



# **REQUIREMENT OF SECURITY FOR FOG BASED CLOUD ENVIRONMENT: A REVIEW**

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**ABSTRACT:** *The requirement of security in fog based cloud system has been discussed here. There are several researches in the field of fog computing which have been mentioned in this paper. Fog computing the fog networking. It is a decentralized computing system. In this system the data, compute, storage and applications are distributed in the most logical, efficient place. The main objective of fogging is to improve efficiency of cloud. It reduces amount of data transmitted to cloud for processing, analysis & storage. The middle fog layer is consisting servers. These have been installed at edge of IP networks. It is supported by limited data storage, computer and wireless communication tools.. To ensure the data protection by splitting and encrypting data using advanced cryptographic mechanism. This paper is describing the method to reduce the probability of packet dropping and congestion. It designs and implements more secure algorithm to protect data from active and passive type of attack at application layer. It also makes comparative analysis of proposed model with existing security model.*

**KEYWORDS:** *Cloud Computing, Fog Computing, Port no., Session layer security, Application layer, Cryptography*

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## **1. INTRODUCTION:**

It could be said that today's business software is mobile & collaborative. This is because of cloud computing. There are several services which have made cloud computing most feasible. Cloud computing are also making data access easy to the user. Fast execution of cloud application is the basic requirement of enterprises. It enables IT teams to set resources quickly to fulfill changeable non-predictable claims. These claims may be related to business. It is done with better manageability and high maintenance. It may lead to unexpectedly high cost if administrator is not going to accept cloud price model.

## 2. FOG COMPUTING

Fog computing [3] has been considered as architecture which is making use of several collaborative end-user clients as well as near-user edge devices. Fog computing extends cloud computing along with services to edge of network. The main objective of fogging is to improve efficiency of cloud. It reduces amount of data transmitted to cloud for processing, analysis & storage. The middle fog layer is consisting servers. These have been installed at edge of IP networks. It is supported by limited data storage, computer and wireless communication tools. Basic role of fog servers is to connect cloud directly to remote users.

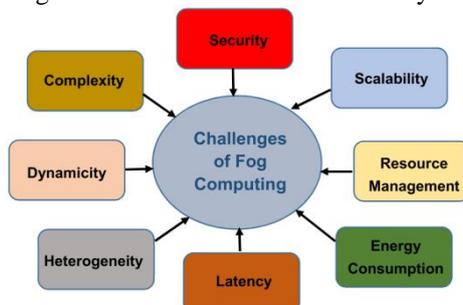


Figure 2 Fog Computing [3]

## 3. LITERATURE REVIEW

There are numerous researches which have been done to secure fog based cloud computing. Some of them have been located below:

### Yunguo Guan et al. (2018) “Data Security & Privacy in Fog Computing” [1].

In this article, the design challenges for data security in fog computing. Particularly, the research has discussed the special data security and privacy design issues. These issues are created by the fog layer. They also considered the causes because of the data security methods of cloud computing are not used in fog computing.

### Jiyuan Zhou (2017) “A Hierarchic Secure Cloud Storage Scheme based on Fog Computing” [2].

Generally the existing security techniques are related to encryption technology. But these techniques are not successfully avoiding the attack of cloud server. Theoretical security evaluation as well as experimental analysis, the possibility of our technique has been considered the authenticated. It is actually an effective appendage to the traditional cloud storage technique.

### Bushra Zaheer Abbasi(2017) “ Fog Computing: Security Issues, Solutions & Robust Practices” [3].

They discussed security issues related to fog computing. They also proposed solution regarding issues in fog security. This paper presents the critical analysis of the fog architecture with respect to security. The state of the art work done since 2012 is critical analyzed on the bases of security techniques and security threats. They grouped the existing security techniques on the bases of security goals achieved by each. It will provide a clear and comprehensive distinction between the security areas explored and those, which still need researchers' attention.

### Nabil Abubaker et al. (2017)“Privacy-Preserving Fog Computing Paradigm” [4].

The research work has explored two privacy issues. Such issues are the posed by the fog computing system. The security challenges are discussed according to the need. Reduction of latency is the first hurdles related to the Fog Computing. The researchers have discussed the essentialness to address such issues. It has been done to relate in the context of real-life situation. At last, the research has proposed the privacy-preserving fog computing concept. It is able to solve such challenges. They have explained that their research has provided the security and effectiveness of their work.

### M.Verma, N.Bhardawaj, A.K.Yadav, (2016) “architecture for Load Balancing Techniques for Fog Computing Environment”[5].

The Cloud computing has been determined as the emerging computing technology. This has been solved by innovative type computing model. This new sort is referred as Fog Computing. As it is well known thing that the Fog computing is similar to cloud. The one thing which vary it from the cloud computing is situated at edge of network. Cloud computing is also capable to provide the protection of cloud environment. Only of Fog Services, it is feasible to secure the services of cloud computing. The fog computing places the data as possible as close to end user. The security issues are mentioned in this paper.

**K.Shenoy, P.Bhokare, U.Pai, (2015)“Fog Computing Future of Cloud computing ”[6].**

Fog computing Extends cloud computing, cloud computing provide data, compute, storage, and application services to end-user, It will be wrong if anyone say that the Fog Computing is an alternate of cloud. It is only helpful to extend the cloud computing. It has been done to offer the security in the cloud system. Using the Fog Services it is possible to enhance the security of cloud computing. The objective of fog computing is to offer the data to end user at the close location. The protection challenges have been mentioned here.

**Mohamed Firdhous, Osman Ghazali, Suhaidi Hassan (2014)“Fog Computing: Will it be the Future of Cloud Computing?” [7].**

The review provide the depth look at cloud computing and fog computing. It has been done in order to examine the fog computing. It is able to manage the limitations of cloud computing. The fog computing is able to effectively replace the cloud computing and become the defector of cloud computing in future.

**B.H. Bhavani and H.S. Guruprasad, (2014)"Resource provisioning techniques in cloud computing environment: A survey,"[8].**

The Cloud Computing has been the model. It enables the user to use a suitable, on-demand network access of configurable computing resources. These computing resources are quickly selected as well as accessible. The Resource Provisioning has considered the selection, consumption, and execution time arrangement of software and hardware resources. It has been done to make sure the performance of applications. The Resource Provisioning has become an essential and difficult issue within huge sized distributed systems. The Cloud computing system is a large scale distributed system. Several resource provisioning techniques are there. The static as well the dynamic techniques have their various advantages. Both have their own issues.

**M.Georgescu and M.Matei (2013)"The value of cloud computing in the business environment" [9].**

Cloud mentality consists of the chances to get the access lacking of store and maintain the technologies. Cloud mentality allows to alter the way business on an individual stage. It also broadly alter the purchase decision-making.

**P.Pazowski and Z.Pastuszak, (2013) "Cloud computing – a case study for the new ideal of the IS/IT implementation"[10].**

The objective of authors is to make comparison of existing method to manage and implement the IS/IT in enterprises. The existing methods has been compared to the cloud computing. Objective of this research is to contrast chief economical advantages from adopting cloud solutions. The researcher also examined the impact on Business

**S.Malkowski, Y.Kanemasa, H.Chen, M.Yamamoto, Q.Wang, D.Jayasinghe, C.Pu, and M.Kawaba (2012) "Challenges and opportunities in consolidation at high resource utilization: Non-monotonic response time variations in n-tier applications"[11].**

SLA-critical response time reduction of effects is considered here. They have also defined the software configurations. In the field of technical, the direct calculation has been made by author. The research work has evaluated the resource uses.

#### **4. OBJECTIVE**

This paper carries several objectives which have been listed below:

1. To study active and passive attack
2. To provide security to network at different layer
3. To design and implement more secure algorithm to protect data from active and passive type of attack at application layer
4. To make comparative analysis of proposed model with existing security model

#### **5. PROBLEM FORMULATION**

The proposed work would be more secure as to traditional approach. Here the security would be applied on application layer as well as session layer. More over the information would be transmitted from multiple paths using user defined port. It has not used predefined port such as 21 for ftp, 80 for http for data transmission. Proposed encryption mechanisms have been capable to secure data from being destroyed. Proposed system provided security not only on application layer it is also providing security at session. The whole data is not transmitted in single cycle. Data has been split in fog and cloud. If split data is decrypted un authentically it is completely unusable for cryptanalysts.

## 6. CONCLUSION

In case of traditional work there was security of data at application layer only. Here in proposed work the security has been provided to the packet. Due to limitation of existing security mechanisms there was need to develop a new security system. Chance for decryption without authentication should get reduced. There is need to implement decentralized security in order to prevent attacker from different network would enhance Advanced Encryption standard by introducing multilayer security. The proposed work has divided data in multiple parts in order to provide reliable transmission mechanism. This mechanism would make security system immune to attacks made by hacker or crackers.

## 7. FUTURE SCOPE

The research work would provide protection to data transmission by providing data splitting option on cloud. Some part of data would be stored on cloud while other part would be stored on fog side. This data would be transferred from two different locations and merged at receiving end and decoded after that. The research would provide protection against attack at application layer where user interacts with network directly. The common protocol at application layers are FTP, TELNET & HTTP. The proposed work would be proved helpful for secure transmission because it very efficient and less time consuming system at application layer.

# REFERENCES

- [1]YunguoGuan,JunShao,GuiyiWei“DataSecurity&PrivacyinFogComputing” 0890-8044/18/\$25.00©2018IEEE
- [2]JiyuanZhou(2017)“AHierarchicSecureCloudStorageSchemebasedonFogComputing”,2017IEEE15thIntlConf onDependable,Autonomic&SecureComputing,15thIntlConfonPervasiveIntelligence&Computing,3rdIntlConfon BigDataIntelligence&Computing&CyberScience&TechnologyCongress
- [3]Bushra Zaheer Abbasi, Munam Ali Shah (2017)“Fog Computing: Security Issues, Solutions & Robust Practices”, Proceedings of 23rd International Conference on Automation & Computing, University of Hudders field,Hudders field, UK, 7-8September 2017
- [4]Nabil Abubaker, Leonard Dervishi & Erman Ayday “Privacy-Preserving Fog Computing Paradigm” The 3rd IEEE Workshop on Security & Privacy in Cloud (SPC 2017)
- [5]M.Verma,N.Bhardawaj,A.K.Yadav,“architectureforLoadBalancingTechniquesforFogComputingEnvironment ”,I.J.InformationTechnology&ComputerScienceVolume6No.2,pp.269-- 274, April2016,DOI:10.090592/IJCSC.2015.627
- [6]K.Shenoy,P.Bhokare,U.Pai,“FogComputingFutureofCloudComputing”, International Journal of Science & Research(IJSR)Volume4Issue6, pp.55-56, June2015.
- [7]Mohamed Firdhous, Osman Ghazali, Suhaidi Hassan ( 2014) ”Fog Computing: Will it be the Future of Cloud Computing?” ISBN: 978-1-941968-00-0 ©2014 SDIWC
- [8]B.H.BhavaniandH.S.Guruprasad,"Resourceprovisioningtechniquesincloudcomputingenvironment:Asurvey,"InternationalJournalofResearchinComputerandCommunicationTechnology,vol.3,no.3,pp.395--401,2014.
- [9]M.Georgescu and M.Matei, "The value of cloud computing in the business environment,"The USV Annals of Economics and Public Administration, vol.13, no.1, pp. 222--228, 2013.
- [10]P.PazowskiandZ.Pastuszak,[8]"Cloudcomputing--acasestudyforthenewwidealloftheIS/IT implementation," in International ConferenceonManagement,KnowledgeandLearning,Zadar,Croatia,2013,pp.855--862.
- [11]S.Malkowski,Y.Kanemasa,H.Chen,M.Yamamoto, Q.Wang, D.Jayasinghe, C.Pu, and M.Kawaba, "Challenges and opportunities in consolidation at high resource utilization: Non-monotonic response time variations in n-tier applications," in Fifth IEEE International Conference on Cloud Computing, Honolulu, HI, USA, 2012, pp. 162--169.