Cloud Computing: A General User's Perceptions and Security Issues at Universities of Faisalabad, Pakistan

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Abstract

We are going through the era of information. While going through this era, this has become nearly impossible to achieve the desired goals without using emerging information technologies. In third world countries, this is becoming very hard to run with the pace at which new technologies are emerging and changing our lives over a night. Third world countries are facing a lack of resources problems in the field of information technologies. This lack of resources has increased the importance of resource sharing between different organizations, specially the educational establishments. When we discuss the resource sharing, the idea of Cloud computing is originated. This paper will focus on the user's general perception and what sort of issue they can face while using cloud computing. To carry out this research work a survey questionnaire method is adopted. This work involved group of users from different universities of Faisalabad, Pakistan.

Keywords: *Cloud Computing, Grid Computing, Information Technology*

1. Introduction

Societies are now moving towards innovation. They are demanding every basic necessity of life at their door step. Every person wants to avail these facilities whenever he/she desired. This desire can be fulfilled if it will be available under one umbrella. Now, information technology is also as necessary as other basic utilities of life. Cost of these utilities is based on their usage. In cloud computing IT services are available under one umbrella [1]. Cloud computing is one among fastest growing technologies. With low financial budget and limited available resources, education sector can become level one beneficiary of cloud computing. Conspiracy is created when different definitions and implementation from Amazon, Google and Microsoft are focused. Education sector became confused in this situation [2]. Despite of these hurdles many work is required in cloud computing and much flexibility is available in this technology.

2. Cloud Computing

Cloud computing can be define in two ways, the one is, it is a computer facility that is provide via the internet, the other is that it is a computer facility that accessing via the internet from different locations. When a school or university, for example, moves to cloud computing for online operations, it necessarily considers both of the equation [13]. Cloud computing is becoming popular due to its virtualized, elastic, saleable and on-demand services [17].

Cloud computing is based on concept of grid and client server computing or peer to peer service. Therefore it is not a new technology so an educational institute should not feel worry while converting on these technology [5]. Cloud services can be accessible through internet from anywhere. Consumer can use services without paying extra charges of hardwares, softwares, networks, people and trainings. In other cases one should have to pay total price of each component is being used [16]. It is observed that some services or utilities charged more when in peak mode. Cloud computing is free of all these issues [6].

3. Cloud Computing Deployment Models

Its different level of deployment models (public, private, hybrid and community) and service models (Infrastructure, Platform and Software) made more flexible for education especially. These features

enable it to share services of one educational institute to another at deployment and service models [3]. Deployment cloud models are described as following.

3.1 Public Cloud

Public cloud model offers services like utility services i.e. electricity. It means these kinds of model present services for everyone. These models are usually less secure and it is difficult to define scope of public models [8].

3.2 Community Cloud

These models are usually public but for same community or concerns. Community cloud models have larger in boundary than private models and lesser than public models [14].

3.3 Private Cloud

These models are normally designed for a single organization or a university. Different departments of an organization or university can share it services. It is more secured than all other cloud models. It has limited in scope. Only authenticated user can access these services [8].

3.4 Hybrid Cloud

It is combination of two or more same/ different cloud models. It is more flexible. It is more secured than public and less secure than private model. It can be developed by joining two organizations or universities. It can be treated as public or private [8, 15].

Increasing demand of IT resources especially in educational projects, research and teaching made it essential to find out a way in which maximum resource can be available with low cost. It is difficult for a single university to provide all desired resource at same time. Cloud computing brings hope for those universities who are located in third world countries like Pakistan [4].

Due to its issues, educational institutes feel reluctant while adopting cloud computing. They do not want to share their campus confidential data. Some consider it will increase misuse of IT services and will lead towards hacking issues [7]. In cloud computing scenario end user have to developed trust on third party which is offering that particular service. It is a tough job for a company or a person that have some confidential data. Everyone needs security about his/her personal or confidential data [8]. Google and Amazon are providing different services as third party. Critics of cloud computing blamed cloud computing for security problems. Security issues are occurred when a person misuse some ones laptop and Computers. If one forgot his/ her password on Google than this it is not a fault of cloud computing it is an authentication problem [9].

This research work includes the following objectives:

- To focus on the user's general perception about Cloud Computing.
- What sort of security issues they can face while using cloud computing.

The evaluation is based on case study of four universities of Faisalabad, Pakistan where more than 50 users of IT are worked on their own developed systems. A survey questionnaire was designed on self assessment based. Survey is containing several areas of cloud computing but in this paper two areas are focused i.e. user's general perception about Cloud Computing and issues they can face while using cloud computing. This research work comprises the following section: section 4 contains that how survey designed, published and who is the population of said survey. Section 5 the related work. Section 6 the results about general perception of cloud computing and issues faced by said universities. In section 7 conclusion and future work is discussed.

4. Survey Methodology

This survey is conducted on IT administration and IT staff of four local universities of Faisalabad, Pakistan where more than fifty respondents are working. Survey included twenty five questions Table. 1. The questionnaire including its rating scale is designed to evaluate the user's perception and security issues of cloud computing. An inquiry tool was developed to access this questionnaire. Users is rated the each question from the given value for evaluation and to promote the cloud computing concept. This design method is selected due to its easiness, manageable and secure.

5. Related Work

A self assessed questionnaire was designed to evaluate the user's general perception and issues regarding cloud computing. The adoption purpose of this method was due to it is cost effective, easy to access and efficient way to gather the data from participants. The survey includes different options for evaluation. To access the objectives, an inquiry tool was designed Figure.1. The purpose of designing this tool is due to ease of access, free of cost and quick response from the users. This inquiry tool is also a very good concept of cloud computing because users are accessed this application over a internet.

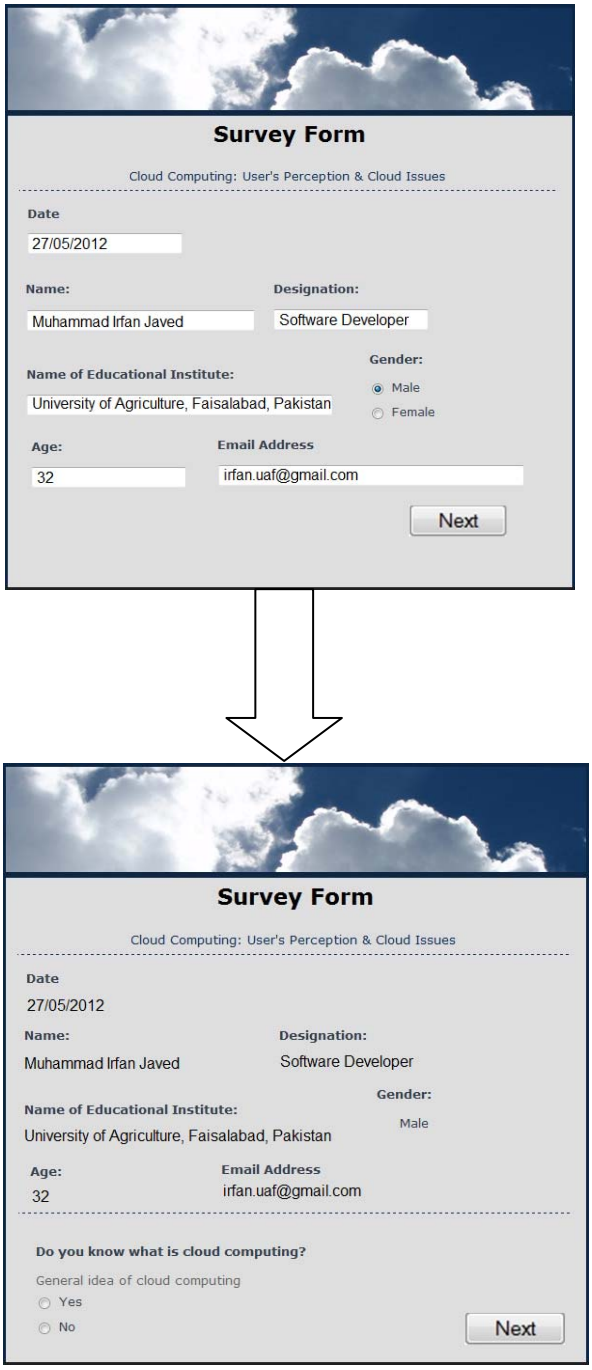

Fig. 1 Assessment tool to evaluate the general perception and issues of cloud computing

6. Results and Analysis

A criterion at which evaluation questionnaire was designed is given below in Table 1. The selection of questionnaire was based on previous literature [5, 6, 7, 8].

Areas	Questionnaire
General Perception	Do you know what is "Cloud Computing"?
	Do you know how it works?
	Is cloud computing bigger than internet?
	Is cloud computing beneficial for education or not? Especially in Pakistan
	Do you have practical experience of cloud computing?
	Do you have idea about cloud service models?
	Do you have idea about working of cloud service models?
	Do you know cloud deployment models?
	Do you know how cloud deployment models establish?
	Which cloud service model will you prefer for your institute?
	Which cloud deployment model will you like to establish?
	Do you think cloud computing will bring mega change in information technology?
	Do you think cloud computing is emerging concept and will helpful for every field of life?
Issues	Do you think resource sharing is a risk?
	Have repository of your institute contained confidential data?
	Do other universities are co-operating while converting towards cloud?
	Is sharing of research and development projects of different universities will be harmful?
	Do you think budget is an issue while converting to cloud computing?
	What percentage do you think cloud computing is a security risk?
	Do you think working performance of cloud computing is satisfactory?
	Do you think due to confidentiality permission/rights can be an issue?
	Do you convince with service quality of cloud computing?
	Do you think customizations of services are an issue?
	Do you satisfy with service availability of cloud computing?
	Is Limited data availability is an issue?

Table.1 Selected questionnaire for assessment of general perception and issues of cloud computing

Responses received from users were managed through inquiry application. The users have to rate the question as per value they perceived from the given data. 50 users from 4 universities of Faisalabad, Pakistan are answered the questions. There were 30 out of 50 having master level of education with 5+ year's experience. 12 out of 50 have bachelor in computer science and having less than 5 years experience while remaining 8 out of 50 have bachelor in computer science with 2 years working experience.

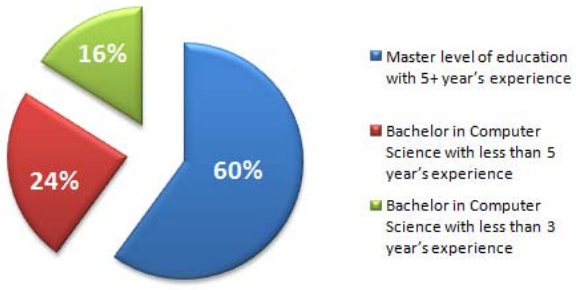

Fig. 2 Graphical presentation of respondent qualification and experience

The author received the response from all 50 users completely. The below figure show that how many participants are knowing about the cloud computing

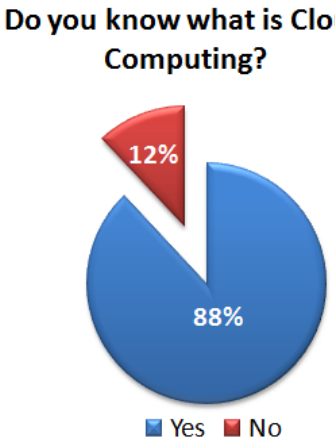

Fig. 3 Graphical presentation of Cloud Computing awareness from the participants

Fig.3 is showing about the awareness of cloud computing from the selected participants of 4 universities. 88% participants of received respond are very well aware about the cloud computing while 12% are eliminated due to unawareness of cloud computing. Now the 44 out of 50 participants are participated in the remaining evaluation questionnaire.

6.1 Response received against general perception of cloud computing

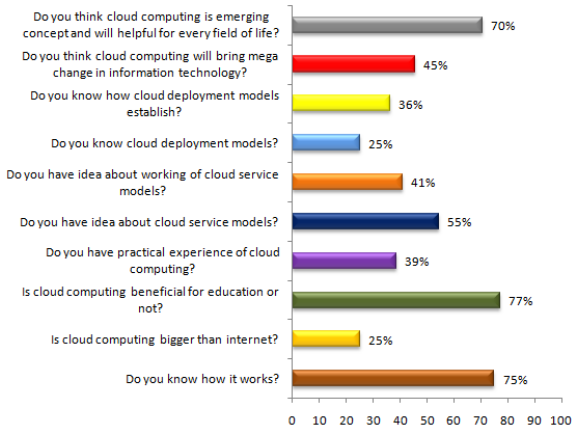

Fig. 4 Graphical presentation of General Perception of Cloud Computing

Fig.4 is showing the results of questionnaire which were asked from the 4 universities IT staff. 70% agreed that the cloud computing is emerging concept and will helpful for every field of life. 45% participants said yes cloud computing can bring mega change in information technology. When we asked about how to establish the cloud computing models 36 % said yes they know. 25% said yes they know cloud computing models. Regarding idea of cloud service model 55% said yes they have an idea of cloud computing models. When we asked the working of cloud computing models 41% said yes they have an idea. 39% said yes they have practical experience in cloud computing while 61% said no they don't have any experience. 77% said yes cloud computing is beneficial for education sector while other said no there are lot of issue in cloud computing for education sectors. When we asked, Is it bigger than internet 25% said yes. 75% said yes we know how it works.

When we asked the prefer model of cloud service for their institute Fig. 5 showing the results we received.

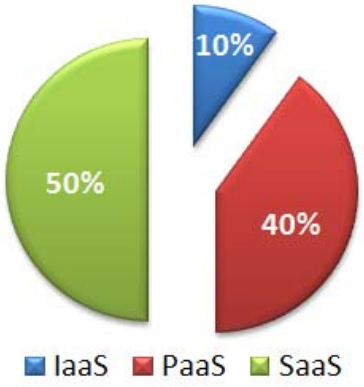

Fig. 5 Graphical presentation of Preferred Model of Cloud Service

50% said they will prefer SaaS (Software as Service) model, 40% said they will prefer PaaS (Platform as Service) model and 10% said they will prefer to use IaaS (Infrastructure as Service) model.

The response against the question which cloud model would you like to establish. Fig. 6 showing the result we received.

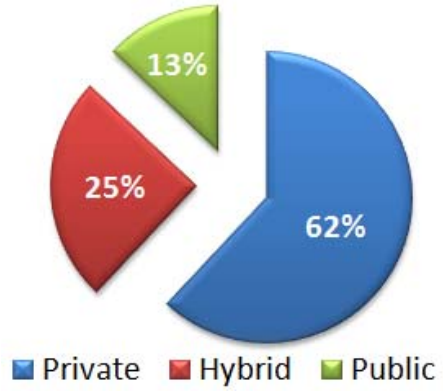

Fig. 6 Graphical presentation of preferred cloud model

62% said they will prefer private model, 25% said they will prefer hybrid model and 13% said they will prefer for their institute is public cloud model.

6.2 Response received against security issues of cloud computing

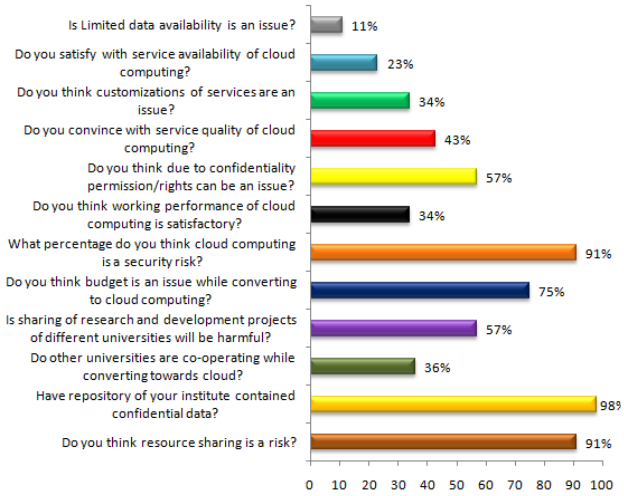

Fig. 7 Graphical presentation of Security Issues of Cloud Computing

Fig.7 is showing that which sort of issue can occur while using cloud computing facility. The security issues questionnaire were asked from the participants and the Fig.4 show that positive reply in "Yes" were received from 4 universities IT staff.

7. Conclusion and Future work

The purpose of this research work is to evaluate the user's general perception and security issues regarding cloud computing. For this purpose a survey was conducted through an inquiry tool to evaluate the objectives from IT administrators of 4 different universities of Faisalabad, Pakistan. In Pakistan where peoples are not well aware about information technology and will take time to know the concept of cloud computing. Findings are showing that most of the participants are familiar with cloud computing but unfortunately some of them have not much clear due to lack of resources. 91% participants replied that using of cloud computing is a highly security risk due to research and development projects of different universities will be harmful, they contained confidential data and sharing of resources. Some universities have cost issue that they don't have sufficient budget for cloud computing. So there is a need of trainings, brain storming session of IT administrators of universities to highlight cloud computing importance as it is among fastest growing technology. In future a cloud model will be suggested according to requirements of IT administrators at universities of Faisalabad, Pakistan.

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