

## **Incentives in Adopting Cloud Computing for Shaikh Zayed University, Khost Afghanistan**

Samiullah Hassan<sup>1</sup>, Muhammad Sharif Haider<sup>2</sup>

<sup>1</sup>(Computer Science Faculty/ Information Technology Department/ Shaikh Zayed University, Afghanistan)

<sup>2</sup>(Computer Science Faculty/ Information Technology Department/ Shaikh Zayed University, Afghanistan)

Corresponding Author: Samiullah Hassan

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**Abstract:** Teaching in these days is almost regarded impossible without the Information Technology resources which needs a great amount of investments in this sector, there are a huge number of educational institutions which cannot afford these IT investments. Many institutions are in search of a cheap and economic way of delivering and managing these resources mainly in the Asian countries. Among such solutions, it is debated that Cloud computing is the right choice to reduce the expenses of the institutions. This paper describes the common benefits of cloud computing for Shaikh Zayed University. To provide imported and updated information and to deliver daily lectures on time, a physical structure such as (hardware and software) is needed. To attain this objective, the researcher conducted qualitative data to collect the data. Data from different experts were collected using the questionnaires in this field. The results of these survey showed that cloud computing had great role in reducing the Costs, achieved a Collaborating environment and all time Availability.

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### **I. Introduction**

Cloud computing has become a topic of consideration due to its high computing power, cost effectiveness, high performance, scalability, accessibility, availability and reliability. Cloud computing is also called Internet computing, it is the process to provide services and resources from the cloud online on the Internet from anywhere at any time. There is a need for such services in every Higher Educational Institution in order to share, collaborate, and get access to information all the time. For this purpose I have selected my study area of Shaikh Zayed University.

#### **Study area**

Shaikh Zayed University is one of the top ranking universities in Afghanistan which is located in Khost province and expands to an area of Eight (8) kilometers. It has twelve (12) faculties, seven thousand one hundred and fifty (7,150) students from many provinces under the supervision of two hundred and fifty (250) lecturers. Currently Shaikh Zayed University has many challenges and problems such as students and teachers do not have access to services anytime and anywhere and also this university has faced economic problems to make their own IT infrastructures in such case or situation the cost will be increased, but nowadays university of sheikh Zayed has limited budget. Shaikh Zayed university has faced a lot of other problems like the lack of collaboration between student and teacher as well as they cannot work as a team when they are in remote locations, they cannot view and share information easily and securely. Also the other problem of the current system, is that they have not outsourced some of the services to other organizations. For outsourcing the organizations (third parties) have professional employees responsible for handling a variety of configuration and management tasks for the university. For instance, monitoring services and resources for some malicious activities, providing automated backup and archival. The University also faced scalability issues i.e., whenever the university wanted to extend its services, it was either difficult or totally impossible.

#### **Problem statements**

Due to the increased cost of physical hardware and software, these has increased the challenges in higher education of Afghanistan. Students and teachers do not have access to services anytime and anywhere, lack of collaboration between students and teachers etc.

#### **Research questions**

- 4.1 What is cloud computing?
- 4.2 What are the benefits of cloud computing adoption for university?

#### **Aim**

The main goal of this research study is to identify the advantages by adopting cloud computing in Shaikh Zayed University.

## Objectives

To fulfill the above-mentioned goal the following sub-objectives has been formulated.

- To Reduce the cost of resources in the institution
- To facilitate e-learning services.
- To facilitate collaborative work.
- To provide Services anywhere, anytime.
- To increase Scalability, flexibility and reliability.

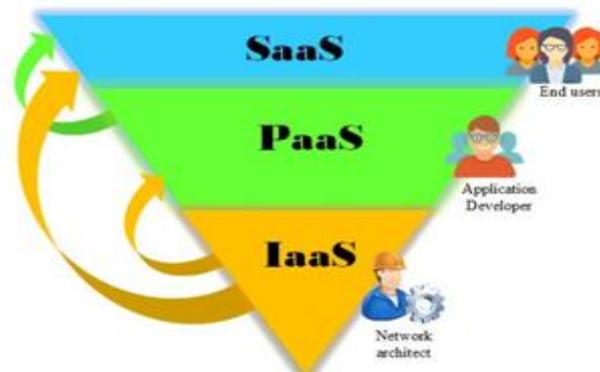
## II. Literature review

Cloud computing is a model which provide services according to the end user demands. Cloud computing is referred to the use of remote servers which are hosted on the internet in order to store, process and manipulate data, in this the services are delivered over the internet. Cloud computing has become of particular consideration due to its high computing power, cost effectiveness, high performance, scalability, accessibility, availability and reliability. Cloud computing is also called Internet computing, is the process to provide services and resources from the cloud online on the Internet from anywhere at any time. In order to store data, it uses completely secure datacenters which appears as a cloud[1]. In the past few years the cloud computing and virtualization has become very famous in the field of information technology. Cloud computing is now entered to the different portions of the society such as in education. Without modern information technology it is impossible to train students especially in technical institutions. But as universities have limited budgets and cannot afford updating computer IT infrastructure and also the costs of software used to keep students information, so they can adopt cloud computing which can reduce their software and hardware costs, application programs used during the training as well. There are different Cloud Services Providers such as Google and Microsoft which provide E-mail services and storing of private documents, this results in good functionality in university system[2].

### Cloud service model

Cloud Service Provider generally provide three types of services such as SaaS, PaaS and IaaS which will be describe in this portion of the paper.

- **SaaS (software as a services)**Software as a Service is a software distribution model in which applications are hosted by a cloud service provider and made available to customer over Internet. These services can be a mail service, messaging services, storage services and etc.[3].
- **PaaS (platform as a services)**this is a developer programming platform which is created for the programmer to develop, test, run and manage the applications regardless knowing of the underlying platform. In this model programmer can use any kind of programming language, writing any kind of application in it.[3][1].
- **IaaS (infrastructure as a services)**in this model the customer organization outsources its IT infrastructure like Servers, Networking, Processing, Storage, Virtual machines and other over the Internet with a pay-per use model. [4][3].

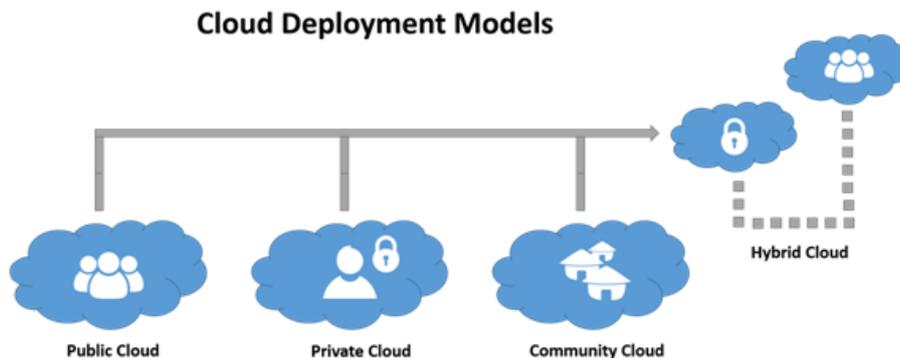


**Figure 1:** Shows the Cloud services model(Source: <https://www.finoit.com/blog/cloud-computing-service-models/>)

### Cloud deployment model

The deployment model of cloud computing includes Public cloud, Private cloud, community cloud and the hybrid cloud.

- **Public cloud:**It allows accessibility of systems and services easily to everyone on the Internet. It is public means any customers, client organizations, industries and many more can access it.
- **Private cloud:**Private Cloud allows accessibility of systems and services within the organization. Private cloud is operated only within a particular organization but managed internally by third party such as Google, Amazon or else. [1][3].
- **Community Cloud Community Cloud:** A type of cloud that is shared among various organizations with common resources. This is managed by a third party services and made available to on or off [5].
- **Hybrid Cloud:** Hybrid Cloud is the mixture of Public and Private clouds, the organization internally use private cloud for critical activities and public cloud for non-critical activities. [3].



**Figure 2.** Cloud Deployment Model( Source: <https://www.uniprint.net/en/7-types-cloud-computing-structures/>)

### The Benefits of cloud computing for higher education

Cloud computing is a new technology nowadays and growing rapidly day by day, cloud computing is extremely vital for education's area. I would like to mention some benefits of cloud computing as follow.

- **Availability:** cloud computing provides services 24/7 without any concerns, the services are offered over the Internet accessible to all with a high speed, there will be no delay to make you ambiguous for the cloud computing services. Cloud computing allows students and teachers taking online courses, examinations, sending feedback, projects and homework anytime anywhere accessible by any device like PDA, PC, Laptop, mobile etc. But they must have access to the internet[2][6].
- **Cost effective:** Cloud computing reduce the cost for hardware and software installation, upgrading and maintenance, you pay only for the virtual machines, storage and services you use. It decreases the investments for IT infrastructures by pooling the resources through this you can achieve optimal usage of hardware and software. This also enhances the efficiency, effectiveness and availability. Instead of purchasing individual or educational licenses for software you can rent your software packages which will be available online for a broad amount of users. This can significantly reduce the cost because you only spend money on the service rather than the maintenance of hardware and software and their license. Due to cloud adoption there is no need for on premise IT infrastructure or datacenter, this also lessen power consumption and cooling equipment. Also the company will not spend money on hiring IT staff to maintain the IT infrastructure[2]
- **Speed up collaboration:** Cloud computing makes it easy to collaborate, means teachers and students can work as a team even if they are in remote locations over the cloud, they can view and share information easily and securely across the cloud platform. Cloud computing provides environment for students, teachers and management staff to access information from their PCs regardless of installing a specific program, all documents are stored in a single place with unique format. This provide flexibility and facilitates interdepartmental collaboration. Forms, files, presentations can be edited at the same time by different people from different computers. Helps in quality improvement of information and efficient tasks distribution by boosting feedback [7][8].
- **Information backup:** Also called redundancy by software specialists; means the data is stored on many and different locations. The information storage by the cloud computing is done in a large pool of servers throughout the globe which results in high speed. With backups if a problem happens to a physical or virtual server the data is still not lost and can be accessed [2].
- **Disaster recovery:** Means that the data is available after physical or virtual failure or other problems happened. In cloud computing the data is stored on multiple virtual servers in multiple locations. This saves

a lot of time and expenses for the university. In all kinds of emergency situations cloud service providers provide quick data recovery when disasters and power outages occurs [9].

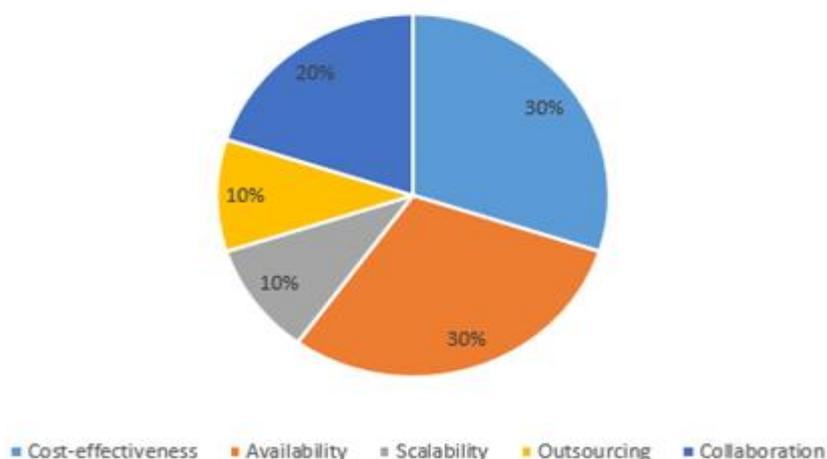
- **Outsourcing:** Is the key benefit of cloud computing through which some of the functions of the IT department in a higher education is transfer to the cloud provider [2]. In Cloud environment, a system administrator is responsible for handling a variety of configuration and management tasks. For instance, monitoring services and resources for some malicious activity, providing automated backup and archival. As the CC offers services in different service models (Infrastructure as a Service, Platform as Service, and Software as a Services). The process of maintenance, management, and upgrading is responsibilities of the Cloud provider or the third parties. The user is not responsible for managing or updating the underline infrastructure. In the case of using platform as a service, customers are responsible for controlling their own services which they want to deploy in the Cloud environment and when an organization own Infrastructure as a service Cloud, then they can have a control over the underline hardware, managing and updating the overall infrastructure is still responsibilities of Cloud providers [9].
- **Scalability:** Quickly build, deploy and manage applications and users, ability to build and expand within minutes. You only have to pay for applications you need, only the storage you need, only the virtual servers that you use, you can grow as you need and at some points you can reduce. Based on the needs of the users, the virtualized resources can be aligned up and down, we can add more and more CPU or power to the existent machines which is also known as vertical scaling. Load scalability is also known as the scaling of cloud resources[10][11]

### III. Research Methodology

We have conducted Literature Review related to the benefits of implementing the Cloud services in higher institutions like universities and colleges. In our case it is the Shaikh Zayed University. Additionally, we have also conducted survey in the form of questionnaires which were distributed to the experts in the computer science faculty as well as the students studying in this field. After gathering these questionnaires, it was analyzed thoroughly for the adoption of these services.

### IV. Results And Discussion

Questionnaires which were gathered from various individuals were conducted based on their degrees, level of Education and their responses to the advantages of the adoption of Cloud computing in Sheikh Zayed University. The following pie chart shows the effectiveness of the advantages of Cloud computing in terms of percentage of the people who have participated in this survey. About 30 % percent of the respondents were in favor of the advantage of bringing a collaborative environment. On the other hand 20 % of the expert showed that it is a cost effective method for implementing it in a university. Another 30 % of the interviewees said that Availability of the cloud infrastructure was the primary incentive. Finally, for the advantage of scalability and Outsourcing 10 % people were in favor of adopting it in Shaikh Zayed University.



**Figure 3.** Percentage of responses in terms of advantages from Interviewees perspective.``

### V. Conclusion:

Cloud computing has many advantages for educational institutions by providing SaaS, PaaS and IaaS. The IT staff of educational institutions can free from overburdened work such as maintenance, updates and etc. the rising demands of students from the campus can be easily satisfied with the help of modern technology. The

students of such system can have access to a shared environment through which they can easily collaborate with each other without transferring files or to think about any software compatibility. Students can gain access to the system with less effort and inconsiderable cost.

#### **Future work:**

As it is clear that every technology which is designed for any system have Pros and Cons. As we have discussed certain advantages of implementing the Cloud services, it is a need to conduct research on the disadvantages too in the future. It is a broad scope for researchers to investigate those factors which obstruct the services of the Cloud in higher institutions.

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