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DIGITAL HEALTHCARE SYSTEMS BASED MOBILE PLATFORMS FOR SECURED EHR SHARING

[1]Matimpati. Chitrarupa, [2]E. Dayakar, [3]Gongati. Sai Sushmanth, [4]G.Surendra Babu
[1,2,3]Dept of Computer Science and Engineering, Sree Venkateswara College Of Engineering, Nellore (Dt), Andhra Pradesh, India.
[4]Dept of Electronics and Communication Engineering, Sree Venkateswara College Of Engineering, Nellore (Dt), Andhra Pradesh, India.

ABSTRACT
Electronic health records (EHRs) are increasingly being stored in mobile cloud environments, which merge mobile technology with cloud computing to make it easier for patients and healthcare professionals to share medical data. With the help of this cutting-edge paradigm, healthcare services may be provided at minimal operational costs with a great degree of flexibility. This new paradigm does, however, bring up issues with network security and data privacy for e-health systems. The correct transmission of EHRs amongst mobile users while maintaining strong security standards in the mobile cloud is a challenging issue. In this work, we offer a distinctive EHRs sharing structure using a mobile cloud platform and the decentralised interplanetary file system (IPFS). We provide a trustworthy access control solution that makes use of smart contracts in particular to facilitate secure EHR exchange between various patients and medical professionals. On a mobile app utilising Amazon cloud computing, we provide a functional prototype of an Ethereum block chain implementation in a real-world data sharing situation. The actual results show that our concept offers a workable method for secure data transfers on mobile clouds while protecting sensitive health data from threats. The system evaluation and security study demonstrate performance advantages in the light-weight access control architecture, minimal network latency, and high levels of security and data privacy when compared to the current data sharing models.

1. INTRODUCTION

Based on peer-to-peer communication technology, network theory, and cryptography, blockchain is a paradigm-shifting technology that has arisen during the past ten years. The current blockchain architecture still has several flaws, nevertheless, which preclude widespread commercial implementation of the technology. The necessity for each blockchain node to store a copy of the distributed ledger is a significant restriction. This storage need quadratically rises with the number of transactions, which finally limits the scalability of a blockchain system.

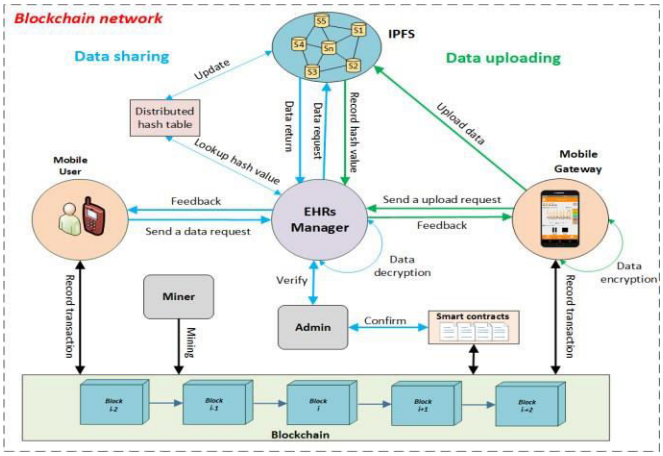
2. PROPOSED SYSTEM

In this work, we merely save one block rather than the complete transaction of blocks. To ensure the security of the block author, the block will be converted into SHAMIR share, and all SHAMIR share will subsequently be disseminated across all available nodes. All shares from nodes will be obtained by the reconstruction application, which will then use SHAMIR SECRET to retrieve the original block data. When producing the secret polynomial, which is applied to the block data, and when obtaining the original value, reverse polynomial is used. If any shares are lost or return wrong values, reconstruction will fail.

3. SYSTEM MODEL

This part introduces the system architecture as well as the concept of data uploading and sharing in our system. The goals of this paper's design are also highlighted. The mobile cloud-based, block chain-based e-health system is depicted in fig 1. fig 2: The data flow of the proposed mobile cloud block chain system.

Fig.1.An overview of the mobile cloud-based, block chain-based e-health system.



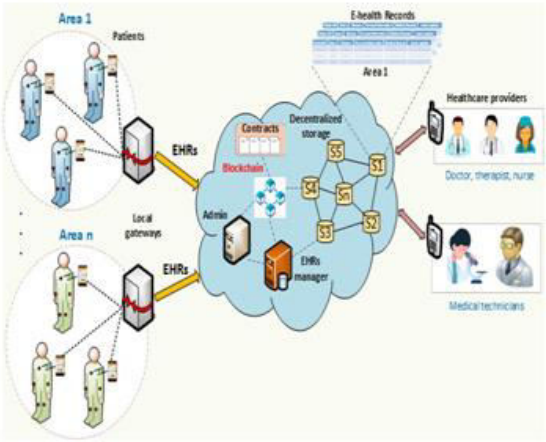


Figure.2.The data flow of the proposed mobile cloud block chain system.

We consider an e-health scenario in which, as shown in Fig. 1, patient records are obtained from a network of local gateways and stored on a public cloud for exchange with healthcare providers. E-health records may contain personal data and medical history that patients have provided. With an area ID AID and a distinct patient ID PID, patients are categorised according to where they currently reside. In this paradigm, we assume that the patient is the local user who controls the private wearable sensor network. We also expect that a mobile application built into the patients' smartphones will be able to gather EHRs from wearable body sensors. Consequently, a patient's block chain address may be written as Addr= {AID, PID}. We advise just storing patient addresses on block chain due to the impossibility of storing vast amounts of medical data there, with the remainder being saved on decentralised cloud storage. A cloud EHRs manager ME is also suggested to handle medical records.

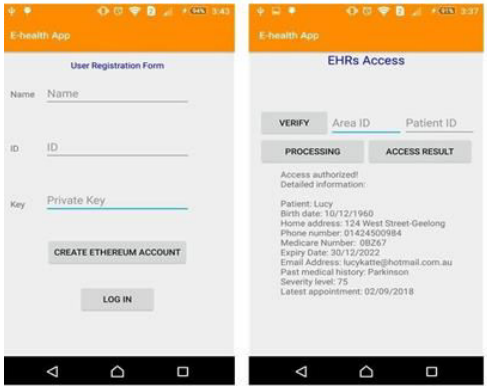
4. EXPRIMENTAL RESULTS

To establish our EHRs sharing system, we first built a private Ethereum block chain on AWS, as depicted in Fig. 11. Data access and transaction logs are kept and displayed on the web interface for monitoring reasons. We used smart contracts, IPFS storage, network entities, and links to mobile apps when building our e-health system, all of which are based on block chain configurations. We controlled the EHRs sharing system using these settings, and we evaluated the performance of our architecture using the two important performance

indicators of network overheads and access control.

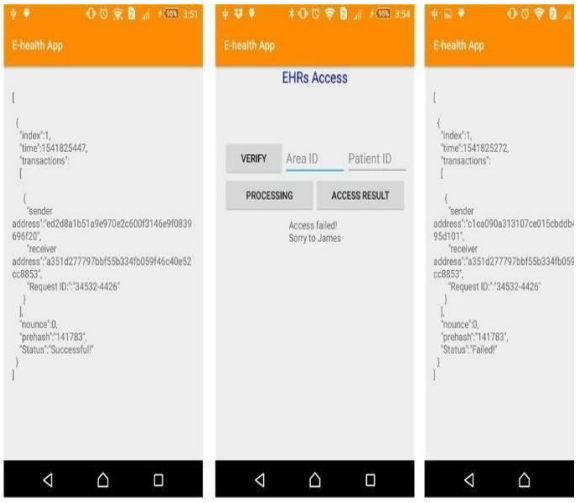
4.1 ACCESS CONTROL PERFORMANCE

To assess the effectiveness of our EHRs sharing approach with a planned access control, we provide two use scenarios with authorised and unauthorised access (Fig. 12). The purpose of our framework is to give efficient access to EHRs via the cloud for authorised parties (such as healthcare providers) while being able to prevent unauthorised access to our EHRs resources. A mobile user, such as a doctor who wants to examine his patients' EHRs in the cloud, can utilise our mobile application with a mobile user interface to create an Ethereum account and register user information for interacting with the blockchain (Fig. 12(a)). Once his request has been granted, he now starts a transaction to access EHRs by providing the patient's address.



(a) (b)

by the cloud EHRs management.



(c) (d) (e)

Advantages of Proposed System

1. This can effectively work.
2. Security is more.

CONCLUSION

This article suggests a cutting-edge EHR sharing system made possible by mobile cloud computing and block chain. Through the deployment of a working prototype, we identify the main shortcomings with the present EHR sharing systems and recommend effective strategies to resolve them. The goal of this effort is to create a

reliable access control system based on a single smart contract that will regulate user access and ensure the efficient and secure sharing of electronic health records. We set up an Ethereum block chain on the Amazon cloud, where medical entities can communicate with the EHR sharing system using an Android mobile application that has been developed, to test the effectiveness of the suggested strategy. In order to enable decentralized data storage and sharing, we additionally combine the block chain with the peer-to-peer IPFS storage system.

REFERENCES

1. T.-T.Kuo,H.-E.Kim,andL.Ohno- Machado,``Blockchaindistributed ledger technologies forbiomedical andhealthcareapplications,"J.Amer. Med.Inf.Assoc.,vol.24,no.6,pp.1211_1220, 2017.
2. M.Mettler,``Blockchaintechnologyinhealthcare:Therevolution starts here,"inProc.18thIEEEInt.Confe-HealthNet.,Appl. Services, Sep.2016, pp. 1_3.
3. W.J. Gordon and C. Catalini, ``Blockchain technology for healthcare:Facilitatingthetransitiontopatient-driveninteroperability,"Comput. Struct.BiotechnolJ.,vol.16,pp.224_230,2018.
4. A.Dubovitskaya,Z.Xu,S.Ryu,M.Schumacher, andF. Wang,``Secure andtrustableelectronicmedicalrecordssharingusingblockchain,"in Proc. AMIA Annu. Symp., 2017, pp.650_659.
5. M.Hölbl,M.Kompara,A.Kami²alic,andL.N. Zlatolas,``Asystematic review of the use of blockchain inhealthcare,"Symmetry, vol. 10, no. 10, p. 470, 2018.
6. S.Jiang,J.Cao,H.Wu,Y.Yang,M.Ma,and J. He,``BlocHIE: Ablockchain-basedplatformforhealthcareinformation exchange,"in Proc.IEEE Int. Conf. Smart Comput.(SMARTCOMP),Jun. 2018, pp. 49_56.
7. L.A.Tawalbeh,R.Mehmood,E.Benkhlifa, and H. Song, ``Mobile cloudcomputingmodelandbigdataanalysisforhealthcareapplications,"IEEE Access,vol. 4, pp.6171_6180, 2016.
8. S.M.R.Islam,D.Kwak,M.H.Kabir, M.Hossain, and K.-S.Kwak,``TheInternetofThingsforhealthcare: A comprehensive survey,"IEEEAccess,vol.3,pp.678_708,Jun. 2015.
9. BahgaandV.K.Madisetti,``Acloud-basedapproachfor interoperableelectronichealthrecords(EHRs),"IEEEJ.Biomed.Health Inform., vol. 17, no.5, pp. 894_906, Sep. 2013.
10. E.AbuKhousa, N. Mohamed, andJ. Al- Jaroodi,``e-Healthcloud:Opportunities andchallenges,"FutureInternet,vol.4,no.3, pp. 621_645, 2012.