

# A Comprehensive Analysis of Cloud Computing Services

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## Abstract

*In today's era, the term cloud computing is growing quickly which has purchased critical changes in different areas of India. It is a broadly spreading processing model that has changed the framework of Information Technology and the method of conveying the administrations. On request, benefits are given by cloud computing. One of the essential administrations that cloud computing gives is data storing. The client can get to their information when the cloud specialist co-op moderates the information. Likewise, through cloud computing suppliers, cloud computing is generally utilized by the Information Technology based new businesses which is a benefit in the advancement of their organization. In any case, its development is quickly expanding in the instruction area too. The utilization and exploration of distributed computing in training were directed through subjective philosophy. This report is an examination of the activity of cloud computing in leadership. A short overview was additionally performed to distinguish and dis-sect the benefits and hazards which distributed computing might have in the area of training. This investigation is skilled to achieve its advantages about the prologue to cloud computing in the administration of instruction.*

## Keywords

*Cloud computing, cloud service model, limitations of cloud computing, benefits of cloud computing*

## 1. Introduction

The title cloud computing can be described as the method of computing that provides user the services of information technology and allows its users to access these services on the internet without having specified / particular data. Cloud computing is not fully a new kind of technology, it is developed by using already existing technologies. Sending mails (via gmail), playing online games, watching movies (in Netflix, Prime Video and others), listen to music and storing file in drives and more are part of cloud computing. Cloud computing basically a service of computing which involves servers, storage, database, networking, software, analytics and intelligence. These services are available only using internet, so the term Cloud is related

to internet. Servers like google drive provides this service free of cost. This new trending technology focuses on user requirements and is also urged by the use of devices like smart mobile phones, pc's etc. You can also take backup of your information easily using this as your data is safe and secure. Working on cloud is an easy task and can be performed at any location with proper internet, for this there is no need to carry any hard disk or pen drives [1-4]. It is a budget friendly technology with speed which depends on the internet speed. Services provided are flexible and reliable. As all the information are put away using internet so in locations with no internet it will be difficult to get the stored data which is one of the limitations of cloud computing. For education, teacher and student both can approach the information and applications on the cloud. Through this personalized learning / teaching environment can be created.

## 2. Types of Cloud Computing

There are four types of cloud computing as shown in figure1.

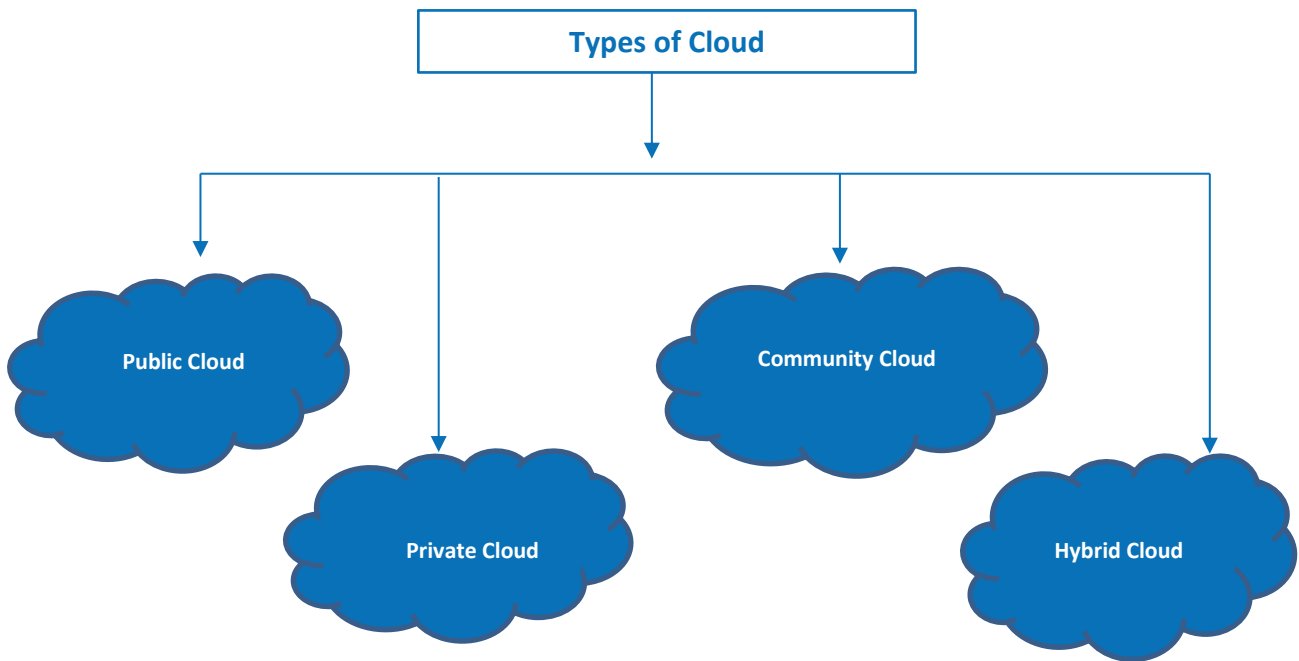


Figure 1. Types of Cloud

### 2.1. Public Cloud

This term of computing can be explained as a service which is operated by the third-party that makes services of servers and storage available through internet. In such type of services hardware, software and other supporting framework are provided and controlled by cloud on its own. Clients using web browser can use their assistance and can manage their account. Example: Microsoft Azure.

## 2.2. Private Cloud

This cloud is mainly for organization or business which can also be situated at its server farm, or it tends to be overseen by outsider assuming the organization needs. In this type of cloud computing, services and infrastructure are maintained using private network.

## 2.3. Community Cloud

This sort of cloud computing is divided among those organizations which have the common goals and together makes a community. Only the members of the formed community can use this service.

## 2.4. Hybrid Cloud

It is a combination of public and private cloud. In this sort of cloud computing, information and applications are acted between public and private clouds. Using this cloud more flexibility and more development options are provided, also the security and infrastructure are possible to optimize.

## 3. Cloud Service Model

The administrations that are given by cloud sending models are-

### 3.1. Infrastructure As a Service (IAAS)

This is the basic category of cloud computing model services. In this service, the client can purchase the necessary assets from the cloud specialist organization on lease. The resources that are provided by this service are storage visualization, server sort and networking. The client is answerable for running and keeping up with it. The user is free to use the service on its own and also have to maintain security on its own. When a user is demanding for this then the client is given by the IP address related to the accustomed framework [4-8]. This service enhances scalability and flexibility. Example: Digital Ocean, Amazon Web Services (AWS).

### 3.2. Platform As a Service (PAAS)

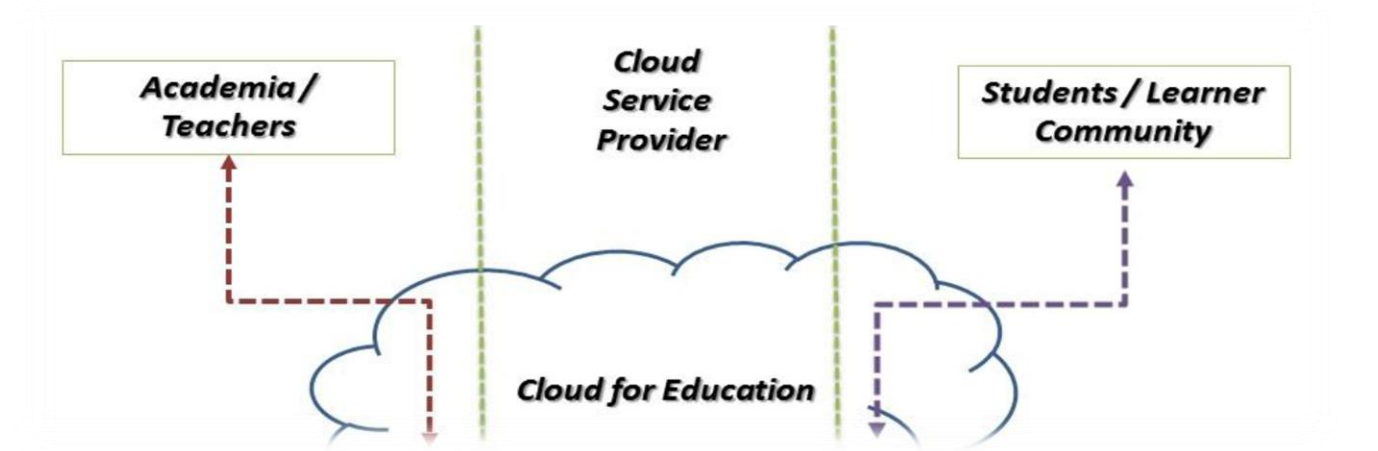
This service provides environment for on-demand supply of software application development, test, deliver and manage. This help is proposed to make web and portable applications rapidly. In this there is no need to buy any software or hardware while developing or deploying the application, all the required hardware or software is provided through this service. The assets that are given by this service are storage, visualization, server, networking, operating system, applications, data runtime and middleware. This service is provided by Google Application Engine, Microsoft Windows Azure and International Business Machine (IBM).

### 3.3 Software As a Service (SAAS)

This service is used by the vendors. In this the frontend is provided to the user and user only have to utilize or access those services provided by the software, all the backend things or servers are controlled by the vendors. There is no requirement to place a software in your device but the thing that is required is high speed internet. So, there is no need to maintain the software, no compelling reason to manage the security or issues related with the product as all these things are managed by the vendor. This service is not dependent on the platform, it could be any operating system. Example: Dropbox, Google apps.

#### 4. Role of Cloud Computing

The figure 2. Shows the role of cloud for students and faculty.



Enrollment process, Secure environment, Applications, Contents, Conferencing, Document sharing, LMS, Event scheduling etc.

Figure 2. Role of cloud for students and faculty [1]

Complete online facilities are also provided by many universities. Moreover, during the pandemic cloud plays a vital role. Many universities exercise hybrid mode of cloud computing for online education programs. The main use of cloud in education sector is for emails, conferencing, collaboration, Learning Management System (LMS). The institutions are now highly depended on information technology for the service of their requirements. Faculty and students using internet can access to the services from the web browser. These services are not very expensive [8-12].

#### 4.1. Implementation

In the sector of education, the services of cloud technology are mainly used by students, faculties, examination branch, administrative staff and admission branch. The services attached to cloud are shown in figure 3.

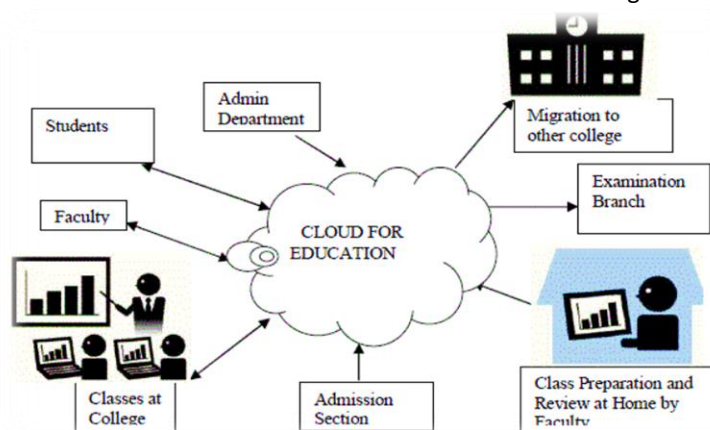


Figure 3. This diagram describes the services attached to the cloud. [1]

On the cloud server faculty can upload the assignments, tests, class tutorials which are easily accessed by the students and are available at the server 24x7. The learner can approach to the provided materials using internet from any location and at any time. Student can also upload the response to the given task in the server which helps the faculty to evaluate student's performance and according to that guide the individual. The resources of information technology are housed and are also managed in-house. Multiple form of these services and gadgets are shifted to cloud and are used over the internet either as raw computing, fully functional application or advance platform.

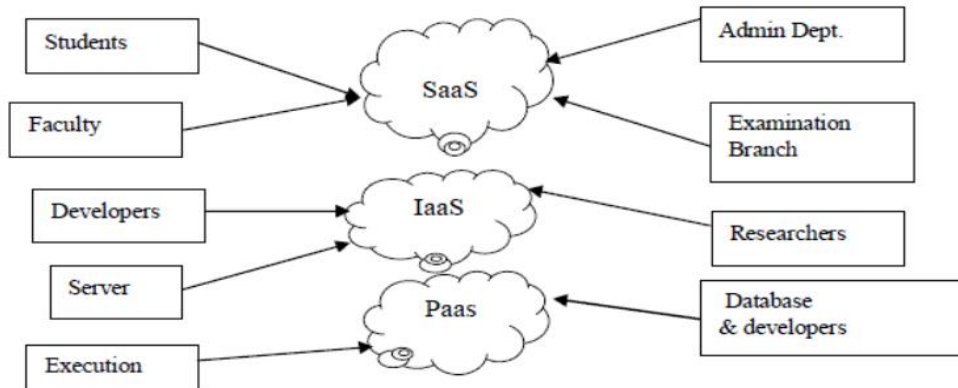


Figure 5. This diagram shows how particular class of university users consumes the services provided by cloud. [1]

## 5. Benefits of Cloud Computing

### 5.1 No Extra Framework

Now with the existence of this technology institutions now focuses more in providing the study facilities to the students in spite of worrying about the labs, building and teachers.

### 5.2 Less Expensive

As all the necessary textbooks are made stored at the cloud server so it reduces the cost of buying textbooks. There is no requirement of buying any hardware as the cloud applications are accessed using web browser which could easily run in the smart phones. Also, there is no need to buy any storage devices as data is stored in the cloud.

### 5.3. Accessibility

Learners can easily access to the study material as they are available 24x7 and also can access it from anywhere using internet.

### 5.4. Environment

This innovation not only decreases cost but also makes a healthy environment for the learners to approach for their higher education.

### 5.5. User friendly

This innovation is client friendly and there is no need to concern about the complications. It is easy to operate and understand.

## 5.6 Learner's Capability

This technology provides a wide platform learner. Individual can learn anything of their interest in online mode.

## 6. Challenges of Cloud Computing

### 6.1. Security

As the information is saved in a place which can be dogged so its security here is a major issue. Although now guarantee is provided by the cloud providers that the client's personal data is only be stored in particular country. It has been recommended that the plan of cloud administrations through an unaccompanied supplier is a weak link and it is smarter to contract more unrequested promoting in which cloud suppliers will target clients with spontaneous email or publicizing. The information of institutions is more secured if it is introduced by the institution on its own [11-15].

### 6.2. Privacy

Not alike popular computing model, this technology uses the virtual computing technology where client information may be dispersed at different virtual server farms, which may be found topographically at various area. Where there could be debate in information security insurance in the locational legal frameworks.

## 7. Data Analysis

The information gathered for this research is from the students of different institutions. Few questions were proposed about this computing. The survey was performed by 30 students from different institutions [11-19].

### 7.1. Survey Questions and Result

Q1. Do you know anything about cloud computing?

62.1% of the students were aware of this technology while 20.7% of students were somewhat aware and rest were not aware. Fig 6. shows the analysis.

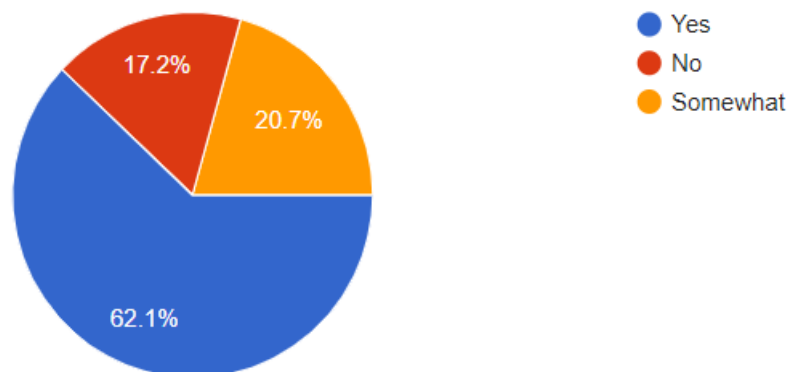


Figure 6. Awareness ratio

Q2. Do you understand the aspect of this technology in collaboration with your institution?

44.8% of students were never thought about the collaboration while 34.5% of students understood its role and 17.2% of students were neutral for this. Fig 7. shows the analysis for the same

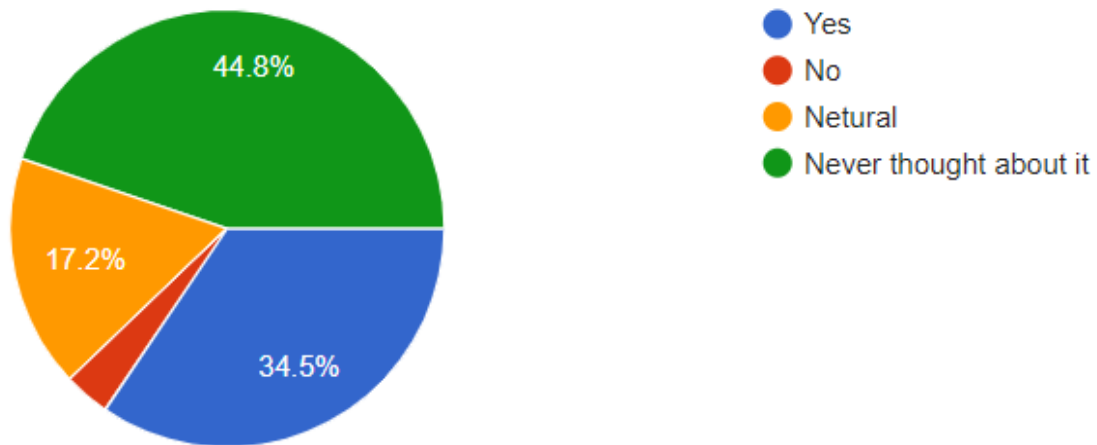


Figure 7. Collaboration percentage of the students

Q3. What according to you cloud based services are being adopted by your institution?

Many were not familiar regarding the adopted services while others responded that the adopted services are data storage and MS Teams.

Q4. According to you what might be the affecting features of cloud computing?

Many students found that Internet bandwidth is the cause that influence its adoption. Analysis is shown in fig 8.

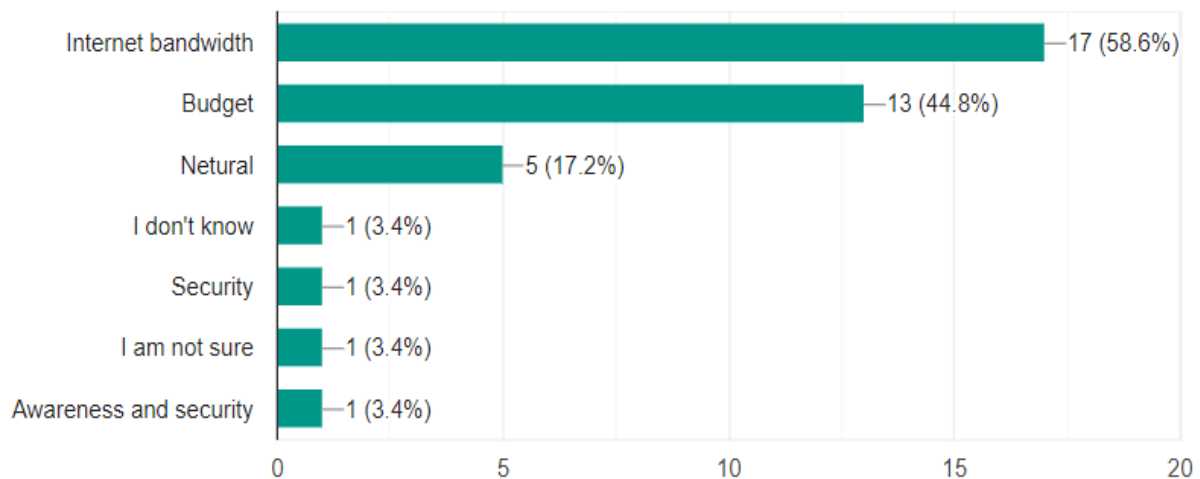


Figure 8. Students found that Internet bandwidth is the cause that influence cloud adoption

Q4. Do you find cloud computing as an insecure medium (trust factor)?

Many students (41.4%) found that this computing technology is not an insecure medium while according to 37.9% students this technology maybe a insecure medium. Fig 9. shows the analysis.

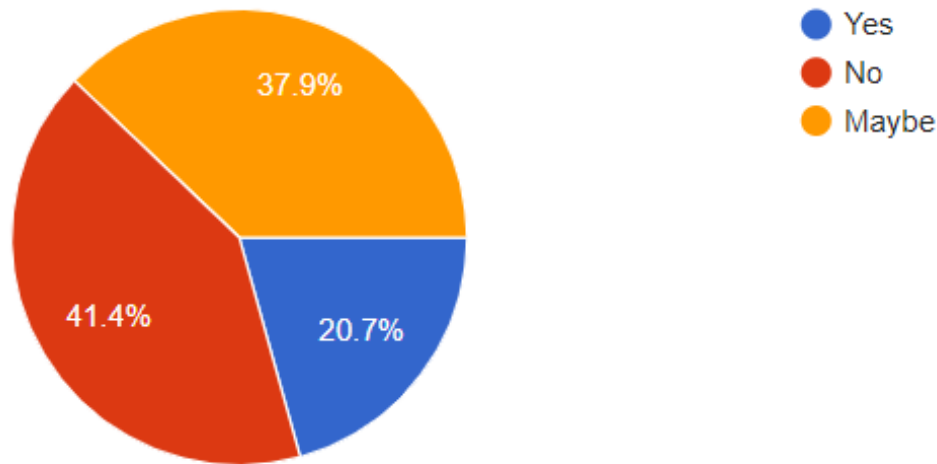


Figure 9. Trust on the cloud computing w.r.to security

Although the survey is performed at a lower level with very few students, but its aim was achieved.

## 8. Conclusion

The cloud computing is quickly developing internet-based model. Using this computing technology one can work from anywhere and anytime and can also share it with anyone. There is no doubt that the presentation of distributed computing into the board schooling is possible and presents to us the roughly endless registering ability, adaptability, advantages to the under studies. Using this technology, there is no need to buy any extra machine for accessing a file or an application like word processor or spreadsheet program. Regardless of the way that handling cloud could see one more sensation which is found to modify the manner in which we utilize the comprehensive, there is ton to watch out.

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