

# Cloud Computing in Education Sector

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## Abstract

Education is highly important in today's society. It helps to motivate the minds and shape it into intellectuals. Many Academic Institutes are exploring new technologies for effective teaching and learning Methodology. One of the emerging technologies Cloud Computing can be very useful in teaching learning process. As Cloud provides a variety of services, an institute can offer quality education by providing latest infrastructure in terms of hardware and software. This paper focuses on basic introduction of cloud Computing and how cloud computing can be introduced in the education to improve teaching and learning methodology which can bring a revolution in the field of education.

**Keywords:** Cloud, Education, Information, Infrastructure, Services

## I. INTRODUCTION

During the last two decades the evolution of distributed computing has changed the working of scientific and commercial applications. This progress has evolved several newer applications. The latest evolution of distributed computing is Cloud computing <sup>[1]</sup>. In Simple form Cloud computing means storing and accessing data and programs over the Internet instead of computer's hard drive <sup>[2]</sup>. In other words cloud computing provides shared resources, software and information through Internet as a PAYGO (Pay-as-you-go) basis.

Cloud computing can be a welcomed optioned in the universities and educational institutes for studies. It gives a better choice and flexibility to the IT departments by building multipurpose computational infrastructure once and then uses it for several purposes for several times.

Teaching is now not just restricted to classroom with students. Today Education is heavily dependent on Information technology. The rate of IT technology is changing and which puts more extra financial burden on institute. Continuous upgrading hardware and software is difficult and also it leads high cost to maintain them. Cloud Computing provides the solution for this problem. With the help of cloud computing the user uses the platform and application on-campus or off-campus or combination of both depending on the institutions need. It offers services at the least cost to users like student, staff who can acquire it anywhere any time.

## II. CLOUD COMPUTING

Cloud computing means that instead of all the computer hardware and software you're using sitting on your desktop, or somewhere inside your company's network, it's provided for you as a service by another company and accessed over the Internet, usually in a completely seamless way. Exactly where the hardware and software is located and how it all works doesn't matter to you, the user—it's just somewhere up in the nebulous "cloud" that the Internet represents <sup>[3]</sup>.

Cloud computing is a type of computing that relies on sharing computing resources rather than having local servers or personal devices to handle applications <sup>[4]</sup>.

Cloud computing is Internet-based computing in which shared resources, software and information are delivered as a service that computers or mobile devices can access on demand. Cloud computing is already used extensively in education. Free or low-cost cloud-based services are used daily by learners and educators to support learning, social interaction, content creation, publishing and collaboration <sup>[5]</sup>.

Some major examples of cloud computing services includes Google Drive, Amazon Cloud Drive, Apple iCloud, Microsoft's SkyDrive, Humyo, ZumoDrive. Cloud computing services are categorized into three different levels:

### A. Software as a Service (SaaS):

These types of application are generally designed for end-users, delivered over the web. SaaS works so much better for students because it provides access to applications anytime, anywhere, for any type of devices like laptop, smart phone, tablet, or other web-enabled device. Adding more users or scaling the software to more classrooms or campuses is becomes very easy task with

SaaS. As an example, a college can scale its SaaS solution from 50 students to 5,000 in a matter of hours – unimaginable in the conventional IT scenario.

#### **B. Platform as a Service (PaaS):**

PaaS is the collection of development tools and services which is used for coding and deploying the applications quick and efficient. With PaaS, Students, teachers or other academicians can develop new applications or services in the cloud which is platform independent, and also make them widely available to users through the Internet. It also provides services for testing, deploying, collaborating on, hosting, and maintaining applications.

#### **C. Infrastructure as a Service (IaaS):**

IaaS is the combination of hardware and software that powers it all – servers, storage, networks, operating systems. These are also known as On demand data centers which provide compute power, memory, and storage, typically priced per hour according to resource consumption. It can be used to satisfy the infrastructure needs of students, staff or any other academia's.

### **III. CURRENT SCENARIO OF EDUCATION**

Education system is always based on the marks, grades and figures. But in real life the practical knowledge, reflective thinking, and some practice is required to remain in competition [6]. Moreover practical knowledge has great significance to be in competition nowadays for this reason to impart the practical knowledge Institute has to build latest configured Laboratory which incurred highest cost in hardware configuration and due to technological obsolescence it will becoming recurring cost for the institute. Hence there is need to find out feasible solution and the solution is Cloud Computing services. To overcome from such type of problem the Institute can subscribe a service from any cloud service provider on the bases of pay as you go. Another factor is that Institutes are heavily depend upon content management system according to that Institute can also hire a service to store the content on the cloud and any student or staff or any academia's can use that from anywhere and anytime and on any device.

### **IV. IMPLEMENTATION OF CLOUD COMPUTING IN EDUCATION SECTOR**

The following diagram shows how the educational institute is using various services of Education cloud in departing quality education.

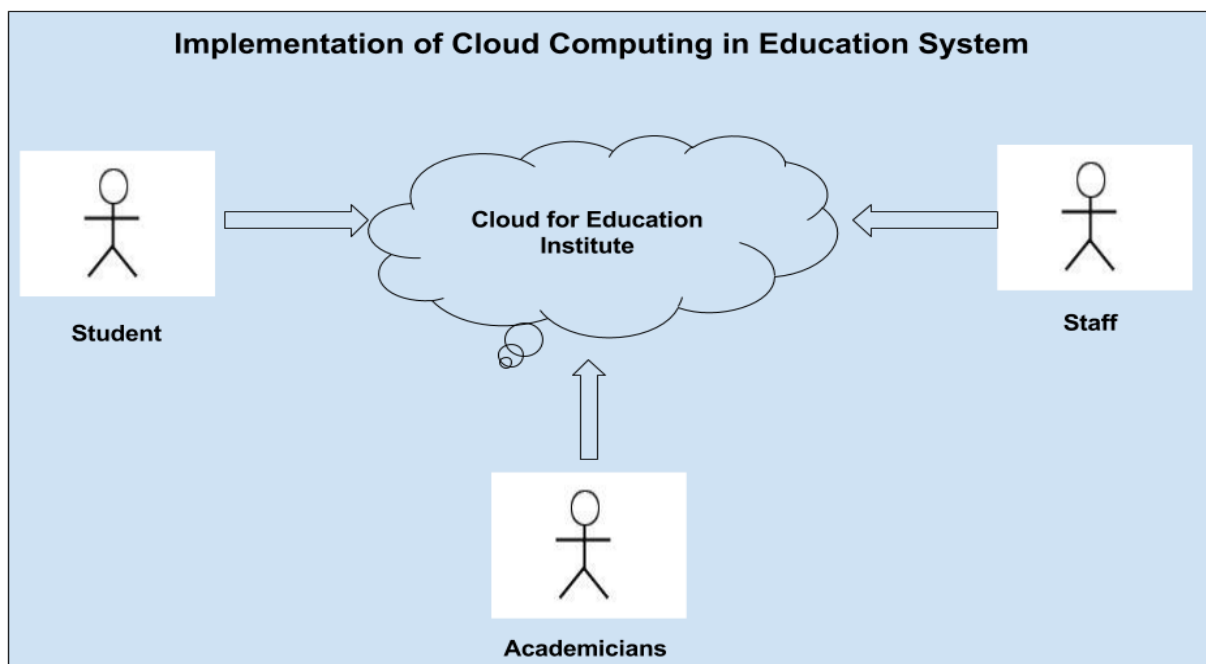


Fig. 1: Education Cloud for Different User

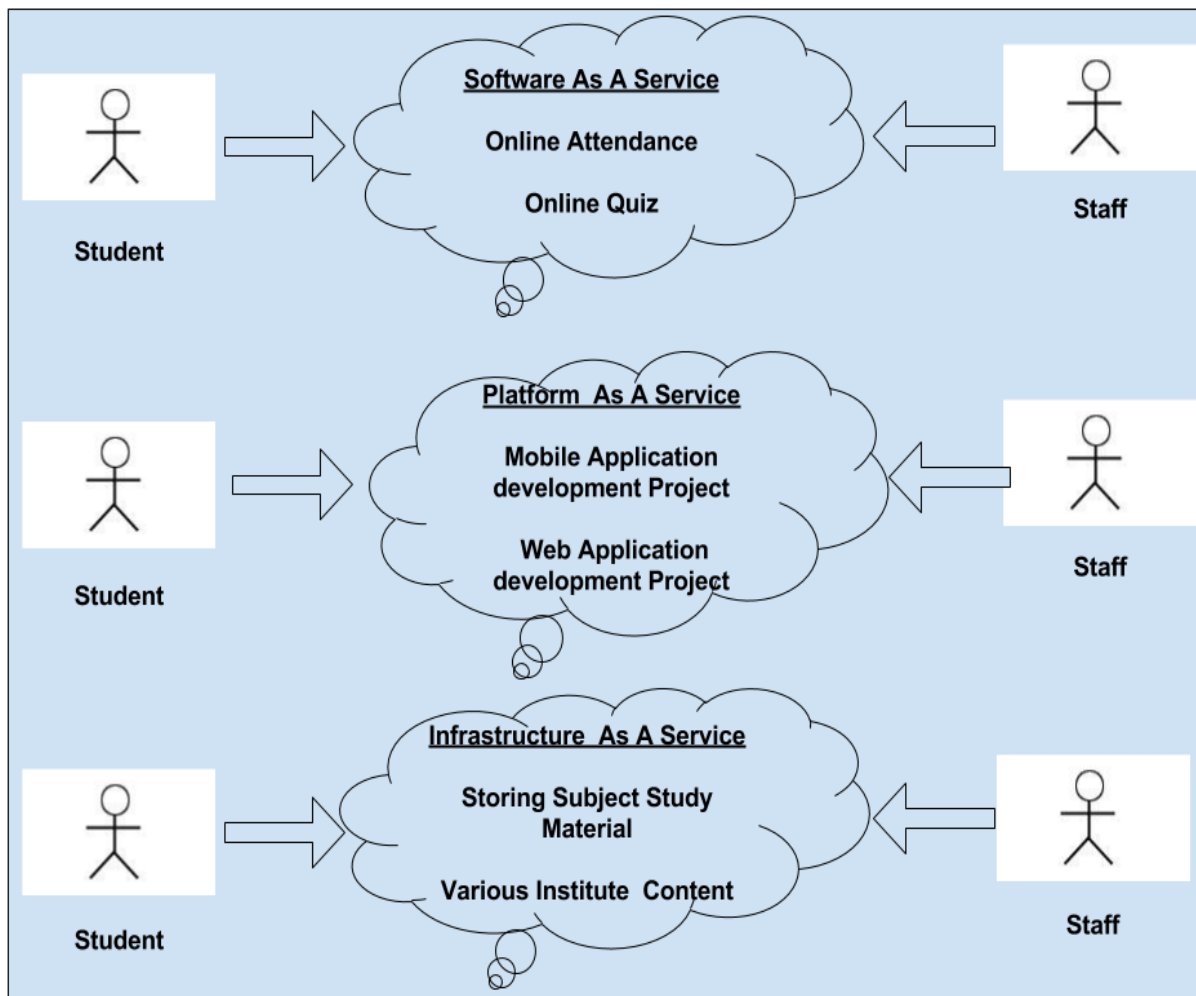


Fig. 2: Various Services of Education Cloud

The potential users of Education cloud are students, staff or academicians. Each user has their own credentials to access the respective cloud services. Adopting SAAS of Education cloud, teaching staff can maintain the attendance, conduct online quiz and many more with the respective software packages. Adopting PAAS Institute can organize practical sessions as and when needed from Education Cloud. For e.g., developing projects like mobile apps, web apps, etc. Adopting IAAS Staff can upload their study materials or any related content on Education cloud and student can access these materials and content 24\*7\*365.

## V. BENEFITS OF CLOUD COMPUTING FOR INSTITUTIONS AND STUDENTS

With the development of educational cloud, new web applications such as Lecture Tools, Slide share etc allows the lecturer to get their work done in their web browsers rather storing and carrying it on the hard drive. Its gives the benefits such as; <sup>[7]</sup>

- Access the files from anywhere
- Stop worrying about additional software licenses
- Share content more easily
- Get things done without software hassles
- Support for teaching and learning
- Software free or PAYGO
- 24 X 7 access to infrastructure and content
- Protection of environment by using green technologies
- Increased exposure of new IT technologies to students
- Reduced the cost to update infrastructure

Cloud computing has the potential for improving the efficiency, cost and convenience for the universities and educational sectors, but it has few limitations such as; <sup>[7]</sup>

- Not all application run on cloud
- Risk related to data protection and security and its integrity
- Organizational support
- Dissemination politics, intellectual property
- Speed and lack of Internet can affect work methods

## VI. CONCLUSION

Cloud computing is an arising technology in the coming years which provides range of advantages to students, staff, and academicians. Despite of these limitations cloud computing offers reliable services to student and staff so that teaching learning methodology become effective and qualitative. Besides this by acquiring cloud services from Education cloud Institute can reduce their expenditure in maintaining their laboratory.

The main aim of the paper is to highlight the implementation of cloud computing in education will shape a 'revolution' in the traditional education system.

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