

# An Virtual Education System for Rural

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**Abstract**— In the modern era, computer has become urgency. The use of computer is expanding with such an extent that the life without the computer is unimaginable. Nevertheless the roots of computer have emerged in each and every age group and sector still there are some areas where the computers cannot be used with such a proficiency. The people of rural areas are unable to get the sound knowledge of various things due to the unavailability of the resources in their areas. Our research work focuses on imparting the knowledge to the rural areas using the concept of the far-flung technology, i.e., cloud computing.

**Keywords**— Cloud Computing; Virtual Campus; e-Learning

## I. INTRODUCTION

In the present scenario the development of the rural area is a challenging issue. The major role in development of any area mainly depends upon the quality of education or knowledge being imparted. Through this research paper we are focusing on imparting education in the rural areas by dint of cloud computing so that the people of rural areas cannot be deprived of the quality education. We are proposing solution to provide education to those people who are residing even at rural areas.

Cloud computing is a technology that provides pervasive, On-Demand, effortless network access to a shared pool of configurable computing resources.[1](NIST). Cloud computing provides three basic services Software As A Service(SAAS),Information As A Service(IAAS) and Platform As A service(PAAS). By many researchers had been studied lots of problems as concerned as cloud computing applied in education system, such as the methodology for future distance education with cloud [2], teaching information system [3] [4] [5], the integration of teaching resources[6], teaching systems development[7]. In this paper we have proposed Education As A Service (EduAAS) which focuses on providing a virtual college to the student's of rural areas. The underlying aim of this virtual college is to impart new technologies , latest software, e-tutorials , Computer engineering Laboratories, and e-Exams to the students of the rural areas.. This facility of cloud computing can be offered to the pupils through a variety of ways such as metering capability, i.e., pay per use and fee based infrastructure. In section II we are going to describe Cloud computing in details along with the services provided by it, in section III we will focus on the existing education problems in the rural areas, section IV describes

the education system with cloud along with its advantages. Finally the paper is concluded in section VI.

## II. CLOUD COMPUTING

The term cloud is a metaphor for “the internet” thus the term cloud computing is “internet based computing.” There is no specific definition proposed for cloud computing, several researchers proposes different definitions of the cloud computing but all these definitions have the same gist that “ Cloud Computing is the term that allows sharing of the resources such that anyone can use these shared pool of resources without installing them on their local servers which provides an inexpensive computing infrastructure in a ubiquitous manner.”

The cloud model provides five basic characteristics[1]:

1. *On demand self-service*: A consumer can access the services provided by the cloud vendors whenever they require without any sort of intervention.
2. *Broad network access*: Facilities provided by cloud computing are available over the network and can be accessed via laptops, mobile phones, PDAs.
3. *Resource Pooling*: The sharing of the resources by multiple clients by dynamically assigning and reassigning these resources either physically or virtually as per their need.
4. *Rapid Elasticity*: The cloud capabilities can be provided in a scalable manner, i.e. the resources can be provided and released as per the need.
5. *Measured service*: The he cloud computing gives us a quantum capability, i.e., pay-per-use. This provides consumers with a transparent service by the cloud.

### A. Basic Services of Cloud Computing:

Cloud computing is categorized in three ways on, and each category is a service of cloud computing.

- 1) *IaaS*: It is the lowest-level cloud service model in which, pre-configured hardware resources (servers, storage systems, switches, routers, and other systems) are provided to users through a virtual interface. It enables access to the infrastructure needed by the computing applications. Popular Amazon EC2, IBM SoftLayer, and Google's Compute Engine (GCE) are the examples of IaaS.
- 2) *PaaS*: In this service model where the cloud is used to deliver a platform (operating system and a suite of applications and development tools) to users from which they can develop, and manage applications. PaaS conceptually sits between SaaS and IaaS i.e. it is also known as 'middleware'. Platform's like Google's App Engine, IBM BlueMix, and Apache's Stratos are popular PaaS products.
- 3) *SaaS*: It is serve fully functional and complete software products to users over the web on a subscription basis. SaaS offerings are typically accessed by end users through a web browser on demand. Sometimes referred to as 'on-demand software'. Google Apps, Office Live, NetSuite, Ultimate Software, Ariba, Concur, salesforce.com, intact at are the best examples of SaaS.

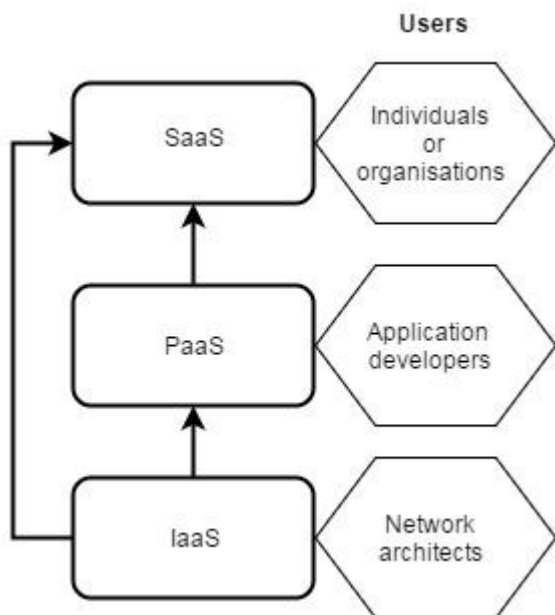


Figure 1: Relation between different service model of cloud computing

#### B. ADVANTAGES OF CLOUD COMPUTING

Cloud computing has various advantages[8]. Some of them are listed below:

- 1) *Powerful computing and storage capacity*: There are numerous computing and storage devices at various distributed locations that assist in providing a high speed computation and large storage capability to the students.
- 2) *Virtualization*: It is the process of creating a virtual version of the several things such as server, desktop, storage

device, an operating system, network resources, laboratories, etc.

3) *Cost effective*: Cloud provides an inexpensive way to use updated software as the organization do not have to purchase the equipment as well as the software which cuts a huge amount of the expenditure.

4) *Improved Collaboration*: Cloud allows dispersed group of people to meet and share the knowledge virtually.

5) *Accessible round the clock*: Cloud providers provide round class availability of the resources.

### III. EXISTING EDUCATION PROBLEM IN RURAL

The level of education being provided in the rural areas is not satisfactory. The people are deprived of the quality education. To get good practical education students have to either leave their home or need to establish a complete laboratory infrastructure in their village, both the options are very expensive. Buying a huge number of devices used in educational process like any licensed software or original hardware is an expensive solution. The education system in rural areas is adversely affected as they cannot afford such expensive tools and so they are deprived of getting good education. Moreover one need to leave their native place and move to urban areas in search of the quality education. This proves to be fatal for both rural areas as well as urban areas. In urban areas the population increases and in rural areas the expenses increases due to this migration.

Migrating from rural to urban areas is an extravagant option as the student have to pay for their food and for their accommodation as well. The resultant is the people never come back to the rural areas and hence the development of these areas is halted. Recently government is giving priority to human resource development in the rural areas by launching various schemes in education sector. Although the government is offering several facilities people are unable to get quality education the reason is improper distribution of educational resources such as teaching tools, teaching stuffs and lack of monitoring as well as inefficient administration. In addition due to lack of communication the people cannot take advantage of these policies. Moreover, the education being imparted in rural areas is limited to the traditional black and white knowledge and no practical demonstration is provided to the students so that they can think out of box and enrich their skills as well as their knowledge. To solve this issue we have entailed the concept of cloud computing in the present education sector of rural areas as cloud computing binds several resources in a unit and is an inexpensive solution for gaining education.

### IV. EDUCATION SYSTEM WITH CLOUD

Mell & Grance [1] define Cloud Computing as a computing model that allows access to virtual networks, storage and shared computing processing capabilities. Chandra and Malaya [9] suggests the uptake of Cloud-based technologies

as a key trend to make access to learning anywhere and anytime due to its network of resources. Cloud computing is the new application to have a important impact on the teaching and learning environment [12].

In this paper we offer a model of virtual college. The underlying aim of this virtual college is to impart new technologies, latest software, e-tutorials , Virtual Laboratories, e-library and e-exams to the students of rural areas.

**A. Education as a service (EduAAS)**

For a university/institution required:

- 1) Classrooms for delivering lectures.
- 2) Laboratory for practical.
- 3) Administration for managing each and every activities

On the basis of above requirements, we proposed a new service EduasS, which is imparting services of IaaS, Paas and SaaS as shown in Figure:2.

In traditional environment, in classroom, someone taking lectures physically but in this new emerging system physical presence is not required. By taking services of SaaS, student can see stored lecture videos on server or streaming live.

In traditional environment, we required laboratories with many software, equipments, instructors and many things but in new system EduAAS by imparting services of IaaS and PaaS provide virtual laboratories at your door steps with all facilities as in traditional environment.

Likewise classrooms and laboratories, EduAAS by imparting services of SaaS, administration works also make easy

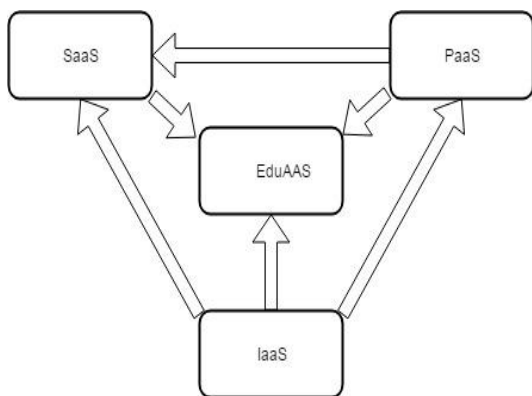


Figure 2: Imparting services of IaaS, SaaS and PaaS.

**B. Proposed cloud based model for rurals education**

Design of the infrastructure on the cloud platform will optimize all the requirements like computer resources and helps in building an inexpensive source to provide quality education as shown in Figure:3. The main aim is to setup an cloud education hub in each village. This education hub will be approved and certified by the government. This educational hub will be cloud based containing all the facilities of virtual college. Traditionally to install software on the system is an expensive solution so our infrastructure

uses cloud technology to provide these software to the students which serves a cheap and best way to learn as cloud has a metric capability. Moreover interactive video lectures can be provided to the students from worldwide so that they can have a two way communication. Learning is not only focused in the paper after the completion of the course the student have to qualify the examination to get admission into the next level. This system aids the students to procure the knowledge without geographical limitations. Availability, scalability and cost are the main factors offered by the cloud. The content in the cloud like e-books, video lectures, exam papers will be controlled by the cloud educational hub and will be available only to the registered students as per the need. To avail the services by the virtual college the student have to register herself with the virtual college with the help of cloud educational hub.

The subject experts can interact with the students through interactive videos using webcam. Through this proposed model the professors can easily upload their video lectures and guide the students whenever they face any challenge.

The cloud learning platform integrates all the resources. The user interface for students include live classroom, e-books, videos, virtual laboratory, online two way communication with professors and other class members.

By developing this model various issues faced by the students in the rural areas can be eradicated. They do not have to immigrate in search of quality education, they will get worldwide access of the knowledge at their desirable location that too by spending less amount. Virtual college is a platform that provide quality education with practical demonstration in a nominal cos.

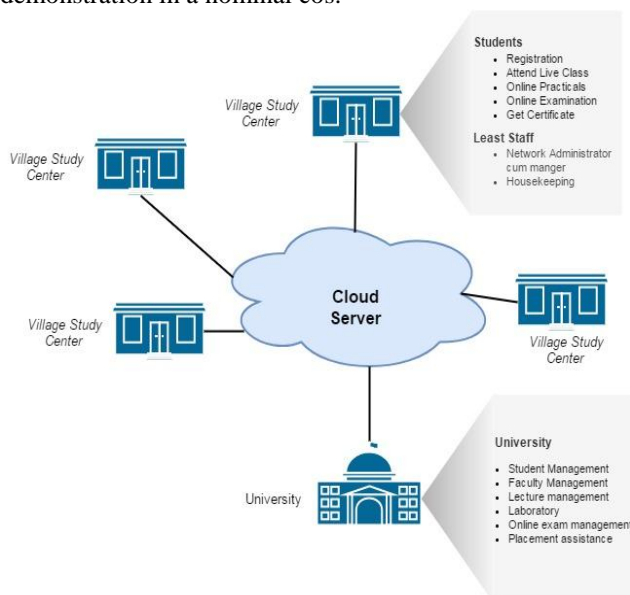


Figure 3: Architecture of education system on cloud

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