

Impact of Cloud Computing in the Development of Information Systems for Smes in the Context of Organizational Competitiveness

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Abstract – This paper exhibits a review of the primary attributes of cloud computing, where they are uncovered, their principle parts and methods for use. In addition to the technological review that is done, is also carried out. To understand how cloud computing can lead to a powerful ally of SMEs in the context of organizational competitiveness in a world where the role of information systems for a long time proved decisive; it is a reflection that the SMEs, whose core business is not technology, need to be carried out.

Keywords: Cloud Computing, Information Systems, Organizational Competitiveness

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I. INTRODUCTION

Since past couple years, Cloud Computing (CC) has proved to be a brilliant place where computational solutions can be developed for various areas of knowledge. There were a lot of benefits which derived because of this new computational technique though it also led to numerous barriers. CC was considered to be an answer for the present situation in which the activities like the sharing, acquiring and managing considerable amount of data is actually a thing. The situation can be quite challenging with regards to computing resources which are there as it seems practical to do those activities with acceptable performance.

In terms of the computing resources, there is an idea of infinite resources for CC due to the fact that they are clearly scaling technique. Capacity to develop the cloud resources with the addition of resources to the cloud cluster can be invisible to end user and it would fix and involve the resources. CC consumer does not have to worry about this but it is the worry of resource provider. Consumers, usually the organizations, receive a considerable benefit from such perception of computing

The idea of computing resources should be managed by infrastructure, services or the development stages with accessibility to internet – it employs, attaches, available and supplier is accountable to make sure about service quality.

CC facilitates the firms so they can provide attention to the business and they can have a scalability setting regarding the services and infrastructure that becomes unlimited. Comprehensive study of the cost would not be the aim of this study and it is shown as universally beneficial.

It is an outdated perception that the organizations in which infrastructures are not registered firms anymore, which has been going on for many years, and is considered as resources owned, administered and accessible by third parties. This perception was broken by CC and it is now looked as a sub that takes the form of services [1].

The new perception helps in retreat the situation what used to be in which ownership, management and maintenance of the infrastructure resources were the assets of all the firms. Even if it is broken completely with previous perception, the fundamental business is the only thing which the business must attend to.

Because of all this, CC puts forward a number of barriers where first of them is a change in the organizational culture in terms of the ways of handling technological aspect. Security, ownership, legal problems and numerous other problems can seem to be the new barriers for the firms.

A. Background

It is necessary to describe the theory of CC prior to the investigation related to it. CC has been described by Cearley (2009) as a concept in which technological skills are flexible and accessible and are offered as a service to end-users through internet [2]. National Institute of Standards and Technology (NIST) described CC as a model that facilitates easy access and on-demand mode, number of configurable computing resources like storage, networks, applications, servers and services) which are obtained rapidly and used with a decreased management effort or communication with service provider[3]. According to Carr (2009), CC comprises numerous network services that offer accessibility, service quality, low-cost computing infrastructure which is accessible normally [4]. Vaquero (2008) it is possible to consider CC as a primary source of virtualized facilities like hardware and software development stage that is accessible and is actively configurable so it can suit properly in various processing loads in which cost model is on the basis of payment by numerous resources employed [5]. Buyya (2008) states that CC is an allocated and equivalent system which comprises of set of virtualized and interlinked computers which are actively handled and presented as one or more combined resources where those resources are offered as the commercial agreement between a service provider and a customer of those services [3]. A theoretical view of CC can be seen in the Figure 1.

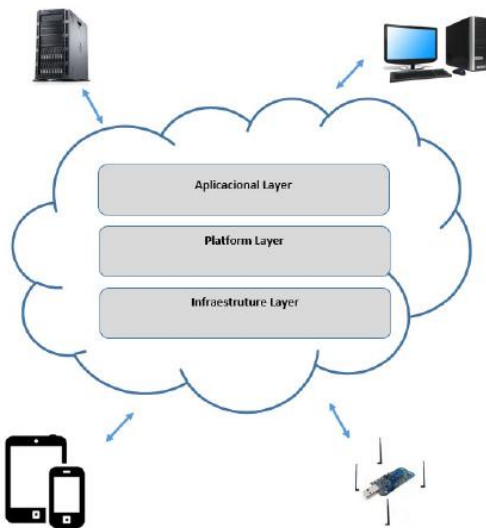


Figure 1: A conceptual view of cloud computing

II. CLOUD COMPUTING FEATURES

There are various properties in CC which categorizes and differentiates it from rest of the models and the ones which are recognized and defined below to have a proper comprehension.

Resource virtualization: It is possible to virtualize computational resources and some virtualization technologies can be found on market through which it is possible to virtualize the computers, networks and the storage systems. Physical infrastructure facilities can be separated too. Such though process would allow managing the skills as services instead of physical elements which make it unwanted to the direct and physical management.

Elasticity and scalability: Elasticity and scalability can lead to creativity in the computing and converts to capability to offer or eliminate computing resources through the course of runtime. There is the idea of scalability related with elasticity of framework and it converts to capability to develop existing skill with the addition of new properties.

Location independence: Location independence is one of the related CN and it converts to capability of every property which exists, irrespective of the location of user and presence of Internet connection as it is a required aspect just for complete access and management of subscribed facilities and therefore cloud is shown in the eyes of a customer along with a centralized access point and can be seen anywhere and in any platform.

Measuring and monitoring service: CN offers the examination of the resources used and based the cost based by determining them and therefore it is a model which is in use at every provider of rest of the resources employed in society, such as gas, electricity, or running water. This method is described by parties at a particular level and service quality to make sure about the developed situations being matched and if there is any failure, then penalties being directed.

Location of resources: Location of resources present on CN might be having an active dimension, the importance and rights related to the location can be set such as country and data center. Questions are usually legal law of every nation and they make location of resources an essential dimension in cloud resource contracting.

A. Service Models

There is a three-tier model in state-of-the-art review which can be seen in the Figure 2 IaaS_PaaS_SaaS. All of the layers describe a service model each. Three layers are Infrastructure as a Service (IaaS), Platform as a Service (PaaS) and Software as a Service (SaaS). There is a short categorization of every layer below:



Figure 2: Services Layers of cloud computing

B. Infrastructure as a Service (IaaS)

IaaS is lower level of theoretical model of CN and it helps in converting the capability of service provider delivering a computational infrastructure to the provided level of storage and processing. IaaS layer should be visible to customer and it is usually a layer which uses virtualization engines of the computing resources. It has the capacity to actively grow or decrease resources which are existing by the application requirement feature. It can make enhancements in maximum ability in oppose of the ability at a certain time which is not utilized, that is, idle ability. There are a few examples of IaaS and they are Elastic Utility Computing Architecture Linking Your Programs to Useful Systems (Eucalyptus) [6] and Amazon Elastic Cloud Computing (EC2) [7].

IaaS converts to a substitution which the companies have instead of obtaining the computing power themselves, that might be under-sized or over-sized, that might be contracting the computing resources as per the business requirements where there are no concerns regarding the need to develop via the transformation of buying new tools by just subscription of greater computing ability in the cloud. Cloud is formed as one of the many limitless resources' platform in the viewpoint of the consumer in which it is not compulsory to know how and when there can or must be the enhancements in the resources.

C. Platform as a Service (PaaS)

Platform as a Service is middle layer of theoretical CN model and it offers operating systems to the customer along with the software development platform and the programming languages. In addition to all that, it also offers storage solutions and databases which would make the application development, testing, and integration facilities easy as they are suited properly with restrictions that introduce the development surroundings like the existing programming languages or the administration systems of potential databases to use. It converts to a layer which can easily smooth the process of development of the applications. A few examples of this layer are Aneka [8] and the Google App Engine [9].

D. Software as a Service (SaaS)

Software as a Service (SaaS) is the layer which is the remotest layer of CN and it stands for numerous applications which are functioning in a cloud atmosphere and it is possible to access those applications when a browser is used. They can be accessed from anywhere and from any device and all that one need is a proper Internet connection. There is no need to buy any software license for SaaS and it leads to decrease in costs along with making the most of the universal applications. Microsoft SharePoint, Google Docs, or Facebook can be termed as a few examples of SaaS.

E. Deployment Models

Use of CN or particularly the formation of clouds can be under the label of various models. State-of-the-art CN is about the public clouds, hybrid clouds, private clouds, and community clouds. All of them have different features which are categorized and can be seen in the Figure 3.

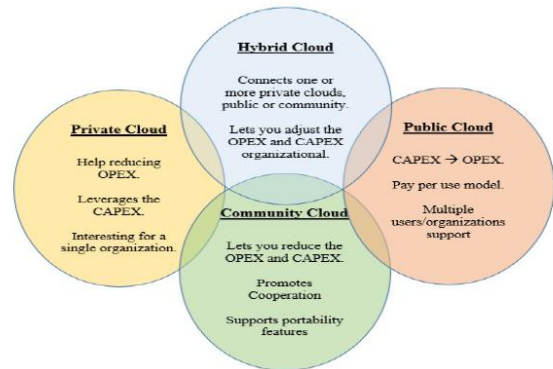


Figure 3: Cloud computing implementation models

F. Private Cloud

Cloud infrastructure is exclusive and is used entirely in this model by the company which is the owner of it. Problems which are associated with the access control and the limitations featuring the style can be seen. High cost of formation and maintenance of the clouds over the use of a public cloud are related with the model here. It must be taken into the consideration that largest and most comprehensive control is over the resources which develop cloud. Organization can completely control the configuration alternatives of computing resources and current service in this model.

G. Public Cloud

In the public cloud, cloud can be seen as a mutual resource space for numerous companies which tend to have mutual interests and those mutual interests usually come together for complementing necessities and the security schemes and the factors of flexibility of use. In the public cloud, one

of the companies can act as the cloud management and it might be fascinating to see in the settings of cooperation networks [10]. It should be taken into the account that along with the mutual interests, support network can share costs of forming and maintenance of a cloud.

H. Community Cloud

In this model, Cloud can be seen as a mutual resource space for numerous companies which tend to have mutual interests and those mutual interests usually come together for complementing necessities and the security schemes and the factors of flexibility of use. In the public cloud, one of the companies can act as the cloud management and it might be fascinating to see in the settings of cooperation networks [11]. It should be taken into the account that along with the mutual interests, support network can share costs of forming and maintenance of a cloud.

I. Hybrid Cloud

It is hard to put this model into the execution as it turns up in the practice with the configuration of two clouds where one cloud is focused on the essential procedures of the company and the other cloud is focused on secondary procedures. Therefore, a private domain can be formed where the control security and internal nature is quite high and a domain cloud can be formed over the public nature, or at least less subject to the tight control and more focused in enduring the challenging procedure environments [12]. The solution is a mixture which is hard to accomplish, more particularly due to the fact that it is hard to shack up and interlink those two clouds.

III. DISCUSSION AND FINAL REMARKS

Majority of the SMEs are not the technological organizations by themselves and they are more attentive towards the fundamental business and not much focused in discussing the technological factors of the support information processing and the compute facilities. At the same time, all the modern organizations accept that information is an important enabler of competitiveness and efficiency. The question still stands that if the companies do not have the resources required to obtain latest technology, how can they handle and develop flexibly? According to us, CC has the answer to this problem. With CC, it is easy for SMEs to convert technology infrastructure to a third party which is suitable to the part of entire management, flexibility and growth of infrastructure. For SMEs, it is the idea in which technology is something which would never be completely diminished. There should be someone to manage and be responsible for the operability where that someone should be making adjustments to these resources according to the requirements of the business. There are a lot of considerable issues

which would be kept aside and it is a good thing for majority of the SMEs where they do not have resources and they do not have their own profiles to go face to face with the technological barriers for the companies. There are legal problems regarding the computing resources being physically identified mostly in public cloud, trust problems associated with surety of complex information from the organizations. The laws which are overseeing the particular nation in which the information is headquartered have the duty of making the decisions regarding the dependability of the information. Most of the times, there is a considerable amount of difference between these laws and the laws which are imposed in the home organization that are making use of cloud.

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