Cloud Computing and its Effects on Electronic Commerce: A Survey

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ABSTRACT
Evolution of cloud computing within the last several years is regarded as one of the most important progresses of computations history. Although lots of research has been done in the field of this technology recently, the essential demand for understanding the problems and constraints related to cloud electronic commerce is still highly felt. This article shows that cloud computing has a wide prospect in e-commerce applications and this matter is shown through describing the cloud computing features, concepts and analyzing the improvement of e-commerce by it. In this article, strength and weakness points, opportunities, threats of cloud computing industry and the impacts of this technology on e-commerce will be stated.

Keywords: cloud computing, e-commerce, business, advantages, constraints

1. INTRODUCTION
Internet has changed the world and this is a reality. Also, cloud computing has emerged at this historical time and is regarded the next evolution in the field of science and technology that has changed the method of business model. Integration of cloud computing and E-commerce has a significant effect on organizations in all aspects. In other words, cloud computing is a transformed way for business enterprises by which they may create their infrastructures and applications. Cloud computing creates an extraordinary chance for business enterprises to be able to concentrate more on their abilities by using it. This matter is realized through outsourcing of IT outward of enterprise and lowering the costs of IT. The domain of cloud services includes a business model as soon as requested to IT resources as well as a set of technologies by which the commercial organizations can deploy their scalable infrastructures as dynamic and make available and applicable their services transparently with no interfering to IT infrastructures and their management. In the following, the important concepts and definitions about cloud computing and its effect on E-commerce will be stated.

2. CLOUD COMPUTING
Cloud computing is an information technology service model so that computing services (hardware, software) are given on-demand to the customers. Of course, these services are located over the network and independent of the place and devices. The above resources need to provide the required and necessary levels of shared services quality and being dynamic and scalable and also are given quickly and possible with minimum interaction to the service provider. Figure 1 shows a general schema of cloud computing model. This figure presents that how the computing resources over the cloud may be available using Internet by various platforms. Cloud computing may be provided by servers of enterprise or leased from a cloud provider [8].

1-2. Expansion Models and Cloud Deployment
At the present, four types of cloud computing services are available as following:
- Private: a private cloud or internal cloud is a type of cloud computing in which the provided services are able to be given to a few people. The delivered services provide the features of the cloud model for the people into an enterprise safely behind the firewall. Figure 2 shows this type of cloud.
• Community: in private cloud, the enterprise itself takes action to provide the resources, controls and makes the cloud services but it may give the responsibility of this practice on the shoulder third enterprise called virtual private cloud. Community cloud is the same as a virtual private cloud except that a specified group of organizations and enterprises with common interests to each other allow the access it. This option may give a higher rate of security, data confidentiality and policy correspondence [7]. The aim of community cloud is to facilitate the collaboration of community members and to link their efforts. The collaboration facility may incorporate full-service standalone applications that are accessible via a Web browser. Figure 3 depicts a community cloud.

![Figure 3: Community cloud](image)

• Public: in public cloud, the enterprises providing the cloud services make their resources such as applications, processing resources and storage available to the public to be used. Utilization of these resources to a low amount may be free or pay per use. This type of cloud is shown in figure 4.

![Figure 4: Public cloud](image)

• Hybrid: a hybrid of at least one private cloud and at least one public cloud. The environment of hybrid cloud is such that some of the resources are managed and maintained by organization itself and on the other hand, some of the resources are placed on the public cloud in order to benefit from the unique characteristics of the public cloud [1]. Figure 5 shows this kind of cloud.

2-2. Service Delivering Methods in Clouds are:

• IaaS: a wide collection of computing resources including all of the software resources (network, storage) are made available to the users for storing and processing virtually and it undertakes the management of the other parts itself by using a suitable operating system image conveniently. It means that they can change the size of these resources using the concepts of virtual making, segmentation, assignments or dynamics [2, 3, 11].

• Paas: cloud systems can provide a software platform to perform applied systems instead of providing an infrastructure virtually [3]. To utilize the cloud services and to benefit from the whole economic features given by the cloud, appropriate programming environments are required to implement and develop the applications. Another service presented in cloud environment is called the platform as a service or namely Paas which provide a suitable platform, software development kits and suitable libraries to develop the cloud software [11].

• Saas: Important characteristic of software as a service or Saas for users is that the latest version of program is always made available to the customers conveniently and they are not required to maintain and update the software. In addition, the customers may use the provided service by light hardware conveniently because heavy computations are conducted in infrastructures providing service. Hence, the costs of hardware for the customers will be reduced significantly. Saas supports being introduced of new markets to E-commerce [1, 2, and 9]. Applied models of this type include Azure, Google App engine, Force.com, Amazon and IBM [3].
3. E-COMMERCE CONSTRAINTS AND THEIR IMPROVEMENT USING CLOUD COMPUTING

During the development of E-commerce, factors related to E-commerce have been changed due to lots of present constraints including:

- Technology and talent: some of the technical issues including massive data storage, data mining, and information security and so on are difficult tests especially for the businesses of E-commerce at small and medium sizes. These organizations cannot also develop their business significantly due to the lack of technical talents and experts [3].
- Cost of construction and operation: activity in the field of E-commerce needs a wide number of computer hardware and software resources. Upon developing the business and growing pieces of data, demand for resources rises and consequently the costs also increase. Therefore increased costs of equipment and operational costs are regarded big obstacles in developing the business of E-commerce [3].
- Collaborative management between enterprises: as the economic strength is limited, decision making, personal affairs and the business of E-commerce at small or medium sizes cannot collaborate with each other in supply chain well so these rough communications result in increased costs and lowered operating efficiency.
- Constraints in terminal performance:

Some of the problems are still found at terminal equipment. For example, the information processing capacity of the terminals is limited or the efficiency of its security is not complete. All of these cases are the barriers to E-commerce development. Nevertheless, technology progress and emergence of cloud computing have provided a suitable opportunity for E-commerce development. Therefore we will be convinced that cloud computing may solve the mentioned problems appropriately.

- Brand-new deployment of resources: applying the cloud E-commerce, organization neither requires being worry about the structure of E-commerce (software and hardware) nor invests heavily for material and human resources. Cloud E-commerce deals with all of these issues using service providers. Hence, enterprises may focus more on their businesses.
- A completely new method of data storage:

In the model of cloud E-commerce, data storage involves a high level of distribution. Data management is performed mostly as centralized and data service as virtually. All of these cases provide an effective data service.

Intelligent business policy making: the environment of the cloud E-commerce provides a wide data center in which storing massive data, computing with high speed and data mining are conducted with high level mechanisms for promotion of intelligent business in E-commerce. Moreover, leasing models of resource allocation causes that the businesses in small and medium size are involved an important benefit from the view of cost [3].
- The capacity of terminal won’t be constrained in any way: The environment of the cloud E-commerce lowers the demand to access the terminal. Until the time that terminal accesses to the cloud, the problems related to information processing, transfer and security would be removed completely.

4. THE EFFECT OF CLOUD COMPUTING ON E-COMMERCE

To struggle among E-commerce of organizations and insufficient resources found into organizations, the problems related to shortage of capital assess, human resources and technologies that are necessary for E-commerce activity may be solved using an application based on the service oriented model of the cloud computing. To develop and apply E-commerce, enterprises are required to invest in the field of software, hardware, implementation of the system and necessary mechanism for its maintenance. On the other hand, as the size of the enterprises business increases, requirement to these resources toward increased potential and capacity of organizations is more felt. Cloud computing as a new service model with the capabilities of network memory and on-demand access can provide a new mechanism for processing and sharing the information resources. At the present, cloud computing hallows that the organizations perform their business activities of E-commerce by investment. Using the cloud environment, the organizations apply software system of E-commerce whenever they need and they pay according to the service time and the amount of the usage. This practice causes lowered costs and more savings. In addition, the prepared software is the newest and latest versions and the personnel don’t need to maintain them. In the following, the most important advantages of cloud computing in E-commerce are mentioned.

1-4. Advantages of Cloud Computing in E-commerce:

As stated before, cloud computing have attracted the attention of IT organization especially the E-commerce organization. One tangible issue is environmental costs of organizations in applying E-commerce that these problems have been solved by the presence and emergence of cloud computing [9]. Developing E-commerce has created new competitions among the organizations. Although, E-commerce means providing the products and services for the consumers done through Internet, it has a high cost for organizations. Through, service providers give them to the
organizations; it is very expensive for organizations in general. Therefore the characteristic and features of the cloud computing provide new opportunities for the enterprises of E-commerce and it no longer needs that these companies spend the material, human and financial resources for operating the system of E-business and its maintenance. All of these matters are done by cloud computing providers and consequently the organizations may focus on this point that how to improve their responsibility toward the customers and rise the organization’s benefit [9]. Utilization of the cloud computing technology results in lots of advantages as the following:

- **From economic perspective:**

Economic debates have emphasized that how the cloud computing linked together by software and business strategies and how this practice may accelerate the construction of new products or novel services and help the companies to supply better services for the customers. If we look at the cloud computing from the economic view point, this technology will cause dropping a lot of costs. Many writers have emphasized that one of the most fundamental advantages of the cloud computing is less investment costs [10]. Lowered costs are including the following:

1. The users only pay the fee of service usage and there is no need for the capital costs (for buying software and hardware) to be paid off. Cloud-based applications may be performed within days or weeks to conduct the desired operations and have lowered costs as well. With using cloud-based applications, it is sufficient to open a browser, customize your desired program and start to use it.
2. Due to a direct communication between user and service provider, the costs related to the dealer and sale agent are removed.
3. Low operational costs for the service provider (in relation to the similar cases) cause a lowered price of services for the customers.

- **From security and update perspective:**

As the location of software installation is on the server, updating of software is performed on the servers by service Provider Company that has advantages for users. Also, as updating is performed on the server by the service provider, malicious programs are not possible to be installed on the user’s system. Some of the biggest companies have transferred their application to the cloud. For an instance, “SaleForce.com” company moved its applications to the cloud after testing security and reliability of the cloud infrastructures.

- ** Facility in use:**

The usage of cloud computing technology is very easy for users and there is no need to install software on the system and all users are able to work with it conveniently. To use this technology, the user only needs a device with the ability of Internet connection as well as a web browser.

- **Lack of location and time limitations:**

In this technology location and time constraints have been removed. The user may access to the desired service at any time and location and make benefit from his service by using any device such as notebook, tablet and cell phone.

- **Sharing the resources conveniently:**

Since the location of stored information is on the server, the user is able to share his information and services with any one at any location conveniently.

- **Safe and convenient maintenance:**

As stated, due to the information storing on the server, there is no need to have information storage as a hard disk. In addition, as the servers have back up files, there is no concern about the information loss. In general the customers of the cloud are not owner of physical infrastructure on which the application are performed or saved. Instead, they use a service provider and make benefit from the system sufficiently as they use gas or electricity.

- **Time and cost savings:**

Applying cloud computing causes that the companies configure their servers with several minutes and their environment with less than some hours (for an operation that other than needs many days or weeks) [10].

- **Higher efficiency capacity:**

Recent Research over six data centers showed that the servers only use 10%-30% of their current computing power while personal computers have average efficiency capacity less than 50% of them [8]. Instead of purchasing hardware and software products requiring installation, configuration, and maintenance, cloud computing allows that the commercial organizations apply computation infrastructures and cloud application as a service. Hence, the cloud provides individual and business accesses to IT’s advanced infrastructures and application which may be out of access.

5. **ISSUES RELATED TO CLOUD COMPUTING DEPLOYMENT IN E-COMMERCE**

Cloud computing is a wholly new experience deployed in E-commerce. Integrating of cloud computing and E-commerce has not been evolved yet and requires a practical experience. Currently there are some issues in this regard as following:

- **Issues related to security of cloud computing platform:**

Traditional security requirements including problems related to the authority, information integrity, non-repudiation, problems relevant to authentication are solved very conveniently in cloud computing model but
data confidentiality and network security have not been solved yet and caused newer security problems [4]. The recent studies show that many organizations have no security preparations for the security of their cloud computing till now. Moreover, some critics express their concern about Internet bandwidth and lack of enough awareness of the cloud. According to the Gartner’s study on the big commercial organizations in 2009, half of the emerged markets had not heard anything about cloud computing or did not know what cloud computing is [6].

- **Challenges:**

For many E-commerce companies, assignment of work to third party would cause the problems and risks so that these risks may even be more than the benefits for business [5]. Maybe the user’s main concern about the technology of cloud computing is the protection of their private bounds so that the proponents of private bounds protection state the most criticism to this technology.

- **Standards provided by cloud computing services:**

Cloud-oriented electrical service model is still state fragmented and heterogeneous. But if we want to promote our system and implement new models in it, a unified industrial standard is required that should be implemented and developed adequately.

- **Regulatory issues of services:**

Information processing, data storing, security, maintenance and the other practices are usually done by service providers of cloud computing. Therefore, the conditions of service providers in proper management of informationsecurity related to users are very important. But, how service providers perform this check to adjust their services is a main issue that needs to be control.

- **Vulnerability on economic crises conditions:**

Since this technology is presented by big companies, economic crises would have a direct effect on cloud computing. In the other words, it’s possible that the companies providing the services decline their services as qualitative or quantitative as the result of economic crises that sometimes occurred among the communities supporting the capital system in order to lower the costs and continue their activities.

- **New emergence:**

Because this technology is considered a new view in virtual world, it has not been accepted completely and comprehensively and its developers deal with cautiously. Moving toward getting cloud require a new model of IT governance and management through the framework.

- **Bandwidth cost:**

Although, companies are providing service save their equipment and software costs by cloud computing, they have to undergo the charge to provide bandwidth.

- **Rate of access to service provider:**

The rate of continuous and comprehensive access to service provider in this technology is regarded an important matter. From this prospect, the following points are considered. Due to the political debates, some service provider may limit or completely stop the rate of their services to some of the countries.

- **Resource pricing:**

The main question is that how cloud customers perform resource pricing and the base and the principle of these pricing decisions are not often clear. Most of the cloud sellers consider different prices to the some resources. As an example, some of the cloud sellers may use the pricing based on the rate of using (such as Google APP Engine) and the others use the compute time as a pricing base (such as Windows Azura). Then, a main problem is various pricing policies.

7. CONCLUSION AND FUTURE WORKS

In this article, we showed that how the issues related to the constraints of E-commerce, capital shortage, human strength and technologies required in E-commerce activities may be solved by using the cloud computing. At present, there is a great problem of environmental costs during the enterprises apply the ecommerce, but with the coming of cloud computing, all of the problem will be solved. According to this research, we believe that an applied and practical model of E-commerce based on the cloud computing may be constructed and its advantages like mass data storage and faster computations capacities will be utilized. But these models of E-commerce have not reached a practical and maturity level and this is one of the most important concerns of investors in shifting and transferring their commercial and business programs and plans toward getting cloud. Some of these issues including platform security, technical standards and the other issues related to the services haven’t been solved yet and require the future studies and research.

REFERENCES


