

# Cloud Computing Era: A Boon or Bane

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## ABSTRACT

Cloud Computing has been evolved due to latest succeeding technologies of computer science. Distributed computing, Internet, SOA (Service Oriented Architecture) has given birth to new computing era. Today, Organisations are not dependent for processing on their own resources as they can take and use the remote resources, services from the internet on payment basis via this new technology. Actually, internet giants like Amazon, Google provide their resources through cloud computing according to the ones need on payment and time basis. The benefit is twofold. Owner can earn from its idle resources by putting them in cloud whereas needier can avail the resources without purchasing them. But there are few problematic issues that need special intentions while availing the services of cloud. The main reason is the internet which is a large sharing facility in the whole world. After introducing the services architecture of cloud and its supporting modules, this paper discusses the critical threats and risks which can arise while availing the services of cloud computing. It also describes some solutions and remedies which can be implemented yet.

**.Keywords:** Distributed Computing, Anonymity, Network Reconnaissance, Port Scanning, Brute-force.

## INTRODUCTION

In these days, the most dynamic and challenging field of information technology is Cloud Computing. We have reached at a point where sophisticated infrastructure for doing large computations has no problem at all. One should not need a large investment for it. Today, organisations are free from the duty of managing the infrastructure resources and purely dealing with core competencies [1]. Cloud computing provide the arms to information technology so that it attains the power to deal with business strategies and customer needs more rapidly at large geographical scale.

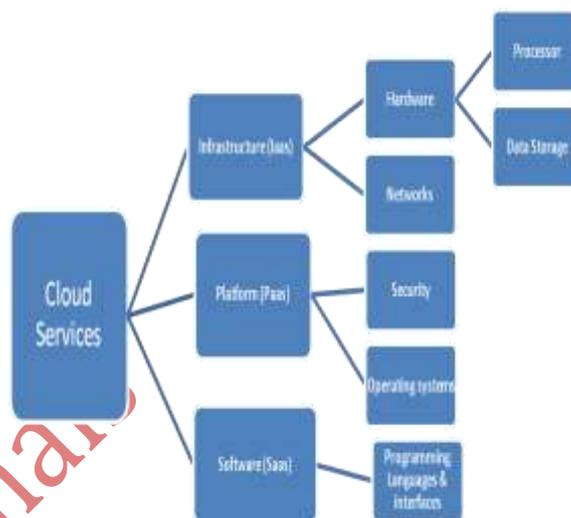


Figure 1. Hierarchy of Cloud Services

Due to the prospects of Cloud computing, organisations are excited to reduce their capital costs and earn more benefits. Today, cloud provides the infrastructure which is known as IoT i.e. Internet of Things. But in actuality services architecture of cloud computing is still hierarchical as shown in the figure 1.

## Data Centres, Internet & Cloud services

All the services as well as total cloud can't be implemented without internet. Internet which makes cloud services a different term i.e. Internet of Things (IoT) as shown in figure 2. But internet abstracts the data from large data centres. These data centres exist at different places in world and also have great variations in their infrastructure which provides heterogeneity in Internet and it is the heterogeneity which enables cloud to provide remote service [2]. User and vendor

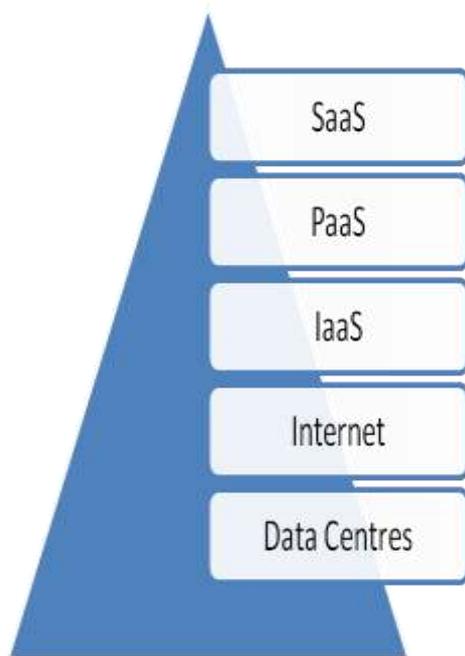


Figure 2: Relationship Between Data centres, Internet & Cloud services

of a cloud can only interact with each other with the help of internet connectivity. A few cloud service providers are [3], [4], [5], [6], [7]. They all have developed their independent clouds.

**Data Centres:** Data centres are stepping stones of cloud computing which provides the infrastructure for its implementation. Mostly, data centres are established in those areas which are less populated but also less prone to natural disasters. Data centres in these areas have more reliability and also they are cost effective. In these days, One data centre is made of thousands of interconnected servers.

**IaaS.** This is the basic facility in cloud which provides a user an unlimited computing power for parallel programming operations. One can analyse user log data at an instant. What can cover in one day on local infrastructure, it can be covered in a minute. Infrastructure can be broadly considered as a hardware service model as it provides computing power of machines. This is really a magic for distributed data applications. It is also responsible for large storage and network connectivity of various data centres. It helps the consumers to enhance scalability and provide computer resources dynamically on demand basis. Multiple consumers can coexist on same infrastructure. Amazon EC2, Microsoft Azure Platform are examples of this layer.

**PaaS.** This is also an important facility for IT sector. Today, portability testing of software does not need each

platform and one do not purchase the required infrastructure. A broad checking can be performed for newly developed software in a very short time. It also provides platform security while availing its services. This service can be availed during different stages of program development like application design, development, testing, and deployment and monitoring. User does not need to download software on its own machine and he can work via remote login. So, geographically dispersed team members can work on same project. Examples for this layer include Google App Engine, Microsoft Azure, and Amazon Map Reduce/Simple Storage Service.

**SaaS.** As software is ever changing field of technology and one has to invest a lot of money to purchase new and licensed software. But SaaS is a model through which a user can avail the facility of using particular software online on rent basis to develop an application. As one need not to invest a large amount of money, so it reduces Return on Investment (ROI) risk. On the contrary, centralization of data requires new and different security measures. This service is provided to end users in its own browser when he demands the particular software with specific features. Users need not to worry for the enhanced features of software as cloud already taken the responsibility of deployment and maintenance. This service can be shared and one do not need additional license. Examples of SaaS are Google Maps, Salesforce.com and Zoho productivity and collaboration suite.

## 2. Cloud Computing Services Characteristics

Experience of using a new technology can be beneficial and hazardous. Similarly, cloud computing has merits, risks and many limitations. This technology has provided multiple benefits to its end users and business organizations like:

- Speed of deployment gets increased
- Easy user adoption
- Need less support requirements
- Reduced cost and responsibility of end user for platform implementation and upgrades
- Less wastage of resources
- Performance of certain factors gets improved like interactivity, reliability and interoperability.
- Device and Location independence
- Scalability

But one must be aware of risks, shortcomings and threats while availing cloud services? How can a malicious internet user harm others? Main limitation of cloud is its rigidity. If someone use a particular cloud services, he has

to fully dependent on it and cannot move somewhere else. He has to live with cloud weaknesses also. Major limitations are:

- **Fully dependence on one cloud:** It is not easy for a user to develop the particular application on one cloud and later on migrate on another as each cloud is technically different from the point of implementation issues. For example, applications deployed on Amazon EC2 cannot be migrated easily due its particular storage framework [11].
- **Lack of flexibility:** One cannot achieve the flexibility to attain some resources from one cloud and some from others. So, a user doesn't have wider selection of components and not customize them manually and save money [12].
- **Lack of SLA (Service Level Agreement) supports:** SLA is a great hurdle for dynamicity. Static SLA does not serve well because business needs are too much dynamic. Some cloud vendors can't sign the SLA as needed by business organisations [13].
- **Disability to support Multi-tenancy:** One can only achieve the goal of cost effectiveness if he can share cloud resources among many members. But in actuality three issues are not resolved yet due to which clouds can't support multi-tenancy [14]. These are resource sharing, security and customization.
- **Lack of User Interface choices:** For evaluating a business perspective user interface is must. But cloud provides limited choices for making effective interfaces as proposed in [15]. There are a lot of ill-uses [2] which one can face while using cloud services. Table I shows them briefly along with their causes and effects [8] [10].

Ill-Use	Cause	Effect
Anonymity	Registration with credit card number and phone number as in Amazon services	User bank account can be stolen and misuse.

Network Reconnaissance	Cloud computing act as an automatic gathering tool to collect various IP addresses and other network related data.	Change IP addresses promptly, spam e-mails.
Port Scanning	Attackers can bypass protection means such as IPS/IDS and can hide port scanning if it is done from different IP addresses at various time intervals.	One can steal whole data of computer.
Attack Implementation	A cloud service site is attacked to abandon remote services from cloud.	Can effect cloud abruptly and delete history from server.
Brute-Force	Cloud computing provides a suitable platform for generating rainbow table by executing NTLM algorithm on 20 machines within 18 months which can provide each combination of possible password.	Password insecurity.

DDoS (Distributed Denial of Service) attack	It needs a number of attacking machines and an “intelligent” loading of the system under attack which is easily possible via IaaS.	Disturb user from availing cloud services.
Trojan Horses in Instance	Distribute malicious software via cloud services.	Damage user machines.

Table 1 Ill-uses of Cloud Computing

**Action taken from cloud providers.** Cloud vendors should take serious actions and remedies for these types of ill-uses but in reality picture is different. To identify the attack, vendors need the attacker’s IP address as well as the exact date and time of the attack [9]. But again time can be wrongly configured. So, vendors leave the investigation and deal with the victim with polite silence.

#### Proposed solutions: What To Do Under Attack?

- One should identify the IP address at the moment of the attack and then check its availability within several hours.
- One should also try to identify the exact type of the attack, then make a copy of the log files from the service being attacked. This copy is to be submitted to the security service later.
- After that complaint the vendor.

In addition to above method, one can also apply the following security measures:

- Privacy measures-One-Time password (OTP), a digital signature and biometric verification techniques.
- Trusted third party involvement- Confidentiality, Server and client authentication, Creation of security domains, Cryptographic techniques.
- Legal metrics - security measures and standards in Service Level Agreements (SLA).
- Machine security - Firewalls & Anti-virus software

### 3. Conclusion

We would like to say in conclusion that even when they use advanced services from top providers, they should always remember basic information security principles to make this era is really a boon. So this paper after

discussing cloud computing services architecture and its enormous benefits gives a view of its ill uses and limitations. It also provides some crucial measures that end users must follow to attain the power of cloud computing in full potential.

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