



**RESEARCH ARTICLE**

# Research Analysis of Cloud Computing

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*Abstract— Cloud Computing is the emerging buzzword in Information Technology. It is growing day by day due to its rich features of services. It is a virtual pool of resources which are provided to the users through Internet. Cloud computing is a new flavor of computing where our trend of using Internet changes. It is the future of Internet. It is also called as fifth generation of computing after Mainframe, Personal Computer, Client-Server Computing, and the Web. Nowadays, various Internet services are available in distributed manner. To use these services in a feasible manner is a big question because sometimes many resources become idle, they are costly and increase the budget of organization. This is the great matter of concern, especially when the world is facing financial crisis. Cloud Computing can be the answer of these questions. In this paper, we have analyzed and highlighted the various aspects of Cloud Computing to find the actuality of the fifth generation computing in the form of cloud computing.*

**Key Terms:** - Cloud Computing; Clouds; Styles; Challenges

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## I. INTRODUCTION

Internet is the connection from computer to computer all over the world. Domain of users has different taste to use Internet. People heavily depend on Internet because it is used for resource sharing, mailing, chatting and searching for information etc. Trend of using Internet is changing every day. In the inception of the Internet, limited services were available but as soon as time fleeting, the services are increasing and the researchers are focusing to provide everything on Internet as service. Another important aspect is our desktops having limited storage, memory, computing power and software etc. If user wants to store images, videos, documents in limited storage and suppose you want to install heavy software but if computer has limited hard disk and memory configuration, then computer doesn't support these tasks. Data mining [2] applications can be a good example because some data mining applications process huge data to find out useful pattern of information. So it may require more resources to process huge data as fast as possible. In that case you are required to increase your computing power, storage capacity and also the memory size. Sometimes we need to purchase licensed software to use them. So the users are restricted because of limited hardware and software configuration. Cloud computing can break all these barriers. It is an extend of grid computing, distributed computing, and parallel computing where everything will be serve as service.

## II. BACKGROUND

Computer has changed our working principle. It solves our problem in time consuming manner. As soon as method to provide services changes, our life becomes easier. In the inception of computer, mainframe computing was popular. Mainframe started the inception of computing era. These computers are early computers, also called big iron, used by large organizations to process bulk data. They have large cabinet to

house CPUs and memory to work. But they are not financially feasible for an individual person. The problems of mainframe computers can be resolved by personal computers which reduce the cost of computing and started the new era of computing. Personal computers are of small size, which focuses on individuals. Individual doesn't worry about special training or operator to operate them. A personal computer may be a desktop computer, a laptop, a tablet PC, or a handheld PC. Any software can be installed and used on them easily. Personal computers reduces the cost but if an organization implements an application in an organization. So it is required to have database and application interface on each individual PC. This can not only increase the cost of implementing application but also make the implementation complex and less manageable. Client-Server Computing resolves such implementation problem. In client server computing, server and client are different entities and they are connected through a network. Database is implemented on server and application interface is on the client machine. Such computing associated with various benefits like reduced cost of computing, increased performance, less maintenance, scalable, high availability and fewer efforts required to implement applications. But in client server computing, the resources of information are limited. Client- Server cannot be applied on the whole world to share information and provide information in effective and efficient manner. Fourth generation of computing.

The WWW provides such facility, WWW stands for World Wide Web which was founded by Tim Berners-Lee. The web is a system of interlinked hypertext documents which are accessed by Internet. Internet has no single point of control, no single point of information, no single owner and no single user or service provider. Initially, Internet was started for military purpose but today it becomes the mandatory part of our daily life.

It provides information in distributed manner. Information or data are stored on different servers which are provided to the user when demand comes. Complete existing systems have some limitation like limitation of resources such as storage, memory and processor etc. Such fourth generation's limitation gave birth to fifth generation of computing which is named as Cloud Computing. Cloud computing doesn't limit to grid, parallel and distributed computing. Grid Computing provides resources to the user when user requires. Parallel computing [3] executes the instruction in parallel for fast response to complete user assigned task. Parallel computing provides only fast response neither storage nor memory as a resource. In distributed computing [4], information or data is distributed in the servers situated at different geographical areas. Cloud computing can involve power of such paradigms at any level to form a resource pool

### III. CLOUD COMPUTING

Cloud Computing as Fig. 1 makes a virtual pool of resources such as storage, CPU, networks and memory to fulfill the user's resource requirement and provides on demand (pay per use) hardware and software without barriers. It can be named as dynamic computing because it provides resources when required (dynamically). Cloud Computing manages the pool of resources automatically and dynamically through software and hardware.

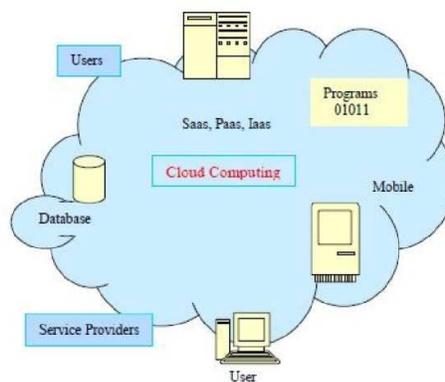


Fig 1

Cloud computing can have three types of clouds [11]: Public, Private and Hybrid Clouds.

#### A. *Private cloud*

It is a proprietary architecture subscribed by an organization, which provides hosted services to the users within the organization. This is protected by the firewall to form a barrier against outside the world to access hosted services from the private cloud.

#### B. *Public cloud*

It is not proprietary of any organization; the services provided in these clouds can be accessed by any organization.

#### C. *Hybrid cloud*

In hybrid cloud, the services are offered to the limited and well defined number of parties.

It can make Internet as a desktop. As we work on desktop, Cloud Computing can be used in the same manner. Many organizations have started implementing cloud computing like Amazon, Google, and Microsoft etc. In Cloud Computing, various service providers participate to provide services like storage, network, CPU, hardware and software etc. If user doesn't have storage on personal computer, he can use cloud computing to take advantage of cloud's storage to store his document without worrying. Same type of service is provided by Flickr.com which can be used to upload images on Flickr's server. User can use it as he is working on his desktop, but he requires Internet when images are to process on desktop. Google Apps is used to create documents online. Such type of services are available in the cloud computing.

Some sites are busy on specific time like result sites. Most of the time these sites are free but they consumes the resources, while result announcement time, they are very busy and may fail because of increasing load handled by limited computing power. So these services can be provided through clouds, if they are free, then their resources could be used somewhere else. But when they are busy, they can use resources of the cloud to avoid failure situation. Cloud computing is not limited to specific data center while it can use many data centers distributed in various geographical locations. Cloud Computing can be implemented in mainly three styles [8].

##### 1). *SaaS*

It stands for Software as a Service. Service provider provides software services in the cloud. Users access these services as software and do his work without installing the same in the local machine. Google Apps provides such services to create documents and spreadsheets online without installing any document or spreadsheet application. Salesforce.com [1] also provides software as a service.

##### 2). *PaaS*

Platform as a Service allows users to use cloud computing for developing any application using development kit provided by cloud computing. Users are not required to install development kit on local machine, he can use installed software or development kit in cloud computing to develop any program. Oracle [1] involves in providing platform as a Service.

##### 3). *IaaS*

Infrastructure as a Service enables us to install and execute the software. Here, users can gain access to virtualized server. IaaS targets operating systems, hardware, CPUs and embedded systems, networks and storage. This enables a homogenous virtualized environment where specific software will be installed and executed. Amazon [7] provides infrastructure as a service.

### **Cloud Computing Advantages**

#### **Faster, simpler and cheaper services**

1. Highly elastic because resources are easily released or occupied on the basis of demand.
2. Optimized utilization of computing resources.
3. Users have more resources than actually they have like unlimited storage etc
4. Everything is provided as service.
5. Less power consumed on hardware and software.
6. High availability and scalability.
7. No data loss.

## Cloud Computing Challenges

Cloud Computing has many advantages but cloud computing also have some challenges like security, trust, interoperability, availability and service level agreement. User wants to secure his information [5] personal identifiable information, sensitive information and usage information etc. Cloud must be secure enough, if data loss happens or hacked, and then what would be the legal action against service provider or cloud manager. Trust [6] means faith or reliance on something; it is also required among service stakeholders. A lot of resources are provided as service, it has to be interoperable. If communication from the server is blocked, due to any reason (hacking or failure), how fast information would be available to the user without loss? Various providers exist in the clouds that provide services as open source or proprietary, so users have to agree with various service level agreements to use their services.

## IV. CONCLUSION

Cloud computing is growing part of IT and many big organizations are going to implement cloud computing. Some of them provide IaaS, PaaS and some other provides SaaS. Amazon.com, Sun, IBM provides storage service while Google Apps provides software as a service. So by incorporating and collaboration of these organizations, a huge cloud can be formed which will provide all necessary computing resources to the users. Today, most cloud computing systems in operation are proprietary. While implementing cloud computing, it is required to provide open source services as much as possible, so that services can be provided at lower cost. EUCALYPTUS [10] [11] is an open source software framework for cloud computing that implements what is commonly referred to as Infrastructure as a Service (IaaS). So PaaS and SaaS can also be implemented as open service to cut the cost of the computing resources. By implementing clouds, the trend of using Internet would change in drastic manner. This shows that the fifth generation of the computing in the form of cloud computing now begins.

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