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**Review Article**

# Analysis on Various Strategies of Cloud Computing & Its Current Issues

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**Abstract:** Cloud Computing is based on the concept of distributed computing, Grid Computing, Utility Computing &Virtualization. Cloud Computing is the internet-based computing and it provides shared resources, software packages and others resources as per client requirements at specific time. Cloud Computing provides us a means by which we can access the applications as utilities, over the internet. This research paper presents basics of cloud computing, the various cloud models, various challenges and issues in cloud computing.

**Keywords:** Cloud Computing, Cloud Models, Software as a Service (SaaS), Platform as a Service (PaaS), Infrastructure as a Service (IaaS), Current Issues.

## 1. INRODUCTION

Cloud Computing is a model for enabling on demand network access to a shared pool of configurable computing resources in a convient way. There are number of resources such as networks, servers, storage, applications and services. These resources can be rapidly provisioned and released with minimal management effort or service provider interaction [1]. Cloud Computing provides us a means to access the applications as utilities, over the Internet. It allows us to create, configure, and customize applications online. Cloud computing has emerged as a popular solution to provide cheap and easy access to externalized IT (Information Technology) resources. Within last few years, cloud computing paradigm has witnessed an enormous shift towards its adoption and it has become a trend in the information technology space as it promises significant cost reductions and new business potential to its users and providers. There are various advantages of using cloud computing such as:

- Reduced hardware and maintenance cost,
- Accessibility around the globe, and
- Flexibility and highly automated processes where in the customer need not worry about mundane concerns like software up-gradation [2].

Computing may be applied to solve problems in many domains of Information Technology like GIS (Geographical Information Systems), Scientific Research, eGovernance Systems, Decision Support Systems, ERP, Web Application Development, Mobile Technology etc [1, 2]. Cloud Computing is a technique to transport services over the network. New progress in virtualization technology, processor, disk storage, broadband internet access and fast, economical and powerful servers have all combined to make cloud computing a realistic and compelling paradigm [3]. Fig. 1 shows a basic cloud computing environment. The remainder of this paper deals with characteristics, issues and challenges of cloud Computing.

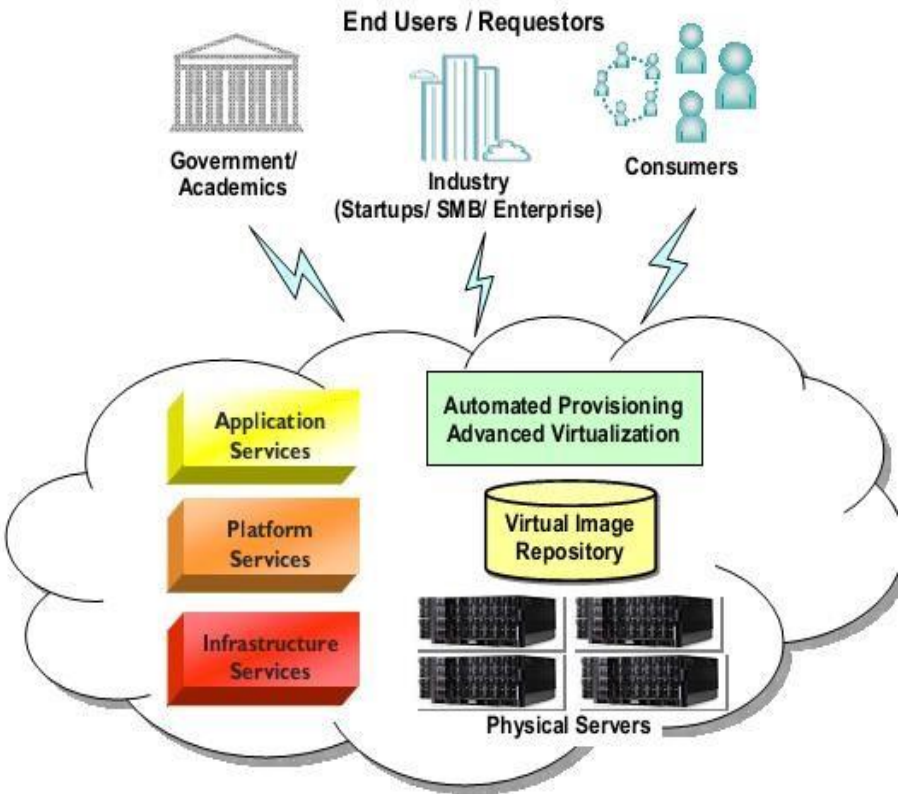


**Fig. 1: Cloud Computing Environment**

## 2. CLOUD DEPLOYMENT STRATEGIES

This section explains the basic cloud deployment strategies. A cloud can be deployed using any of the below mentioned strategies.

### 2.1 Public Cloud

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, e.g., e-mail. Public cloud services are characterized as being available to clients from a third party service provider via the Internet. The term "public" does not always mean free, even though it can be free or fairly inexpensive to use. One of the best examples of a public cloud includes Microsoft Azure, Google App Engine [2].

### 2.2 Private Cloud

The Private Cloud allows systems and services to be accessible within an organization. It offers increased security because of its private nature. The difference between a private cloud and a public cloud is that in a private cloud-based service, data and processes are managed within the organization without the restrictions of network bandwidth, security exposures. Eucalyptus Systems is one of the examples of a private cloud [2].

### 2.3 Community Cloud

The Community Cloud allows systems and services to be accessible by group of organizations. A community cloud is controlled and used by a group of Organizations that have shared interests, such as specific security requirements or a common mission. The members of the community share access to the data and applications in the cloud [1]. An example of a Community Cloud includes Facebook [2].

### 2.4 Hybrid Cloud

The Hybrid Cloud is mixture of public and private cloud. However, the critical activities are performed using private cloud while the non-critical activities are performed using public cloud. An example of a Hybrid cloud includes Amazon Web Services [2].

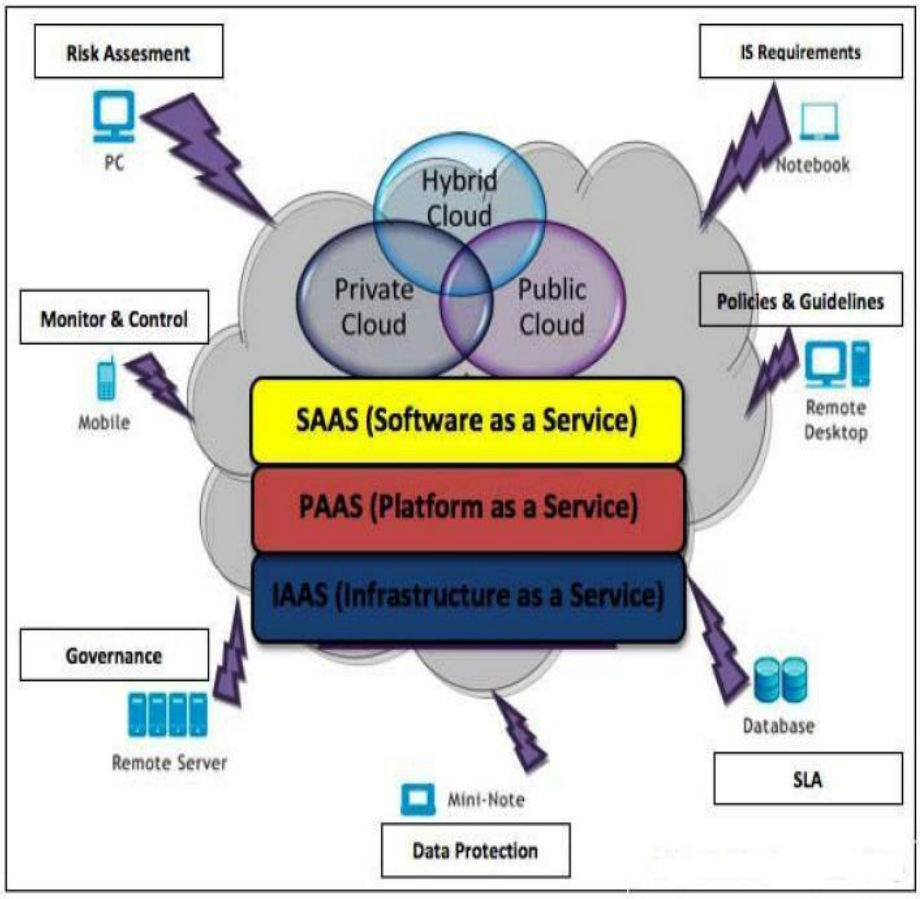


**Fig. 2: Cloud Deployment Model [1]**

## 3. CLOUD DELIVERY MODELS

This section of the paper describes the various cloud delivery models. Cloud can be delivered in 3 models namely SaaS, PaaS, and IaaS.

### 3.1 Software-as-a-Service (SaaS)

In this model, a complete application is offered to the customer, as a service on demand. A single instance of the service runs on the cloud & multiple end users are serviced. On the customers‟ side, there is no need for upfront investment in servers or software licenses, while for the provider, the costs are lowered, since only a single application needs to be hosted & maintained. Today SaaS is offered by companies such as Google, Sales force, Microsoft, Zoho, etc.

### 3.2 Platform-as-a-Service (SaaS)

Here, a layer of software or development environment is encapsulated & offered as a service, upon which other higher levels of service can be built. The customer has the freedom to build his own applications, which run on the provider's infrastructure. To meet manageability and scalability requirements of the applications, PaaS providers offer a predefined combination of OS and application servers, such as LAMP platform (Linux, Apache, MySql and PHP) and Google's App Engine.

### 3.3 Infrastructure-as-a-Service (IaaS)

IaaS provides basic storage and computing capabilities as standardized services over the network. Servers, storage systems, networking equipment, data centre space etc. are pooled and made available to handle workloads. The customer would typically deploy his own software on the infrastructure. Some common examples are Amazon, GoGrid, 3 Tera, etc.

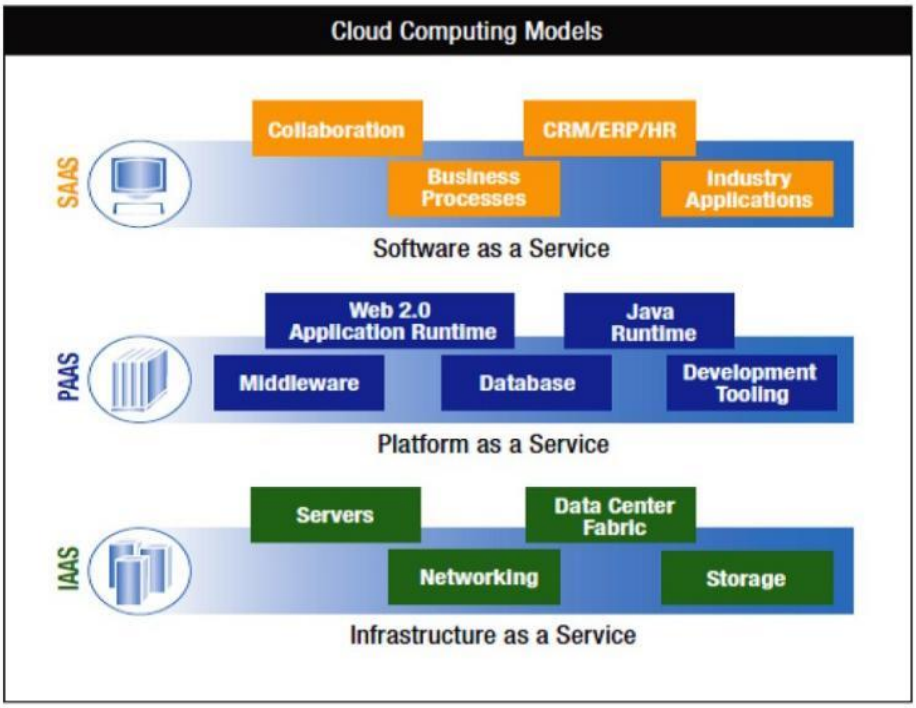


**Fig. 3: Cloud Computing Service Delivery Models [2]**

## 4. CHALLENGES & ISSUES

In this section we explain the challenges & issues cloud computing has to face. Fig.4 depicts the summary of the survey conducted by us on the basic issues of the cloud computing. The client's primary concern is taken in to account. Hence only the percentage of 4, 5 are being shown. The following are the issues that a cloud computing environment has to still resolve:

### 4.1 Security

It is the biggest concern about cloud computing. Since data management and infrastructure management in cloud is provided by third-party, it is always a risk to handover the sensitive information to such providers. Although the cloud computing vendors ensure more secure password protected accounts, any sign of security breach would result in loss of clients and businesses. When using cloud-based services, one is entrusting their data to a third-party for storage and security. Can one assume that a cloud-based company will protect and secure ones data (Cloud computing presents specific challenges to privacy and security. back it up, check for data errors, defend against security breaches) if one is using their services at a very low cost? Or often for free? Once data is entrusted to a cloud based service, which third-parties do they share the information with? [1].

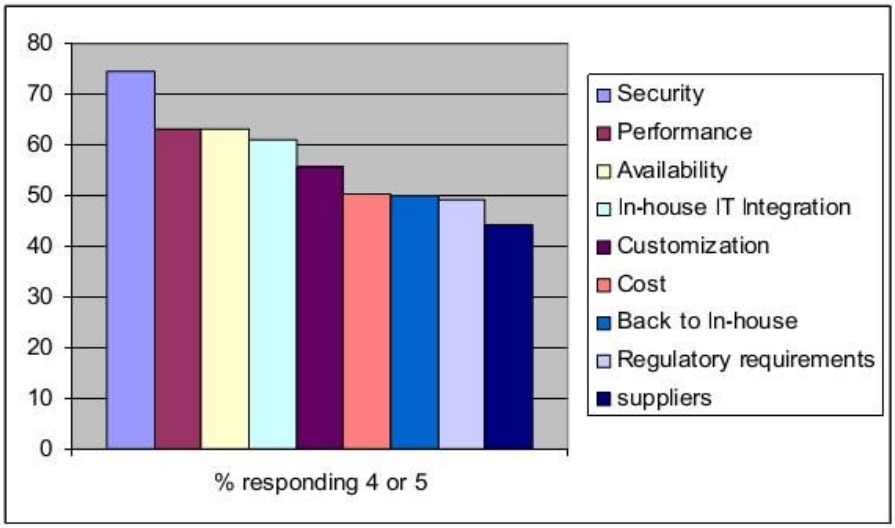


**Fig. 4: Graph depicting the concerns of clients on cloud computing issues [1]**

### 4.2 Performance

Cloud computing suffers from severe performance issues. The cloud provider must ensure that the performance of the service being provided remains the same all through. There may be peak time break downs, internal flaws, and technical snags arising. Load balancer, data replicators, high end servers must be installed when needed.

### 4.3 Reliability & Availability of Service

The challenge of reliability comes into the picture when a cloud provider delivers on-demand software as a service. The software needs to have a reliability quality factor so that users can access it under any network conditions (such as during slow network connections). There are a few cases identified due to the unreliability of on-demand software. One of the examples is Apple's MobileMe cloud service, which stores and synchronizes data across multiple devices [2].

### 4.4 Cost

Cloud computing can have high costs due to its requirements for both an "always on" connection, as well as using large amounts of data back in-house [1].

### 4.5 Regulatory Requirements

What legislative, judicial, regulatory and policy environments are cloud-based information subject to? This question is hard to ascertain due to the decentralized and global structure of the internet, as well as of cloud computing. The information stored by cloud services is subject to the legal, regulatory and policy environments of the country of domicile of the cloud service, as well as the country in which the server infrastructure is based. This is complicated by the fact that some data in transit may also be regulated.

### 4.6 Bandwidth, Quality of Service and Data Limits

Cloud computing requires "broadband of considerable speed" Whilst many websites are usable on non-broadband connections or slow broadband connections; cloud-based applications are often not usable. Connection speed in Kilobyte per second (or MB/s and GB/s) is important for use of cloud computing services. Also important are Quality of Service (QoS); indicators for which include the amount of time the connections are dropped, response time and loss of data (packet loss) [2].

### 4.7 Energy Resource Management

Significant saving in the energy of a cloud data center without sacrificing SLA are an excellent economic incentive for data center operators and would also make a significant contribution to greater environmental sustainability [2]. Designing energy efficient data centers has recently received considerable attention. This problem can be approached from several directions. For example, energy efficient hardware architecture that enables slowing down CPU speeds and turning off partial hardware components has become commonplace. Energy-aware job scheduling and server consolidation are two other ways to reduce power consumption by turning off unused machines. Recent research has also begun to study energy-efficient network protocols and infrastructures. A key challenge in all the above methods is to achieve a good trade-off between energy savings and application performance. In this respect, few researchers have recently started to investigate coordinated solutions for performance and power management in a dynamic cloud environment. The Global Energy Management Center (GEMC) can help companies monitor energy consumption patterns from multiple sources.

The cloud computing provides high reliability from the previous technologies (grid computing, distributed computing etc) but still reliability is primary component to be considered in cloud computing environment. The challenge of reliability comes when cloud service provider delivers on-demand software as a service i.e. accessible through any network conditions (slow connections). The main purpose of discussing reliability in this paper is to highlight the failures in cloud service. From failure characteristics in cloud we can identify the availability of cloud service when several of its components fail. A cloud is more reliable and available if it is more faults tolerant. Fault-tolerance mechanism like FTCloudSim and MCS are used for recovering and evaluating the failures in cloud computing environment.

## 5. CONCLUSION

In this paper basics of cloud computing are discussed. Cloud computing enables the user to have convenient and on demand access of shared pool of computing resources such as storage, network, application and services etc. This research paper represents various issues and challenges of cloud computing, and paves the way for further research in this area.

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