THE ROLE AND BENEFITS OF IMPLEMENTING CLOUD COMPUTING SYSTEM IN SUDANESE HIGHER EDUCATION INSTITUTIONS

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ABSTRACT:

Educational institutions throughout the World have become highly dependent on information technology for their teaching-learning, service delivery and business requirements. Procuring and maintaining. A wide range of hardware and software require substantial, ongoing investment and the skills to support them. In the current financial crisis and being challenged by growing needs, universities are facing problems in providing necessary information technology (IT) support for educational, research and development activities. The objective of this paper will focus on what is the role and benefits of cloud computing in Sudanese Higher Education institutions.

The paper discusses the role and benefits of cloud computing in Sudanese Higher Education institutions, and the limitations of current IT utilization in Sudanese Higher Education institutions.

Keywords: Cloud computing, Sudanese Higher Education Institutions (SHEI), SaaS, PaaS, IaaS.

[1] INTRODUCTION

Recently cloud computing has offered attractive solutions for academic and research institutions. The cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction.[6][3]

[2] SERVICE MODELS OF CLOUD COMPUTING

The Service Models of cloud computing can classified of the following:

[2.1] SOFTWARE AS A SERVICE (SAAS)

The capability provided to the consumer is to use the provider's applications running on a cloud infrastructure. The applications are accessible from various client devices through either a thin client interface, such as a web browser (e.g., web-based email), or a program interface. The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment. [6]

[2.2] PLATFORM AS A SERVICE (PAAS)

The capability provided to the consumer is to deploy onto the cloud infrastructure consumer-created or acquired applications created using programming languages, libraries, services, and tools supported by the provider.3 The consumer does not manage or control the underlying cloud infrastructure including network, servers, operating systems, or storage, but has control over the deployed applications and possibly configuration settings for the application-hosting environment. [6]

[2.3] INFRASTRUCTURE AS A SERVICE (IAAS)

The capability provided to the consumer is to provision processing, storage, networks, and other fundamental computing resources where the consumer is able to deploy and run arbitrary software, which can include operating systems and applications. The consumer does not manage or control the underlying cloud infrastructure but has control over operating systems, storage, and deployed applications; and possibly limited control of select networking components (e.g., host firewalls).[6]

[3] SUDANESE HIGHER EDUCATION

The growth of higher education within the context of Sudan development faces the challenges to nurture conditions in which the individuals with high education qualifications can be productively employed, the high cost of hardware and software requirement is one of important challenge that facing the Sudanese higher education institutions.

[4] BENEFITS OF CLOUD COMPUTING FOR HIGHER EDUCATION INSTITUTIONS

Cloud computing affords opportunities for greater student choice in learning. Using an Internet-connected device, students can access a wide array of resources and software tools that suit their learning styles and interests, and cloud-based services can help institutes reduce costs and accelerate the use of new technologies to meet evolving educational needs. Students can use office applications for free without having to purchase, install and keep these applications up to date on their computers. It also provides the facility of Pay per use for some applications. Availability of

the services is the most important and desired by the user using the education cloud.24 X7 is the availability that is needed by this system without failure. From anywhere one can login and access the information. Colleges and governments are now free to focus on their goals that is making more research facilities available to the students and making the environment global in spite wasting time on worrying about the buildings, labs, and teachers. [2]

[5] ROLE AND REASONS FOR ADOPTING CLOUD COMPUTING IN HIGHER EDUCATION

The research represented the role of implementing for the use and adoptions of cloud computing in Sudanese higher education are:

1. Reducing the size of resources such as electricity and servers and switches and cables.
2. Support sectors of SHEI, universities and provide services in a more self-elasticity of the standard routine now in terms of the development of technical studies and the provision of resources.
3. Decline in hardware costs and an increase in computing power and storage, eliminate the operational burdens and entrusting it comes to cloud services providers.
4. Adopting cloud computing in SHEI.

[6] THE PROBLEM

Despite the growing in the area of cloud computing systems, it is not known why the development of cloud computing systems is still not use, especially in current Sudanese higher education's institutions. Based on the problem raised the following research question is:

How to transform institutions of higher education in Sudan from traditional computing to cloud computing....?

[7] RESEARCH MODEL

Figure 1 shows the role and benefits of implementing cloud computing system in Sudanese Higher Education's.

Figure 1: The Role of Implementing Cloud Computing in Sudanese Higher Education.

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[8] METHODOLOGY AND SAMPLING

For the purpose of collecting information on the perception of universities Sudan to the goals of cloud computing and pattern or patterns of cloud computing that can be applied to serve the educational process designed to identify the researcher. Questionnaire addressed to specialists in the Deanship of Information Technology in Sudanese universities and contains 9 open-ended questions.

Statistical Package for the Social Sciences (SPSS) will be used to answer the research question.

Even though 40 questionnaires were distributed to the participants, 40 questionnaires were successfully collected. Of the 40 (100%) questionnaires that were returned successfully, and this copies were completely answered, Figure 2 shows the technical response rate.
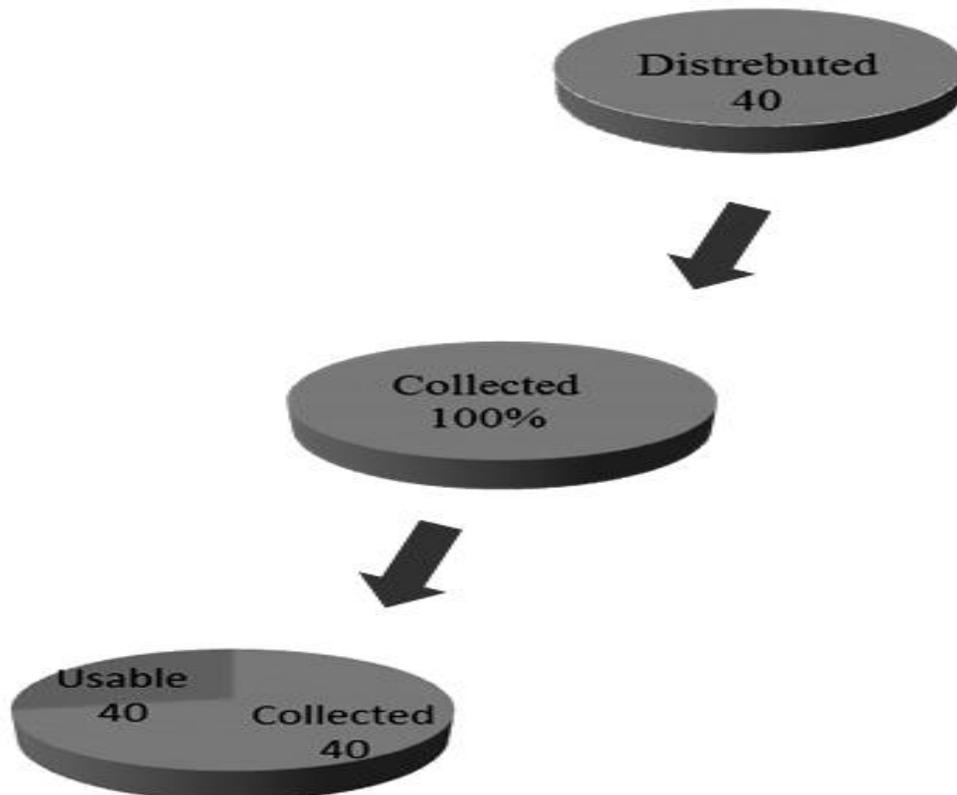
Figure 2: Technical Response Rate.

[9] DATA ANALYSIS AND RESULT

Quantitative approach was used to answer the question about the Roles and benefit of implementing cloud computing system in Sudanese Higher Education's Institutions from the participants' point of view. This will include data has been collected from multiple Sudanese universities to select the participants of the questionnaire.

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[10] DEMOGRAPHIC PROFILE

The first part of the questionnaire collected information on gender, age, marital status, education type, and the experience in information technology field. Table 1 presents the demographic profile of the participants who responded to the questionnaire and the frequency distributions.

Table 1: Demographic Profile

Category	Response	Frequency	Percentage
Gender	Male	23	57.5
	Female	17	42.5
Age	18 _ 25	8	20
	26 _ 30	10	25
	31 _ 36	15	37.5
	37 _ 50	7	17.5
Marital Status	Married	16	40
	Not Married	23	57.5
	Separated	1	2.5
Education Type	Bachelor's Degree	42	60
	Master's Degree	13	32.5
	PHD	3	7.5
Experience in IT Field	1 _ 5	22	55
	6 _ 15	16	40
	16 _ 30	2	5

[11] ANALYSIS OF ROLE AND BENEFITS FOR IMPLEMENTING CLOUD COMPUTING IN SUNDAES HIGHER EDUCATION

The Cronbach's Alpha values of all (variables) are greater than 0.7, Cronbach's Alpha value of 0.7 or higher suggests good reliability and indicators of this model's constructs good. Table 2 presents the Internal Consistency Reliability for benefits and roles of implementing cloud computing in sundaes higher education.

Table 2: Internal Consistency Reliability of roles and benefits for implementing cloud computing in sundaes higher education

Role and benefit of implementing cloud computing In Sudanese higher education	Cronbach's Alpha
Support sectors of Sudanese higher education	0.81
Decline in hardware costs / increase in computing power and storage	0.86
Eliminate the operational burdens / reducing the size of resources	0.87
Adopting cloud computing in Sudanese higher education	0.92

[12] CONCLUSION

Analysis of the results centered on interviews technical specialists who were interviewed in the deanship of information technology in Sudanese universities, and interviews specialists in e-learning in the deanship of distance learning.

From the analysis of the outputs of the questionnaire answered by specialists in the deanship of information technology became clear that the causes that prompted the deanship of Information technology Sudanese universities to take this important step in the recruitment of cloud computing to provide services to beneficiaries from inside and outside the university to the following:

- Reduce the amount of resources (electricity and cables servers and switches ...) and use it optimally.
- Support sectors of the university to provide its services with all the flexibility of self other than the standard routine of where to put the technical studies and the provision of resources and so on.
- Keep up with global technology, and pay for the university centers developed in the use of all the service for its employees.

Also stressed all specialists in information technology that universities have not done any study in the field of application of cloud computing due to the fact that the subject of cloud computing a new topic in the region and be adopted now from a number of institutions of higher education did not announce any institution - to the knowledge of specialists - the completion of the application of computing cloud. But has been found on many international experiences and applied study of different solutions in the field of cloud computing and provided by different companies to develop a vision for cloud computing model optimized for the needs of universities.

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