An Exploration of Blockchain Technology For Secure Data Sharing In Cloud Computing

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Abstract- *With the growing dependence on cloud computing, ensuring secure data sharing has become a critical concern. Traditional centralized cloud architectures pose several security risks, including unauthorized access, data breaches, and single points of failure. In recent years, blockchain technology has emerged as a potential solution for enhancing data security and privacy in cloud computing environments. This research paper investigates the use of blockchain technology to enable secure data sharing in cloud computing and also explore the challenges, and potential applications of blockchain in cloud computing environments. Finally, we propose a conceptual framework for integrating blockchain technology into cloud computing architectures to ensure secure data sharing.*

Keywords- Blockchain Technology, Cloud Computing, Secure Data Sharing, Authorization, Confidentiality, Integrity.

I. INTRODUCTION

Cloud computing is the delivery of different servicesthroughtheInternet.Theseresourcesincludetoolsandapplications like data storage, servers, databases, networking, and software. Rather than keeping files on a proprietary hard drive or local storage device, cloud-based storage makes it possible to save them to a remote database. As long as an electronic device has access to the web,it has access to the data and the software programs to run it. Cloud computing is a popular option for people and businesses for a number of reasons including cost savings, increased productivity, speedand efficiency, performance, and security. This technological trend has enabled the consummation of a new computing model called cloud computing. cloud offer services that can be grouped in to three orders software as a service(SaaS),platform as a service (PaaS), and structure as a service (IaaS).SaaS technology also known as cloud-based software or cloud applications—is application software that's hosted in the cloud, and that users access via a web browser, a dedicated desktop client, or an API that integrates with a desktop or mobile operating system. With PaaS, the cloud provider hosts everything that is servers, networks, storage, operating system software, middleware, databases—at their data center. Iaas enables end users to scale and shrink resources on an as needed basis, reducing the need for high infrastructure and for overbuying resources to accommodate periodic spikes in usage.

Blockchain is a method of recording information that makes it impossible or difficult for the system to be changed, hacked or manipulated. A blockchain is a distributed ledger that duplicates and distributes transactions across the network of computers participating in the blockchain.Blockchain technology is a structure that stores transactional records, also known as the block, of the public in several databases, known as the "chain," in a network connected through peer-to-peer nodes. Typically, this storage is referred to as a 'digital ledger.'Every transaction in this ledger is authorized by the digital signature of the owner, which authenticates the transaction and safeguards it from tampering. Hence, the information the digital ledger contains is highly secure. In simpler words, the digital ledger is like a Google spreadsheet shared among numerous computers in a network, in which, the transactional records are stored based on actual purchases.Blockchain is an emerging technology with many advantages in an increasingly digital world:

1. **Highly Secure -**It uses a digital signature feature for conduct fraud-free transactions making it impossible to corrupt or change the data of an individual by the other users without a specific digital signature.
2. **Decentralized System -** Conventionally, you need the approval of regulatory authorities like a government or bank for transactions; however, with Blockchain, transactions are done with the mutual consensus of users resulting in smoother, safer, and faster transactions.
3. **Automation Capabilities -** It is programmable and can generate systematic actions, events, and payments automatically when the criteria of the trigger are met.

The working of Blockchain is given below in Fig 1.

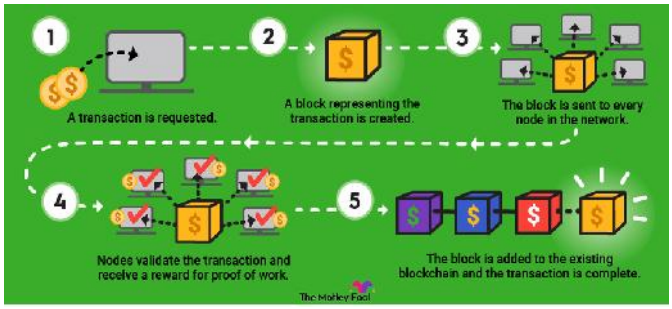

Fig 1: Block-chain Working

II. LITERATURE SURVEY

It is a literature study of the research papers and research which gives the detailed information about some of the existing systems along with its advantages and disadvantages. Gundla S,Satyanadh R and Kathirvel A[1]This report touches upon protecting information in the 5G network efficiently and securely. It further discusses upon a scheme based on blockchain technology to resolve the privacy issues in 5G networks. Illustration on how mutual trust is gained between content provider and user community by merging blockchain in data sharing is also explained. Nitesh Singh, Jay Bothra [2] This paper proposes a framework that encompasses different ecosystems with respect to data sharing with blockchain technology as the backbone of this system. As blockchain inherently answers the major issues of trust, data accuracy and reliability, it goes on to provide a novel solution for data sharing. Monika Pandey, Prof.Tripti Sharma[3]This paper presents Blockchain based proof of staking with elliptic Curve Encryption (BPECE) algorithm is used to secure data transmission in the cloud. This proposed method efficiently checks each node verification using Policy based Key Authentication (PBKA) algorithm. The proposed technique generates public key for each document. Thus the proposed method gives better security performance than previous methods. Wang-You Tsai [4] Concerns secure cloud computing services on a blockchain platform, called cloud@blockchain, which benefit from the anonymity and immutability of blockchain.The results reveal the superiority of the hybrid blockchain with the cache over the pure blockchain and the traditional database, which it outperforms by 500% and 53.19%, respectively. Shweta Gaur Sharma [5] This paper presents blockchain and compare the various platforms on which blockchain can be implemented. The paper illustrates the use of Blockchain applications for building secure infrastructure of cloud computing.Praveen Kumar Mannepalli [6] In this paper, a blockchain-based framework has been proposed to address data security problems in content-centered cloud. Here, we exercise reciprocal trust between users and service providers. The transparency and the resistance to exploitation of the blockchain network protect the provider's protection and access control. Selected from the users with the aid of a common record can be kept secretly by the content owners. The article shares the low overhead interesting data, delay and congestion of the network and then green contact.N'Taya Matissi [7] This paper proposed an architecture for data management based on Blockchain Principle to provide traceability of the updates on data while guaranteeing its security through a combination of hashing and encryption techniques. The model that is used here adapts the Blockchain technology to a centralized environment and supports a heterogeneous de-duplication of redundant data in data centers. This paper evaluates the efficiency of the scheme on the basis of the time consumed for encryption and decryption of big or small data as well as the security level of the proposed model.Kun Hao, Junchang Xin [8] This paper formally concerns the problem of secure data sharing in IBD. We present a scheme named Hybrid-chain to execute transactions for sharing data securely and efficiently. Firstly, this paper proposes a novel concept named Interoperable Consensus Group (ICG) which organizesa set of basic consensus nodes into a group, each of which is responsible for managing atleast one blockchain. Then this paper represents an interoperable cross-chains consensus protocol to achieve eventual consistency of blockchain transactions. By conducting extensive experiments, and the evaluation results show that our proposed approach achieves superior performance.

II. METHODOLOGY

Revenue Distribution Model was developed in which a solitary backing model with a solitary stranger and colorful information parcels dependent on the consequence of the plan of action. At last, we produce a sophisticated multiservice model with colorful outlanders working, which is like the total coordinated trouble model. After that an assumption was made in which every data proprietor holds the data counterplotted by the same service r. That is, each data proprietor Hi ∈ H holds the same type of data and Di = {r}. In particular, the profit v (H) in this model presents the portion belonging to the data proprietor group. The only factor considered is the donation of data that is participate by each data proprietor, also called impact factor of participated data. Assumethat all the data possessors in this model share multiple shadows data with positive impact factors so that the Shapley value of each party is legal. We pay attention to the F1 score in a prophetic model attained by training any subset of the participated data.

After Revenue Distribution Model comes Single-Service/ Double- Group (SSDG) Model the Single- Service/ Double- Group (SSDG) model, correspond of the group of the

data proprietor and the group of the third party and the function of the system is furnishing a single service r. Considering that the SSDG model is developed grounded on the former introductory model and extend it with a single third party. Assuming the topology between the two groups is a complete dual graph, which is a one- to- numerous relationships still. Single- ServiceModel The Single- Service/ triadic - Group(SSTG) model, broaden the SSDG model by adding a bunch of diggers between the gathering of information processors and the gathering of outlanders Multiple Services(Ms) Model In this subsection, a general model was developed for multiple third parties and services in a complex and general collaboration model. The total revenue is distributed by combining the profit distribution for each unit element. Considering an introductory process of data participating created by a set of actors N 0 including a nonempty set H0, a third- party Tj and a nonempty set of miners.To probe the income variety of every institute part as the volume of information possessors taking an interest in the cooperation transforms, we plan a bunch of relative examinations to work out the income proportion of colorful individualities. Also, at that point, we notice the connection between the extents of information possessors in the institute and income vehicle. After investigating the proposed model thinking about the intricacy of the model the impacting elements of the income dissemination extent of each gathering of members was examined and likewise the motivation impact and judiciousness of the proposed dissemination technique of this model was confirmed. To assess the impact of information commitment factors under the provocation system, it's important to anatomize the income dissipation exemplifications of colorful information commitment under the condition that the volume of different individualities in the cooperation is steady. Information commitment is addressed by the F1 regard, which builds up a visionary model on participated information and applications provocations to work out the income rotation effects of individualities in the cooperation.

III. RESULT

The data sharing framework was proposed based on block chain technology in which different parties are involved like Issuer, verifier. These are the stoners who may be either individualities or associations who would add, amend or recoup this data from the system. Intention of user is to upload the bottommost documents or vestiges to Block chain predicated system and also the data is appertained to as records or documents to be streamlined which is the new or being data, stored on pall storage.This data can be requested by the user for assaying and vindicating purpose. After that the system then accepts this data and then it generates the hash for the document which is stored on cloud data storage. Post this document details along with hash is streamlined in the block and this block is delivered to all authorized peers only. This authorization can be streamlined by the authorization update module in the system. Once the block is vindicated and approved by the operation the data is fitted in the chain and linked with former block.

As shown in Fig 2. The system is placed at different places depending on the use case. Now, consider data sharing in VISA operation for particular country one part would be for country's delegation office, another part for the visa applicant and so on as per the demand in use-case. Next comes, the data format, also we suggest to use structured data which could be used with any relation database. The operation could be inter-portable. All access right given in the system would be managed from the operation predicated on the places and these places can be assigned to the user. In this way, the below framework manages the Confidentiality and Integrity aspect of security with the help of Blockchain. For Vacuity the redundancy can be used at operation architecture position and have not been explained in this paper. Coming way are performance of this frame and study it's the criteria of frame from further optimization and scalability aspect.

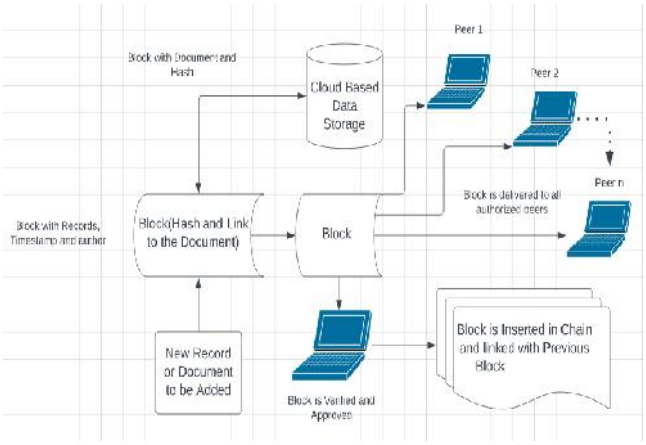

Fig 2: Block-chain based data sharing framework

IV. CONCLUSION

Thus, in this paper the blockchain framework was proposed that grounded data participating frame which is veritably general and can be applied to any sphere where data sharing of sensitive data between multiple parties is a challenge. With this frame data is participated in secured manner and also the data sequestration is defended. The communication and authentication protocols need be further delved and extend this exploration work with farther disquisition. Furthermore, in our work we will continue with the perpetration of the system grounded on this frame and

conduct a study to get better optimization and empirical data which could be used for farther disquisition and studies.

REFERENCES

[1] Ajay Kumar Shrestha and Julita Vassileva," Blockchain-Based Researcyh Data Sharing Framework for Incentivizing the Data Owners", Springer International Publishing AG, part of Springer Nature 2018 S. Chen et al. (Eds.): ICBC 2018, LNCS 10974, pp.259-266, 2018.

[2] Kumar Bhaskaran, Peter Illfrich and Dain Liffman," Double-Blind Consent-Driven Data Sharing on Blockchain", 2018 IEEE.

[3] Z. Zheng,X. Chen and H. Wang,"An Overview of Blockchain Technology: Architecture, Consensus and Future Trends", 2017 IEEE 6th International Congress on Big Data.

[4] Ashiq Anjum, Manu Sporny, Alan Sill,"BlockChain Standards for Complaince and Trust", IEEE Cloud Computing Published by IEEE Computer Society Y.

[5] Vimalkumar Pachaiyapp R. Kasturi," Blockchain Technology(DLT Technique) for KYC in FinTech Domain: A Survey", International Journal of Pure and Applied Mathematics Volume 119 No. 10 2108, 259-265.

[6] M. Shen, H. Liu and M. Guizani," Blockchain helped secure gadget verification for cross-space modern iot", IEEE Journal on Selected Arears in Communications, Jan 2020.

[7] Y. Deng, L. Zhu, X. Du and and N. Guizani," Security Saving Picture recovery for clinical iot frameworks: a Blockchain based methodology.

[8] Prathima Sharma, Rajni Jindal and Malaya Dutta Borah," A Blockchain Technology for Cloud Storage: A Systemetic Literature Review", Aug 2020 Researchgate Publications.

[9] Gundla S, Satyanadh R and Khatirvel A," Secure Data Sharing Based on Blockchain Technology", May 13 2021 Medwin Publishers, International Journal of Forensic Sciences.

[10] Huihui Yang and Bian Yang," A Blockchain based Approach to the Secure Sharing of Healthcare Data", 2017 Computer Science Medicine,Semantic Scholars Research Publications.