

Investigating Scope and Challenges in Cloud Based E-Learning System

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Article History: Received: 13 March 2020; Accepted: 05 August 2020; Published online: 28 August 2020

Abstract

Now a day, cloud computing and e-learning is rising speedily and plays a very huge and powerful role in the field of education and learning. Because of this smart phone users can perform their task easily and with effective manner with paying less cost by utilizing the cloud-based applications offered by the cloud service providers. Cloud computing in educational field is going beyond classrooms as an essential service. The higher education, distance education, online education etc. uses the services of cloud computing for the flexibility available for the students. Because e-Learning systems are open, distributed and interconnected, then security becomes an important challenge in order to ensure that interested, and authorised, actors only have access to the right information at the appropriate time. Security issues is one of the biggest concerns that has been affecting the growth of cloud computing. Although there exist some complications with data privacy. This data protection continues to affect the market. Users need to understand the risk of data breaches in the cloud environment. This paper reveals the prevalence of internal cyber-attack as well as a lack of proper IT policies and procedures in e-Learning systems, in light of their standard architecture and their specific security requirements.

Keywords: Cloud computing, Security, E-learning system, Performance.

[1] INTRODUCTION

Research has made an effort in order to provide better security with high performance in favor of cloud computing environment for distance education. Performance has been increased by reducing size of data by applying content replacement mechanism where large words have been replaced by small words. In order to increase security cryptography technique has been employed. In the technology of cloud computing, transmission of data is done on regular basis. This data is transmitted by means of Internet. Due to this, it becomes necessary to keep data safety factor in mind in the background of cloud. The cloud-based education systems [1] are frequently used by students, teachers, and professionals. The research work provides better quality services by increasing the performance and security for cloud-based distance education system.

1.1 Cloud computing

Cloud Computing gives services over network which may be public or private. Cloud is available at remote location. It could be utilized in wide area network as well as in local area network. Virtual private network could also make use of cloud computing. Lot of application like e-mail and web dependent conferencing are implemented with the help of technology provided in cloud. Cloud computing has offered platform independency. It becomes possible because there is no need to configure any client system. Everyone knows the fact that mobile applications are frequently used in offices. Such applications are shared with cloud computing. A number of facilities are formulating the cloud computing more available and easier to access for operator. Demand of cloud services is increasing day by day because cloud applications are used on regular basis. All of this indicates that protection of data becomes compulsory

requirement. Delivery of significant data from service provider in a secure manner is a difficult task.

Cloud computing in educational sectors is going beyond classrooms as an essential service. The higher education, distance education, online education etc. uses the services of cloud computing for the flexibility available for the students. Because e-Learning systems are open, distributed and interconnected, then security becomes an important challenge in order to ensure that interested, and authorised, actors only have access to the right information at the appropriate time.

1.2 Public, Private and Hybrid cloud

Public cloud

The public cloud is defined as computing services offered by third-party providers over the public Internet, making them available to anyone who wants to use or purchase them. They may be free or sold on-demand, allowing customers to pay only per usage for the CPU cycles, storage, or bandwidth they consume.

Private

Private cloud is a term for cloud computing services offered over the Internet or a private internal network to only select users instead of the general public. Private clouds can be used to run any application or service, including websites, web application backends, virtual desktop infrastructure, big data and machine learning applications, and databases

Hybrid cloud

Hybrid cloud is a solution that combines a private cloud with one or more public cloud services, with proprietary software enabling communication between each distinct service. A hybrid cloud strategy provides businesses with greater flexibility by moving workloads between cloud solutions as needs and costs fluctuate.

1.3 NEED OF CLOUD IN ONLINE EDUCATION

The cloud technology is presently used in education sector. Students enrolls themselves for studies; staff available for providing learning administration personnel provides support using cloud-based education system. Students obtain their homework in the presence of an internet connection. Teachers can send study materials directly to the students. Moreover, teacher could also take the live sessions on cloud system to educate their students. It has been observed that cloud-based distance learning mechanism are also used in industries for professional training. The technical and competent information is provided to profession by online clouds. These clouds are hosting interactive and multimedia web sites where the quality contents are made available. This content takes time during transmission. Moreover, these contents need to be protected. However, several mechanisms are built to increase their security but these security mechanisms reduce the performance of data communication. Thus, there remains a need of system that could provide security to digital contents hosted on educational cloud without affecting performance of data communication. Moreover, it has been observed that there remains issue of packet dropping and hijacking.

1.4 Challenges

Existing studies have looked at the challenges of implementing cloud infrastructure in the education field for faculty, employees, and students. Researchers have also looked at protection risks and danger classifications. The areas where cloud computing can have an effect on education are examined. A big concern that the education sector faces in developed countries is security monitoring. Security issue involves the hacking and cracking activities by intruders.

Another issue in applicability of cloud services is 24-hour availability. Presently student needs to access required information at any time at any place using cloud space. Some of research explored the challenge of reducing cost of distance learner. Existing researches have also presented the issue proper utilization as a service. Providing online cloud-based education to underprivileged students and children in underdeveloped country, is a complicated task. Expanding education system over cloud needs more attentions.

1.5 SECURITY ISSUES IN DISTANCE EDUCATION CLOUD COMPUTING

The main problem due to which online education cloud system is not implemented exclusively is insecurity. Due to the speedy development of this technology, there is increase in security related issues. In the present time cloud is used by educational institutions, but they always remain in fear with respect to safety issues. Out of the various safety issues most of them originate in:

- o Absence of monitoring
- o Doubtful mechanisms
- o Multi-tenancy

All the above said issues are present in controlling system. Issues related to safety are also faced by independent clouds which are different from above. The third parties provide information and system management for cloud computing as cloud privacy is major issue. Delivery of significant data by service provider in a secure manner is a difficult task. Its violation could make loss of user occupation. And because of this, vendors give security.

In cloud computing, transmission of data is done on regular basis. This data is transmitted by means of Internet. Due to this, it becomes necessary to consider data security in cloud environment. Several customers' data may be affected because they are using the infected cloud for distribution of data. The security challenges counted by cloud computing are described as follows:

- Integrity of data: Integrity of data consists of situations when some human errors are made, while feeding data. Errors could take place during information is transferred from one system to another. Some time errors occur due to hardware malfunctions such as crashing hard drives.
- Access control of data: Secret information might be illegally stolen in absence of secured data and information access control.
- Theft of data: Cloud computing applies the external data server for flexible and cost affective tasks. Thus, there is an option that from external server theft of information might take place.
- Location of data: Consumers do not know the actual location of data because all these are kept hidden. Cloud computing is offering a high degree of mobility of information.
- Loss of data: Loss of data is referred as critical issues in Cloud computing. Unauthorized person might be able to capture data that is shared on cloud if business transaction, banking & research & development ideas are online.
- Issues related to privacy: Protection of user data has been considered vital with cloud computing. Several servers are external thus vendor must ensure that data is secured from other persons.
- Challenges at user level: it is necessary that the user make sure that possibility of the data loss because of its own action or other user operating at common cloud server.
- Security challenges in supplier level: Cloud is considered best in the case of high security given by vendor to consumer.
- Application that are Infected: Service supplier must have access to server with overall rights to maintain server and to monitor it.

- Account or service traffic hijacking: If login credentials are theft account could be hacked.
- Insecure application program interface: The application programming Interface is going to control third party. It also verifies the user.
- Denial of service: It is done when millions of user request for common service. Hacker takes the advantage in this case.
- Malicious insiders: It is performed when any one knows our login credentials.
- Misuse of cloud services: With the help of clouds server, hacker could crack security in less time.

[2] LITERATURE REVIEW

There have been several studies of E-Learning in Distance Education that are making use of Cloud Computing [1]. Such researches have focused on the necessity of Using Cloud Computing in field of cloud Educational System [2]. Here author have explained cloud Systems that have been used in Education along with their properties and introduction [3]. Author believes that many kinds of risks and challenges are there when Cloud Computing is used in Academic Field [4]. There is a very huge scope of E-learning in terms of Distance Education as it uses Cloud Computing [5,6]. The author talks about new trends of Cloud Computing in the field of Education [7]. CLOUD COMPUTING emerged as a role model for Distance Learning [8] The author has proposed Novel approach on Distance Education in Cloud Computing [9,10,11]. There are several researches that are working in order to provide security in cloud environment. The concept of DNA Cryptography has been implemented in Cloud Computing and applying the Huffman Algorithm along with Socket Programming. Besides these some of the New Approaches were also used to make Cloud Data more secure [12]. Security can be implemented in CLOUD ENVIRONMENT with the use of RSA ALGORITHM [13] Here the author tells how Data can be Secure by applying RSA Algorithm in Cloud Computing. [14] Cyber security is also a major concern in the field of e-learning education environment. [15] Analysis of security issues in cloud-based e-learning. [16]. Next the author believes that there is a link between need of business and measure of system in three aspects including technology. [28]. The concern about performance where response time is to be minimised and also the overload should be minimized but that to with keep in mind also that throughput gets not suffered. So maximising the throughput is considered [29]. In my review i also go through papers which are explaining about simple types of SaaS, PaaS, and IaaS of cloud along with the advantages and disadvantages of cloud computing. [30].

Citation	Author/year	Title	Objective	Finding Conclusion	Limitation
[1]	Dr. Pranav Patil/2016	A Study of E-Learning in Distance Education using Cloud Computing	To consider the role of cloud computing in distance learning	Author has presented the benefits and working of cloud environment to provide distance education.	There is need to increase the security and performance of cloud environment.
[2]	Asgarali	Necessity Of	To use cloud	Research	Research

	Bouyer , Bahman Arasteh / 2014	Using Cloud Computing In Educational System	for online education	has explained the need of cloud in online education system.	is not considering the security factors.
[3]	Agah Tugrul Korucu, handan Atun / 2016	The Cloud Systems Used in Education: Properties and Overview	Considering the features of existing cloud based system	Research is found suitable to consider the features of cloud system.	Research has failed to provide any technical solution.
[4]	Ananthi Claral Mary.T, Dr.Arul Leena Rose.P.J / 2019	Implications, Risks And Challenges Of Cloud Computing In Academic Field – A State-Of-Art	Considering risk and issues in cloud environment	Research has considered the related issues	The issues of cloud computing are presented in generalized manner.
[5]	Arshad Ali , Amit Bajpeye , Amit Kumar Srivastava/2015	E-learning in Distance Education using Cloud Computing	Research focused on e learning for distance education	Significant work has been made for distance education.	Issues in e learning are ignored.
[6]	Sudhir Kumar Sharma, Nidhi Goyal, Monisha Singh / 2014	Distance Education Technologies: Using E-learning System and Cloud Computing	Technology used in distance learning would be considered.	Research is playing important role in area of e learning.	The security and performance factors are not considered .
[7]	Yinghui Shi , Harrison Hao Yang , Zongkai Yang and Di Wu / 2014	Trends of Cloud Computing in Education	Focused on latest advent in cloud computing.	Work has focused on advent technology.	There is need to consider the advance technology to boost security.
[8]	Sanjay Karak, Basudeb Adhikary / 2015	CLOUD COMPUTING AS A MODEL FOR DISTANCE LEARNING	Considered cloud as e learning model.	Need of cloud in e learning is considered.	Need to introduce security mechanism

[9]	Jyoti Prakash Mishra, Snigdha Rani Panda, Bibudhendu Pati, Sambit Kumar Mishra / 2019	A Novel Observation on Cloud Computing in Education	To propose novel approach for cloud computing.	Novel approaches are considered to provide solution of online education.	Research is lacking security as well as performance
[10]	Awatef Balobaid, Debatosh Debnath / 2016	A Novel Proposal for a Cloud-Based Distance Education Model	To introduce Novel proposal for distance education	Research is considering recent enhancement in distance learning model.	Need to do more work on influencing factors.
[11]	Xu zhihong, Gu junhua, Dong yongfeng, Zhang jun, Li yan / 2013	Expand distance education connotation by the construction of a general education cloud	Considered used of general education cloud for distance learning.	Role and need of cloud for distance education is elaborated.	Work is generalize
[12]	Pandey, G. P. /2019	Implementation of DNA Cryptography in Cloud Computing and Using Huffman Algorithm, Socket Programming, and New Approach to Secure Cloud Data	To Considered security for cloud computing.	Research has considered security factor	The performance factor has been ignored.
[13]	P.suresh / 2016	SECURE CLOUD ENVIRONMENT USING RSA ALGORITHM	To make use of RSA for security of cloud.	The security of content over cloud has been enhanced.	The complex algorithm of RSA takes lot of time to encrypt data.
[14]	Singh, S. K., Manjhi, P. K., & Tiwari, R. K. / 2016	Data Security Using RSA Algorithm in Cloud Computing	To use RSA for data security.	RSA based security is applied on content.	Need to improve encryption speed.
[15]	Bandara, I.,	Cybersecurity	To consider the	Research	There is

	Ioras, F., & Maher, K. / 2014	concerns in e-learning education	cyber security issues.	considered security factors	need to enhance the security.
[16]	Kumar, G., & Chelikani, A. / 2011	Analysis of security issues in cloud-based e-learning	Considering and analysing the security for cloud environment.	Security enhancement is consideration of research	The model takes huge time to secure the data
[17]	Meslhy, Eman & Abd Elkader, Hatem & Eletriby, Sherif. / 2013	Data Security Model for Cloud Computing	To propose security of content used in cloud computing.	Research proposed security protocol for protection of digital contents.	There is need to improve scalability, flexibility and performance.
[18]	Osman, Saife & Eltahir Abdelhag, Mohammed & Abdelrahman, Saad. / 2016	Performance Analysis of Cloud-based Web Services for Virtual Learning Environment Systems Integration	To performance analysis of cloud performance	Research has considered performance factor	The security of cloud has been ignored.
[19]	Garrison, G., Kim, S., Wakefield, R.L. / 2012	Success Factors for Deploying Cloud Computing.	To focus the factors that are suitable for cloud computing would be considered.	Security and performance factors are considered.	There is lack of technical work.
[20]	Herhalt, J., Cochrane, K / 2012	Exploring the Cloud: A Global Study of Governments' Adoption of Cloud	Factors considered for adoption of cloud are considered.	The global study has been made to present the world wide adoption of cloud.	The research is generalized and need to introduce technical implementation.
[21]	Venters, W., Whitley, E.A / 2012	A Critical Review of Cloud Computing: Researching Desires and	The research would focus on different perspectives of cloud computing	Research has considered desires and realities.	Need to introduce more technical work.

		Realities			
[22]	Yang, H., Tate, M. / 2012	A Descriptive Literature Review and Classification of Cloud Computing Research	To review and categorize cloud based research	Relevant researches have been classified.	Research is review based thus it is not considerin g security and performan ce implement ation.
[23]	Marston, S., Li, Z., Bandyopadhy a, S., Zhang, J., Ghalsasi, A. / 2011	Cloud computing — The Business Perspective	Commercial perspective of cloud computing would be presented.	Business perspective of cloud is presented.	Research is just considerin g cost factor and ignoring security and performan ce factor.
[24]	V.Nirmala, R.K.Sivanandh an, Dr.R.Shanmug a Lakshmi / 2013	Data Confidentiality and Integrity Verification using User Authenticator scheme in cloud	Security of data and integrity verification is applied.	Model has provided security to content over cloud.	There need to extend the applicabilit y of model
[25]	Arjun Kumar, Byung Gook Lee, HoonJae Lee, Anu Kumari /2012	Secure Storage and Access of Data in Cloud Computing	Research provided security to content	Storage has been protected in this model.	The factors influencin g the performan ce are not considered .

[3] PROBLEM STATEMENT

It has been observed that there are several researches in field of e learning. Researcher did researches representing role of cloud computing in distance education. But the major issues that are faced in such researches are security and performance. There is always treat of data loss over cloud environment due to hacking or cracking attempts. Lot of hackers and virus like application could be held responsible for damaging of data. However there are several mechanisms that are using security mechanism to restrict such attack and encrypt data to secure it. But due to complexity of such security algorithm that are used to secure the data the performance of data transmission is influenced. Thus there is need to propose a secure and high performance e-learning model that could run over cloud with high reliability, flexibility and scalability.

[4] CONCLUSION

It has been concluded that the compression of content on cloud could reduce the transmission time and minimize the packet dropping probability. Moreover, over the time taken to encrypt the content get reduced. The probability of packet hacking is also reduced because content remains on network for less time. The security of educational content is essential for educational institution. Such proposal might increase the reliability, flexibility of e learning over cloud environment.

[5] SCOPE OF RESEARCH

Further researches are supposed secure and high performance solution of online e-learning system. Such research is supposed to resolve issues faced in online education cloud system because due to growing development of this technology, there is increase in security related issues. More over the research that are suffering due to lack of performance have laid foundation for development of new technology with enhanced performance.

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