

Cloud Computing for E-Commerce

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Abstract : *The popularity and the application areas of the cloud computing has significantly increased since it was proposed by Google in 2007. Cloud computing includes set of resources and services to be shared among users via Internet. As a result, internet computing is another name for the cloud computing. In the earlier years, the cloud computing was a theoretical concept, but now it can be applied within various industries. In this paper, we present how the cloud computing has influenced e-commerce businesses from its inception till now.*

Keywords - *Cloud Computing; Omni-Channel, Cloud Computing of E-commerce*

I. Introduction

E-commerce came into existence since late 1970s. It was supposed to provide how the business transactions are made electronically through EDI (Electronic Data Interchange). ETF (Exchange-Traded Fund) cloud computing and e-commerce are both widely used because of their cost effectiveness. The cloud computing allows organizations to conduct business without having to develop and maintain IT infrastructure. E-commerce gives the flexibility for business to sell products online without having to physically rent an office space. These days, many more e-commerce companies take advantage of the benefits of cloud computing [1].

There are five basic elements for e-commerce activities in cloud computing; namely, i) customers of e-commerce companies, ii) cloud computing in E-commerce suppliers of e-commerce companies, iii) banks, iv) e-commerce companies and v) cloud service provider [2].

E-commerce is essentially a way of exchanging services and product between the consumer and the company through the Internet. E-commerce is comprised of two layers: i) the technical architecture including hardware and software and ii) the corresponding transactions that are based on the technical architecture. Laudon [3] states that the technical architecture is the base of e-commerce. Furthermore, the business modes and marketing techniques can be applied only through this base. It is essential that the technical architecture maintains its security for the online services and products. It is expected that the cloud computing will make substantial impact on the technical architecture of the e-commerce. The cloud computing makes things easier for e-commerce business since these businesses can simply rent the required hardware and software instead of buying them. Consequently, the businesses also do not need to have physical space to hold these entities which brings the cost down even more significantly. Through this ease of use, e-commerce business can just focus on the core business processes.

II. Cloud Computing

Google believes that the cloud computing should provide consumers data storage and computing services in a secure, fast and the most convenient possible way [4]. According to Mell and Grance [5], the cloud computing allows users to customize network related resources, applications, and services based on the demand. Another definition of the cloud computing is a dynamic computing environment which allows scalability and provides virtualized resources as service through the Internet [6].

2.1 Omni-Channel

Based on Marketo, one of the leading Automation Providers, the marketers must provide a seamless experience, regardless of channel or device. The consumers have many ways in which they can communicate with the company (i.e., physical store, online website/catalog, mobile app, social media). The consumers can again use various electronic devices such as desktop or laptop computers, smartphones, tablets, iPads, and so on. And, the aim is that the consumers' experience should be consistent irregardless of the type of communication and the type of device they use for their transactions [7].

There are several benefits of omni-channel to the businesses and their customers [8]:

- **Cross-sell and up-sell:** the sales at physical stores can improve when the sale person can provide realtime information to the customers
- **Operating costs:** can be decreased when sales channels and inventories can be accessed through an integrated platform

- **Customer satisfaction:** can increase when the consumers’ experience has consistency among all the channels
- **Sales:** can be increased by providing customers alternative ways to purchase goods such as online or by sales person finding out the available inventory in realtime
- **Order and fulfillment costs:** can decrease when all the processes such as merchandising, inventory, and shipping are consistent among all the channels
- **Decision-making:** can be improved since the businesses will be able to more precise forecasting, in return more accurate decisions on merchandising and replenishing the stocks
- **Efficiency and confidence:** can increase when all the stakeholders such as decision-makers and departments collaborate efficiently and work within an integrated platform

The companies involved in B2B and B2C commerce should aim to be as omni-present as possible. The goal is not only to keep the current customers, but also to get back the lost market shares and increase their customers base by adding new customers. The traditional retailers has to compete with gigantic online companies such as Amazon and in order to keep their market share, these retailers must invent their unique omni-channel strategy in which they can include the advantages of physical store for the best customer shopping experience [9].

In omni-channel paradigm, the expectations of the customers grow fast and B2B companies need to adapt accordingly. Based on the surveying of 526 B2B organizations in the globe by Forrester [10], majority of the companies stated that the way in which the customers’ interaction with their online services have significantly changed in the last few years. As a result, mature B2B business starting to adapt their services to satisfy the customers’ requirements. The companies, which are not as mature, are also working hard to make sure they catch up with their more matured competitors. An interesting observation was that 72% agreed that they prefer omni-channel customers over a single channel customer and 51% stated that these omni-channel customers usually have higher lifetime value. B2B businesses clearly understand the importance of omni-channel customers (see Fig. 1).



Base: 526 B2B companies in Canada, US, UK, France, and Germany

Figure 1: Primary drivers for omni-channel initiatives [10].

Meet customer demands in order to drive higher customer lifetime value: B2B businesses have the realization that omni-channel offerings are very valuable to their customers as their customers’ loyalty increase accordingly. 66% of the B2B businesses reported that their customers expect omni-channel offerings and many of the companies expect further improvements in customer satisfaction because of these omni-channel offerings.

Differentiate from online pure plays with their physical presence: Some of the extended omni-channel capabilities such as buying online and ability to receive delivery on the following day or picking up from the local store are not easy for online-only businesses to compete with. Many of the customer-oriented online retailers are starting to make changes to their processes to win B2B buyers.

Leverage efficiencies and cost savings: More than half of the B2B businesses are increasing their omni-channel offerings for leveraging efficiencies and further increased cost savings by improved inventory planning. Efficient inventory planning is essential in supply chain management. If the businesses have more accurate picture of where and how much of the inventory they have in their supply chain, both the cost and the delivery times will be further reduced.

2.2 Cloud Modes

Three cloud modes can be formed: i) infrastructure cloud, ii) platform cloud, and iii) application cloud [11]. The infrastructure cloud allows customers access to computing and storage. The resources can be available in a single multiple data centers. Example applications of this mode include Amazon's Elastic Compute Cloud and IBM's Blue Cloud [11].

The platform cloud provides transparent development environment for the users since there is no need for them to know the details of the computing elements such as powerful servers. Example applications of this mode include Google App Engine, Heroku, Azure, and Force.com [12].

The application cloud interacts with the user in the form of Software as a Service (SaaS). The users have the flexibility to customize, configure and test each module based on their specific system requirements as well as to reduce the cost of operating and maintaining the system. Example applications of this mode include Salesforce CRM, Google Apps, and Zoho [12].

2.3 Benefits Of Cloud

Perhaps, the biggest benefit of the cloud computing is its ability to help businesses and organizations to increase their productivity and reduce their cost of operations and maintenance while providing new products to their customers. The pay-as-you-go pricing model is flexible in the sense that it allows the users to try the applications or infrastructure before they commit themselves to renting them. The current consumers can benefit from volume discounts by paying in advance for instance. When the users rent assets, the maintenance of the data centers become the responsibility of the cloud vendor, so the users do not need to worry about operation and maintenance. The cloud users are generally satisfied with the fact that the systems in place are up-to-date, reliable and flexible to respond the user queries.

The up-front expenses of the businesses can be reduced by placing the data and computing center into the cloud. The savings can be then invested back into the core business to provide added value services to the customers of the businesses.

The productivity of the teams will highly depend on the services provided by the highly reliable networks and Internet. The cloud services are generally available 24/7 and accessible from multiple browsers (i.e., Mozilla Firefox, Chrome, Safari) and devices (i.e., desktop, laptop, smartphone, iPad) in any given time zone. This gives enormous flexibility for everyone to conduct their work [13].

Cloud computing can also benefit organizations, industries, and economies by:

- Providing companies ways in which they can develop new products and offer new services to its clients by allowing the professional developers around the globe to more efficiently collaborate with each other with access to the reliable and powerful computing resources
- Giving ability to organizations to analyze their data using data analytics techniques to determine the changing needs of the customers to remain competitive in the market
- Allowing information access to companies from small to large whereas in the past only the larger companies had such competitive edge
- Assisting economies to move forward to higher level of technological advancements by providing fast and cost effective access to infrastructure, tools, and applications

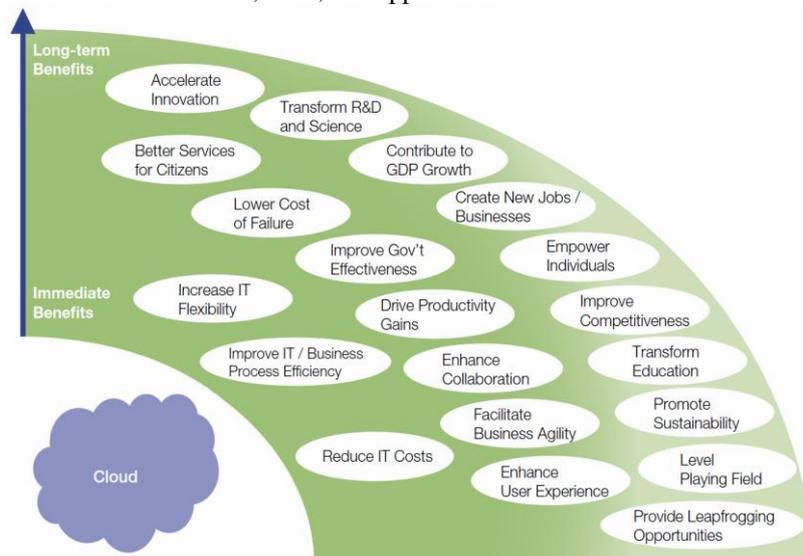


Figure 2. Examples of Benefits of Cloud [14]

III. Benefits of Cloud Computing for E-commerce

The cloud computing and e-commerce highly benefit from the Internet. Cloud computing allows consumers and clients to use services, computational resources and storage in a transparent way. E-commerce on the other hand, allows consumers to buy services or products from just about anywhere in the globe and anytime. The cloud computing for e-commerce has several benefits [15]. The cost can be calculated based on the need of each company. According to Amazon, cloud computing helps businesses to significantly reduce the costs on several places such as hardware procurement, security, privacy, energy, and maintenance.

Trust and Security of cloud computing:

The security of data stored in the cloud is an important concern by everyone [16]. The concept of trust is not easy to define; however, many cloud computing users agree that transparency is important when it comes to trust issues in cloud computing. The businesses must clearly see that the service providers indeed adhere to security standards and best practices. Storing data in the cloud for e-commerce applications is generally considered the best choice.

Investments tailored to the needs of e-commerce:

It appears that the cloud computing allows e-commerce companies to save costs up to 80% which is a significant amount. Given this savings, there is a continuous need to maintain and even enhance IT infrastructure for the future development of e-commerce industry. The scalability and flexibility are two important benefits of cloud computing as applied to e-commerce.

Cloud computing scalability:

One of the most essential benefits of cloud computing is its ability to scale based on the demand of the cloud clients or businesses. Many of the operations such as activation of the server, increasing the computation power, to reallocating the loads due to changing demands on the cloud can take place relatively quickly (in the order of minutes). These operations basically define the scalability of the cloud and the flexibility to allocate more resources when requested and disposing of them when they are no longer needed by the cloud users.

Mobility:

E-commerce benefits from cloud computing by allowing its customers access products and services from anywhere and anytime through mobile devices. If the users travel all around the globe, they can still have access the goods through their smartphones.

Global expansion:

Cloud computing can be considered while developing strategies for current and future global expansion of e-commerce industry. The e-commerce product contents could be readily available to customers in the world through the use of cloud computing. Cloud computing can also assist to handle numerous e-commerce businesses specific to customers within many different countries.

Cost of construction and operation:

As the e-commerce industry grows with the increased data growth, the need for the computer hardware and software resources increase. As a result, costs associated with maintenance of equipment and operations will need to be taken into consideration.

Quality of e-commerce:

In order to sustain the quality of e-commerce, the computing services must be scalable, reliable and provide flexibility of access to products and services from anywhere and anytime in the world. Many of the large cloud service providers such as Google, Amazon, IBM, and Microsoft have their data centers spread across the globe in order to guarantee reliability in accessing the cloud applications in cases of failures [17].

IV. Conclusion

It is clear that cloud computing is essential for e-commerce industry as it provides numerous opportunities for e-commerce industry as we discussed in this paper. In the near future, the e-commerce industry may be even more tightly integrated with cloud computing since many of the e-commerce businesses sustain their competitive edge due to the benefits of cloud computing.

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