International Journal of Scientific Research in Computer Science, Engineering and Information Technology
ISSN : 2456-3307 (www.ijsrcseit.com)
doi : https://doi.org/10.32628/CSEIT217539

A Secured Framework for E-Commerce in Cloud Computing Environment : A Literature Review

Hadeel Mushtaq Shakir [*1], Dr. Syed Zeeshan Hussain[2]
Department of Computer Science, Jamia Millia Islamia (A Central University), New Delhi, India.

Article Info
Volume 7, Issue 5
Page Number: 130-137

Publication Issue :
September-October-2021

Article History
Accepted : 07 Oct 2021
Published : 30 Oct 2021

ABSTRACT

Our understanding of the importance of cloud computing-based electronic commerce in the digital world involves researching and looking for the most important issues faced by electronic commerce and security threats, and user information protection, and as a result, an e-commerce application framework can be proposed which may be based on the concepts, the origins, and development trend of cloud computing which copes with the problem of e-commerce and the storage of resources. As it is on record that cloud computing is widely known for its robust and strong support for data storage and mining. It also offers a most reliable platform for safe, secure, and speedy data transactions at a very manageable cost and a high level of privacy.

Therefore, this paper has examined, analyzed, and discussed the current state of e-commerce and also, we provide much literature that has researched the security problems e-commerce faces in a cloud computing environment and some of them suggested some e-commerce security solutions.

Keywords: Cloud Computing, E-Commerce, Network Storage, Network Security, Cloud Security, Cloud Providers, Cloud Standards, E-Commerce.

I. INTRODUCTION

Electronic commerce is one of the main criteria of the revolution of Information Technology and communication in the field of economy. The Current edge for business today is Electronic Commerce, it refers to the electronic transaction such as buying, and selling, information flow, and fund transfer over the internet. E-commerce broadly encompasses all business activities taking place over the internet [17].

A general definition of e-commerce, given by the Electronic Commerce Association [15, 8], is: “electronic commerce covers any form of business or administrative transaction or information exchange that is executed using any information and communications technology"[10].

E-commerce has the following Models:

1- Business-to-Business (B2B): the transaction between business enterprises.

2- Consumer-to-Business (C2B): this means the customers selling products and services to the Business Enterprises.

3- Business-to-Consumer (B2C): this means the transaction among Business Enterprises and customers.

4- Consumer-to-Consumer (C2C): this means the business transaction among users or consumers.

II. Overview of cloud computing

In the present world of networking systems, Cloud computing is one of the most important and developing concepts for both the developers and the users.[9]

Cloud computing can be defined as "A style of computing where massively scalable information technology-related capabilities are provided as a service across the internet to multiple external customers ". It is an evolution from the distributed computing system, consisting of a collection of inter-connected and virtualized computers that provide services dynamically as one or more unified computing resources based on service level agreements (SLA).[1]

There are too many researches about the benefits of cloud computing. Research by Marston, 2011 can successfully summarize the benefits of cloud computing.[3]

- It provides optimization of resources with lower cost, especially lowers the entry costs for smaller firms which are seeking for business intelligence.
- Provide immediate access to hardware sources without any upfront capital investments.
- By using online applications, companies can lower IT barriers because users can use applications without installation or maintenance.
- Companies can scale their services more powerful. For instance, they can increase their capacity with lower costs and energy to maintain.
- Also, cloud computing gives a chance to companies to establish parallel batch processing, mobile interactive applications, and business analytics more powerful than ever before.

As well as, Cloud computing is a paradigm for providing universal, easy, on-demand network access to a common pool of configurable computing resources. The use of cloud-based services is a new and innovative solution to business management. The transition of the company to the cloud empowers companies to gain substantial economic benefits without investing in developing their own IT infrastructure. [4, 13]

Cloud computing provides a solution to most of these problems, offering access to a low-cost, secure, and scalable online network [6, 1]. Cloud computing has been a theoretical term in the earlier years but it can now be implemented in various industries. In Bangladesh [11] a cloud-based e-commerce platform was proposed to build applications for e-commerce.

In [13] presents how e-commerce companies have been affected by cloud computing from its inception until today. Additionally [10] said that, given the few issues being cited by industry experts, SMEs or SMBs are not difficult to incorporate cloud into their business strategy.

Providing security has become a major challenge for the security of e-commerce in cloud computing, and e-commerce security methods should be evaluated and ensured in the cloud [20, 16, 14]. In this analysis of literature, details on the role of cloud computing in building e-commerce were available, in addition to the challenges it may face and ways to solve them.

III.RESULTS AND DISCUSSION

According to the type of service, the application mode of cloud service can be divided into Infrastructure as a Service (IaaS), Platform as a Service (PaaS), and Software as a Service (SaaS).[19,11]. As illustrated in Figure 1.

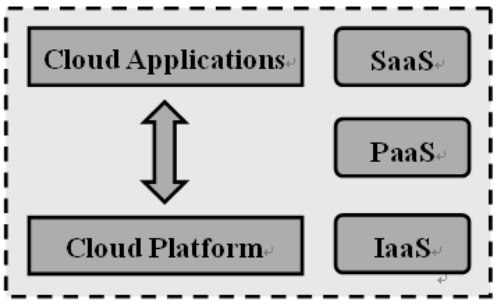

Figure 1 : Cloud Service Model

Types of Cloud Computing

(a) Software as a Service (SaaS):
SaaS works at the application level. It provides a platform for customers/users over the internet. Clients use the service on demand. It gives the users a platform to utilize various applications from the cloud instead of using their own computers. The cloud service provider generally provides some kind of software development environment to allow applications to be developed within the cloud. The services are open source and are automatically updated from the cloud. Multiple clients share the services [11,19]

(b) Platform as a Service (PaaS):
PaaS is the middle layer of cloud services. It offers a development platform with a set of services to assist application design, development, testing, deployment, monitoring, hosting on the cloud [20]. It doesn't need software installation, and can work on projects collaboratively. It is used for managing storage space and computing available resources for the applications [11]

(c) Infrastructure as a Service (IaaS)
Infrastructure Providers manage a large set of computing resources, such as storing and processing capacity. Through virtualization, they are able to split, assign, and dynamically resize these resources to build ad-hoc systems as demanded by customers, the Service Providers. They deploy the software stacks that run their services.[19]

IV.Deployment Models of cloud computing

There are four different ways in which cloud services can be deployed depending on the structure of an organization and the provisioning location. [12, 5]

a. Private Cloud:
Private cloud computing architecture provides hosted services to limited members of people. It is exclusively use by a single organization includes multiple customers. It may be own, manage, and operate by an organization, a third party or combination of them. It may exist on or off-premises. It is also known as an internal or corporate cloud.

b. Community Cloud:
This cloud infrastructure exclusively used by a specific community of consumers from an organization that have shared concerns (e.g. Mission, Security requirements, Policy, and Compliance considerations). It may own, manage and operate by one or more of the organization in the community, a third party, or some combinations of them and it may exist on or off-premises.[1]
c. Public Cloud:
Anyone from public can access the cloud in this infrastructure. It may own, manage, and operate by a business, academic, or government organization or some combinations of them and it may exist on-premises of the cloud provider.

d. Hybrid Cloud:
Hybrid cloud designed as per the consumer request, it is a composition of two or more distinct cloud infrastructures that remain unique entities but are bound together by standardized or proprietary technology that enables data and application portability.

Hybrid cloud typically offered in one of two ways; a vendor has a private cloud and forms partnership with a public cloud provider, or a public cloud provider forms a partnership with a vendor that provides private cloud platforms.[6]

Ideally, the hybrid approach allows a business to take advantages of scalability and cost effectiveness that a public cloud community environment offers without explosion mission critical applications and data to third party vulnerability.

V. Security issues faced by e-commerce in cloud computing environment

1. Data Storage Risk: Data security is one of Cloud computing's major concerns based on the E-Commerce model. Enterprise data centers save vast volumes of private corporate data in cloud storage, including customer information, financial information, main business processes, etc. All of this information is kept on the cloud side. The e-commerce company cannot track the confidential information.

E-commerce firms are normally concerned about how cloud computing service providers ensure that confidential corporate data is not illegally collected, processed, and used. Their residual data will not reveal sensitive information and they are also concerned about whether appropriate measures are in place to ensure the normal operation of the e-commerce system in the event of natural disasters, hardware failures, etc.

As cloud computing uses modern information technology in which the personal data of the user is stored in different virtual data centers that can cross international boundaries. E-commerce companies that use cloud storage services do not know where their data is stored and do not even know where their data is located in the world. And even the cloud storage system and data are exchanged by many users so the e-commerce companies are worried about the uncertainty caused by their own data and the data of other users? And also, whether it encrypts their data?

2. Protection of data transmission: In the cloud computing model, when business data is transmitted across the internet to the cloud side, e-commerce firms are also worried that data should be encrypted throughout the network transmission and should be strictly confidential without misuse.

3. Security Data Audit: As the organization maintains internal data to ensure the quality of the results, it aims to incorporate third party verification bodies to inspect or approve. But cloud storage service providers ensure there should be no loss of business data in the cloud computing world. We also have the required information support to help third party entities meet corporate compliance standards for data protection and design accuracy generation. In the context of sustainable growth of accredited cloud computing service providers, how to ensure that cloud computing service providers provide valuable data without sacrificing the protection of other current customers, enabling the business to choose a long-term presence, the technological strength of cloud computing service providers in the delivery of services will be the security risk.

4. Related laws and regulations aren't perfect: Since we realize that cloud computing and e-commerce is a modern phenomenon, cloud computing and e-commerce linked laws are not perfect. This is the duty of cloud network service providers to mitigate much of the risk in the service agreement but there is no guarantee of data loss and data destruction. It takes on a legal responsibility or a duty to act. Cloud providers should bear all of the responsibility for security according to the perception of the user. So, it may contribute on both sides of the conflict in the case of a security issue.

5. Hackers and viruses are more secretive:Hackers may take advantage of new technology such as virtualization, to write in the form of malicious software to a virtual machine that makes it harder for users to detect and delete. At the same time, the use of virtual machines leased masks the real identity, making it difficult to track. Such e-commerce firms would bring great harm to data protection. More efficient methods to deter these attacks would also be implemented.

VI.Cloud computing environment for E-commerce based Applications

1.1 Based E-Commerce in Cloud Computing Environment

Cloud computing is business with the economic and commercial community, based on Cloud Computing Ecommerce models is the specific application in the economy, trade, and management, this model will ultimately lead to a significant change in the organization of enterprises, profits, marketing management, and knowledge management, this model is called the e-commerce model [18].

Cloud computing and e-commerce are now two main components of our daily usage. They are popular because of their cost-beneficial. Cloud computing service saves companies the cost of IT infrastructure, while e-commerce provides traders to do business without renting or buying a business entity shop [17].

This Internet-based innovation can improve the reliability, availability, and flexibility of e-business as well as reduce costs. Including power, heating, gas, and telephony, which are so regularly accessed that they are still on and paid for by customer use [6].

1.2 Impact study of adopting Cloud Technology in Business Organization

The literature support for these impacts is summarized below.

1. Lower costs: Cloud computing pools all the computing resources that can be allocated as required to applications – maximizing the usage of the number of computing resources and ensuring greater productivity and utilization of the entire shared infrastructure. [10, 4, 1, 7]

2. Launch Projects Faster: Since servers can be installed & removed in a matter of minutes, cloud computing significantly reduces the time to launch a new program. Instead of installing and networking a new hardware server, a self-serve control console enables the new server to be dialed up and imaged in. [7]

3. Scale as required: You can add storage, RAM, and CPU power as needed as your applications expand. This means that as the application demands grow, you can buy just enough and scale. The value requires resource elasticity. [4, 7, 1]

4. Lower operating costs: less equipment, less outsourced and shared IT, staff. Because cloud computing requires low physical resources, lesser hardware is required to power and maintain. You don't need to retain full-time server, storage, network, and virtualization specialists on staff for an outsourced cloud. [1, 7]

5. Resilience and redundancy: One of the advantages of private cloud deployment is that if you're primary data center experiences a failure, you can get automatic failover between hardware systems and disaster recovery services to pull up your server collection in a different data center[7]

6. The facility of use and convenience: Small business workers frequently work outside the actual office venue, making it a major benefit to having convenient access to their data (using their mobile devices). This need for workers to have remote access as well as the increasing number of online

transactions requires a cloud computing solution. The cloud approach helps reduce administrative overhead and enables access from any venue, system, and organization. [10, 4, 13]

7. Reliability: This is more secure as the cloud is available round the clock. Employees can also call the cloud center (if necessary) instead of relying on the in-house IT personnel. Cloud storage solutions incorporate data redundancy so that the files can always be obtained, even in times of network downtime, power failures, etc. [10]

8. Security and privacy: Cloud security is good since authentication and encryption minimize risks. For example, protection is improved by monitoring behaviors, tracking transactions, providing selective user access, and using a strong password. While data protection is the main issue for SMBs, they still use public clouds, because a public cloud offers standard services at a fair cost [10]

9. Sharing and collaboration: With social media and smartphones (mobile devices) proliferating, start-ups, and small businesses have strengthened cooperation within their companies.[12]

Cloud file storage enables different SMB stakeholders to exchange information and data (via emails, shared web-links, and IM-instant messengers), store and retrieve information among themselves. Google Apps, Box and Jive are very good examples of content sharing and collaboration between stakeholders [10, 4]

1.3 Security e-commerce in a cloud computing

Many of the literature has studied the security problems faced by e-commerce in a cloud computing environment and they suggested some solutions for e-commerce security, for example, [15,20] They proposed firstly Use the Private cloud, E-commerce businesses can put a non-critical business on the cloud platform, and put the core and the key part of the business on the private cloud. Secondly, Use Public Key Infrastructure (PKI) technology can greatly reduce the e-business risk disclosure of confidential information. And also [8,16] they provided methods to secure data such as: (Encrypting Files, Encrypting E-Mails, Use reputation service, Reading Privacy statement, User Filter)

While [18, 12] presented the methods to make sure data security in cloud computing. They studied the face of network security such as (Client Information Security, Server Information Security, System Architecture and the Main Form), reviewed cloud computing and information security such as (Challenge, Opportunities, and Credible Cloud). And also [14, 7] gave a background of the technologies to be used and explore in more detail, and what are the basic fears from cloud customers to adopt cloud computing in e-commerce. They described the problems of cloud-based PKI. Finally, they presented some broad strategies that might be used to mitigate some of the concerns outlined.

Many studies introduce a proposed e-commerce application framework based on the concepts, the origins, and development trend of cloud computing which copes with the problem of e-commerce and the storage of resources [19].

Here [9] suggested a newer e-commerce architecture that relies on secure and obscure coding-based logic based on a specific trust model that will be helpful in solving current e-commerce problems. Also, they discussed the full working procedures of the model and some experimental results that will help to demonstrate the validity of their model.

[6] clarifies, based on a survey of leaders of 175 small, medium, the proposed model empirically validates organizational, technical, and contextual factors that would make e-commerce adoption more effective for businesses, governments, and service providers. In [11] the authors propose a conceptual cloud-based e-commerce model for developing e-commerce applications in Bangladesh. The proposed cloud-based e-commerce model would support e-commerce enterprises to meet the business goals in terms of cost-effectiveness, security effectiveness, availability, and IT-resources (hardware, software) and services.

They discussed how globalization impact on e-commerce in business with policy implementation, pro, and cons of e-commerce enhancement in the increase to business. It outlines the framework of the new policies and regulations needed by e-commerce [3]. This empirical impact study emphasizes the consequences of adopting Cloud Technology in business organizations (micro, Small Medium Businesses (SMBs), and Small Medium Enterprises (SMEs)) and how it affects business development, based on the various research literature. [5, 10]

[2,17] analyzed the driving-forces which led to the changes in E-commerce in the cloud computing era. By establishing the framework of e-commerce application based on the cloud computing environment and how cloud computing effect E-Commerce services and applications. Finally, it concluded that only when the E-commerce enterprises involved cloud computing in the business strategy and established the core competencies, could they realize the sustainable development in the cloud era.

VII. CONCLUSION

Having knowledge of the importance of electronic commerce based on cloud computing in the modern era, it is necessary to make further study and research for the most important problems that may be faced by electronic commerce especially breach of security and the safety of information of users.

There are many literatures that studied the security problems faced by e-commerce in a cloud computing environment and suggested some solutions for e-commerce security. Some of them presented methods to make sure ata security and network security such as (client information security, server information security). Some of them proposed to use the private cloud and others to use public key infrastructure. And these literatures also provided methods to secure data such as encryption of file, encryption of e-mail, use of reputation service, and use of a filter etc.

VIII. REFERENCES

1. Ahmed AbouElfetouh Saleh," A Proposed Framework based on Cloud Computing for Enhancing E-Commerce Applications", International Journal of Computer Applications (0975 – 8887) Volume 59– No.5, December 2012.
2. Danping Wang, "Influences of Cloud Computing on E-Commerce Businesses and Industry", Journal of Software Engineering and Applications, 6, 2013.
3. FazliYildirim. "HOW MARKETING AND CUSTOMERS WILL BE AFFECTED BY CLOUD COMPUTING?", INTERNATIONAL JOURNAL OF e-BUSINESS AND eGOVERNMENT STUDIES Vol 4, No 2, 2012.
4. G. Kiryakova*, N. Angelova, L. Yordanova," APPLICATION OF CLOUD COMPUTING SERVICES IN BUSINESS", Trakia Journal of Sciences, Vol. 13, Suppl. 1, pp 392-396, 2015.
5. Gardner Mwansa and Ernest Mnkandla, "CLOUD COMPUTING FRAMEWORK FOR AGILE DEVELOPMENT", International Journal of Cloud Computing (ISSN 2326-7550), Vol. 2, No. 2, April-June 2014.
6. GhadaRefaat El Said," A Cloud Computing-Based Model of E-Commerce Adoption for Developing Countries", Journal of Electronic Commerce in Organizations Volume 15 • Issue 3 • July-September 2017.
7. HeenaKharche and Deepak Singh Chouhan, "Building Trust In Cloud Using Public Key Infrastructure", (IJACSA) International Journal of Advanced Computer Science and Applications, Vol. 3, No. 3, 2012.
8. KanchanMahale, "Privacy Preservation of Data in Amalgamation with Cloud Computing and E-commerce", MIT- SOM PGRC KJIMRP National Research Conference (Special Issue) - 2016.
9. KawserWazedNafi, TonnyShekhaKar, Md. Amjad Hossain, M. M. A. Hashem, "A New Trusted and Secured E-commerce Architecture for Cloud

Computing", Process of the IEEE 2013 International Conference on Informatics, Electronics and Vision, Dhaka, Bangladesh, May 17-18, (2013).

10. Lakshmi Devasena," IMPACT STUDY OF CLOUD COMPUTING ON BUSINESS DEVELOPMENT", Operations Research and Applications: An International Journal (ORAJ), Vol. 1, No.1, August 2014.
11. Lamia Rukhsara, FarhanaAklam, TasinNawer, Naresh Singh Chauhan, Muhammad Nazrul Islam," A Conceptual Cloud-based Model for Developing E-commerce Applications in Context of Bangladesh", 5th International Conference on Informatics, Electronics and Vision (ICIEV), 2016.
12. Lokhande and Meshram, "E-Commerce on Cloud: Issues, Attacks & Security", International Journal of Advanced Research in Computer Science, Volume 4, No. 4, March-April 2013.
13. Nevin Aydin, "Cloud Computing for E-Commerce", IOSR Journal of Mobile Computing & Application (IOSR-JMCA), e-ISSN: 2394-0050, P-ISSN: 2394-0042.Volume 2, Issue 1. (Mar. - Apr. 2015).
14. Niranjanamurthy M, DR. DharmendraChahar, "The study of E-Commerce Security Issues and Solutions", International Journal of Advanced Research in Computer and Communication Engineering, Vol. 2, Issue 7, July 2013.
15. RuchiOberoi, SharmisthaDey, "Survey of Security Issues in Cloud based E-Commerce", International Journal of Advanced Research in Computer Science and Software Engineering, Volume 7, Issue 5, May 2017.
16. Sanghita Roy, Indrajit Sinha, "Data security and Influence of Cloud Computing in Electronic Commerce Industry", International Journal of Computer Applications (0975 – 8887) Volume 88 – No.6, February 2014.
17. Satinder and Niharika, "IMPACTS OF CLOUD COMPUTING ON E-COMMERCE BUSINESSES IN INDIA", International Journal of Advance Research In Science And Engineering, IJARSE, Vol. No.4, Special Issue (01), April 2015.
18. ShenJuncai and Qian Shao, "Based on Cloud Computing E-commerce Models and Its Security", International Journal of e-Education, e-Business, e-Management and e-Learning, Vol. 1, No. 2, June, 2011.
19. Tairan Liu, "E-commerce Application Model Based On Cloud Computing", School of Business Administration, Changchun University of Technology, Changchun, 130012, China.
20. Xiaofeng Wang, "Cloud Computing Security of E-commerce Environment", Applied Mechanics and Materials, Vols. 347-350, pp 3377-3380, 2013-08-08.

Cite this article as :

Hadeel Mushtaq Shakir, Dr. Syed Zeeshan Hussain , "A Secured Framework for E-Commerce in Cloud Computing Environment : A Literature Review", International Journal of Scientific Research in Computer Science, Engineering and Information Technology (IJSRCSEIT), ISSN : 2456-3307, Volume 7 Issue 5, pp. 130-137, September-October 2021. Available at doi : https://doi.org/10.32628/CSEIT217539
Journal URL : https://ijsrcseit.com/CSEIT217539