characteristics that the traditional hosting. These services are sold on demand and are very elastic. A user can but it for a hour or a minute also. This services are fully managed by the provider..

The cloud can be a private cloud or a public cloud. A private cloud means it is a proprietary cloud which provides hosted services to limited number clients. A public cloud sells services to anyone on the internet.

### 3. Characteristics of Cloud Computing

The main characteristics of cloud computing are classified based on the following;

**Agility:** Improved agility as users are able to re-provision technological resources very rapidly.

**Cost** is reduced to a great extent

It allows users to access systems using a web browsers irrespective of the location. i.e it allows **device independence**

**Multi-tenancy:** It allows to share the resource amongst many users which helps in centralization, peak-load capacity and better utilization of resources and better efficiency.

**Reliability:** It improves due to use of multiple redundant sites.

**Scalability and security:** Loosely coupled architecture and centralization of data gives this added characteristics to it.

The five essential characteristics of cloud computing are;

- On-demand self-service
- Broad network access
- Resource pooling
- Location independence

- Rapid elasticity
- Measured service

### 4. Challenges in Cloud computing

**Privacy:** Even though cloud computing offers great advantages and the need of the hour which is green computing, there are few disadvantages with cloud computing, the company which hosts the cloud services can monitor the client systems as per their wish.

**Security:** As the cloud is accessed through the internet there are security concerns. It is always secure whenever the data is in-house. Cloud security is a concept which is identical to network security and information security. There are security issues faced by the cloud service provider and also their customers. It is the duty of the cloud service provider to maintain the safety and security for the consumers.

**Availability and performance:** In addition to security the cloud service provider needs to make sure the system is available for its consumers. There are service level agreements (SLA) between the cloud service provider and the consumer which is related to the availability and performance.

### 5. Cloud Computing Architecture

A cloud can either be public or private. A public cloud is where the service is provided on demand for any clients. In a private cloud the service is provided to a single client. The combination of both public and private cloud is called virtual private cloud; here the private cloud is hosted in a public cloud. Some examples of public cloud are Google App Engine Amazon Web Services - EC2, S3 and Microsoft Azure. The cloud reference model has shown in fig 2.

In general cloud computing has a front end where the consumers log in and work on the backend which is hosted by the cloud service provider. The front end is nothing but the client computers and the applications required to access the cloud. The means of communication is the internet. The architecture of cloud computing has shown in fig. 1.

- The cloud is the backend computing devices like servers, storage devices which together provide the computational services. There are set of computer which monitors the traffic, systems, and client requirements by following certain protocols which is known as middleware.

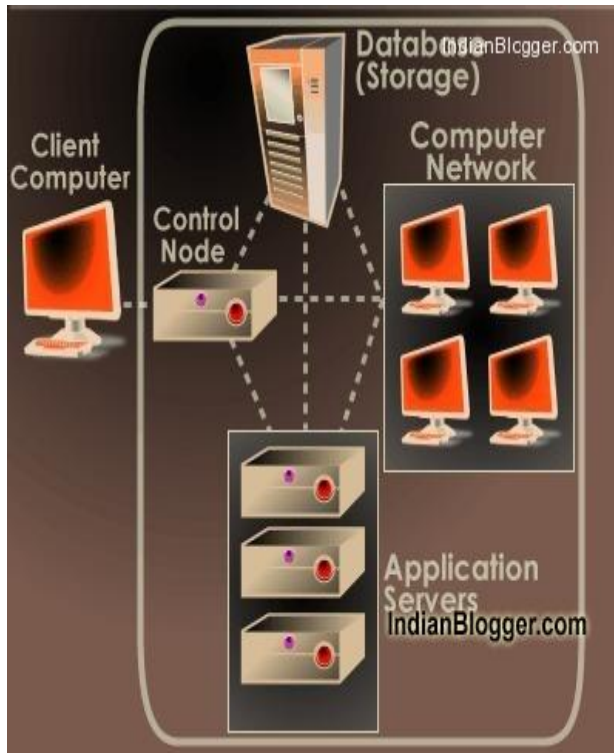


Fig. 1. Architecture of Cloud computing

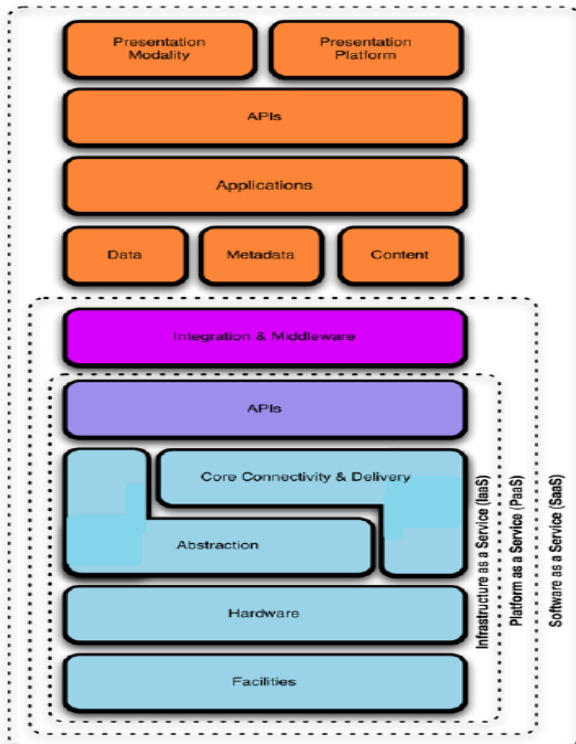


Fig 2. Cloud Reference Model

## 6. Advantages of cloud computing

**Resilience** - One big advantage that all types of cloud computing offer is that, by its nature, cloud computing removes single points of failure. The failure of one node of the system has no impact on information availability and does not result in perceivable downtime.

**Scalability** - Cloud computing enables organizations to quickly scale their operations. Provisioning of new resources and software applications can be delivered at a pace that does not hold back the rest of the business.

**Flexibility and efficiency** - Cloud computing allows businesses to expand or contract computing power as required and allows 'bursts' of computing power to be utilized on an on-demand basis.

## 7. Conclusion

Cloud computing is still struggling in its infancy, with positive and negative comments made on its possible implementation for a large-sized enterprise. Its security deficiencies and benefits need to be carefully weighed before making a decision to implement it. In future cloud computing makes a big revolution in IT organization.

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