

# Survey Paper on Hospital Management System using Blockchain

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**Abstract** -Electronic health records are health information of patients that are saved digitally in a network. The information of the patient are stored in the blockchain and these details are stored in the block chain as a blocks of data. The data is encrypted by the algorithm known as AES which is used to encrypt all the data of the patients. A Blockchain network is used in the healthcare system to exchange patient data improve the performance, security, and transparency of sharing medical data in the health care system. The three main feature of blockchain technology – Security, Decentralization Transparency make any application secure and not accessible by unauthorized parties.

**Key Words:** Health records, Blockchain, Encryption of data, Decryption of data, Security.

## 1. INTRODUCTION

Blockchain is a distributed ledger technology that can be used to create secure, transparent, and tamper-proof healthcare management systems. A healthcare management system based on the blockchain can securely manage and store health information such as electronic health records, patient information, medical histories, and clinical trial data. One of the key benefits of using blockchain technology in healthcare management systems is that it can enhance the security and privacy of health data. Because blockchain is a decentralized and transparent system, it eliminates the need for intermediaries, such as third-party data aggregators and clearinghouses, that are typically used to manage health data. This helps to prevent data breaches and protect the confidentiality of patient data. Another advantage of using blockchain in healthcare management systems is that it can help to streamline administrative processes, reduce costs, and improve efficiency. For example, blockchain technology can be used to automate claims processing, manage drug supply chains, and track medical devices, among other applications. Healthcare management systems based on blockchain technology can provide significant benefits in terms of security, privacy, efficiency, and cost savings. As the healthcare industry continues to evolve, it is likely that we will see more widespread adoption of blockchain-based healthcare management systems in the years to come.

### 1.1 MOTIVATION

Better health is important to human happiness and the welfare of society. It plays a vital role in the economic progress of the nation. If health, casualty, emergencies occur every day and the diseases are expected to be diagnosed and treated. A

health record is a collection of clinical data related to the patient's mental and physical health, gathered from different sources. Health record consists of a patient's medical history, examination, diagnosis, treatment, results of lab investigation, scanning reports, alerts like allergic to etc. These health records can be managed both manually and digitally.

### 1.2 PROPOSED SYSTEM

Firstly, there is a registration process for patient and hospital after that they login into the system. The hospital insert patient records in the system. Then records is being encrypted with AES algorithm for security purpose. Hash value will be generated for particular record and Using blockchain record stored in local database, and original records also stored. 1 Health Record Management using Blockchain 2 If another hospital need records they send request to local database for access of the records. Request goes to patient and they gives access to there record. After that record is send to hospital and at time of transaction hash value get verify for particular record, that there is any changes doesn't occur in record then the record successfully send to the requested hospital Or any changes occur in blocks at the time of transaction then record goes in temper and alert message will be sent to the hospital through mail. We use the patient email to make authentication

## II. PROBLEM STATEMENT

The main and basic goal of our system is to provide Health records of patients to hospitals and provide Security to Data. Firstly, there is a registration process for patient and hospital after that they login into the system. The hospital insert patient records in the system. Then records is being encrypted with AES algorithm for security purpose. Hash value will be generated for particular record and Using blockchain record stored in local database, and original records also stored If another hospital need records they send request to local database for access of the records using special access key. Request goes to patient and they gives access to there record. After that record is send to hospital and at time of transaction hash value get verify for particular record, that there is any changes doesn't occur in record then the record successfully send to the requested hospital Or any changes occur in blocks at the time of transaction then record goes in temper and alert message will be sent to the hospital through mail. We use the patient email to make authentication. The global Electronic

Health Record (EHR) market is growing. To safe-guard security and privacy of EHR, access control is an essential mechanism for managing EHR data. A hybrid architecture to facilitate access control of EHR data by using both block chain and edge node. Within the architecture, a block chain-based controller manages identity and access control policies and serves as a tamper-proof log of access events.

### III. RELATED WORK

Blockchain Technology has gone far beyond Bitcoins. Healthcare is one of its application areas. The proposed system was based on the bitcoins approach was meeting information customers' needs and protecting patients' privacy [5]. In this proposal, if the information customer needs to see the record of the patient then they have to pay the fee with bitcoins. The disadvantage of this is a misuse of patient records and paying fees every time makes it difficult in terms of cost. The research took a turn from Public Blockchain Networks to Private Blockchain Networks. In healthcare, many parties have to access the same information [6]. Gem Health Network was launched which was based on Ethereum Blockchain Technology. With this infrastructure, the information can be shared among different entities. The latest treatment information is available to prevent the use of outdated information in a transparent way [6]. It also shows previous interactions between the patient and all physicians. Another research in this field was by Estonia's digital health infrastructure which was created to help insurance companies to check all the medical treatments of patients. The Counterfeit Medicines Project based on Hyperledger Technology was based on drug counterfeiting [5]. The drug produced was a timestamp and added to the blockchain which cannot be altered [7]. This also helps in detecting the ownership transfer thereby protecting against fraud [7]. Each transaction performed in a block of the network is validated through a process based on the consensus distributed across all nodes (that is, the devices/users connected to the net). Blockchain technology belongs to the larger category of Distributed Ledger technologies, whose functioning is based primarily on a register structured in blocks linked in a network; each transaction performed in a block of the network is validated through a process based on the consensus distributed across all nodes (that is, the devices/users). The transactions are the outcomes of the operations that take place among the network's subjects. The concept of blockchain comes from the fact that each block keeps a reference to the previous one using a cryptographic method. Blockchain is not stored on a centralized server like typical online services, but rather on network devices (computers) called nodes, each of which has a copy of the entire blockchain. Furthermore, two important elements of this type of technology should be highlighted for our analysis: (i) decentralization of consensus and (ii) decentralization of ledgers. The existence of trustworthiness among the individuals participating in any form of transaction and the presence of a central authority may no longer be necessary due to the decentralization of consensus[10][11]. Similarly to the second point, the replication and storage of different copies of different blockchains across network nodes ensure greater system security and equity among users, who can access the same information at the same time, and thus the traceability and immutability of the validated transactions contained in the blocks. As a result, blockchain is a peer-to-peer network in

which all network users can trust the system without having to trust one another.

### IV. OUR PROPOSED MODEL

We are using blockchain technology with SHA256 and AES algorithms in our suggested approach to give a better security-related solution. By utilizing this algorithm, we introduce new capabilities that can serve as the foundation for subsequent implementations of this idea. While Blockchain technology exploits the decentralization of data to offer great security, founded on the idea that data should be centrally managed. We attempted to project our model in this paper, showing how we may apply both of them for this specific application.

#### 4.1 System Architecture

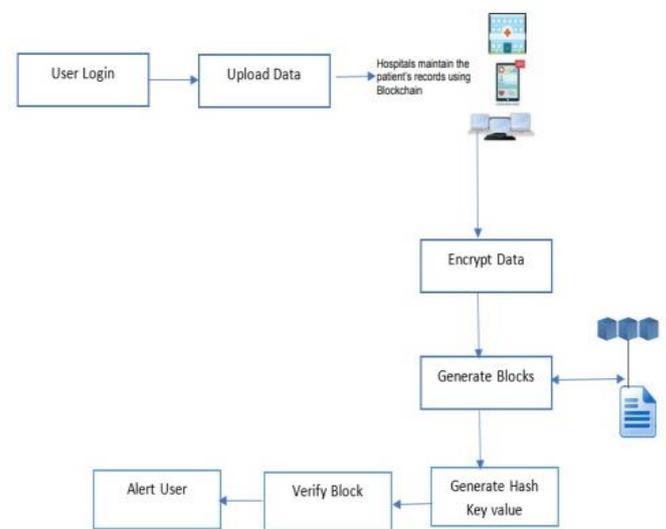


Figure 1: System Architecture

The Patient healthcare data is secured using a Blockchain network through which transactions between the patient and the authorized doctor are made as shown in fig.1. The functionality of Blockchain ends here. This data from a hospital can be transferred to other hospitals by using e-mails or by uploading the data set from each hospital on a cloud based storage system that can be accessed by hospitals and researchers. This sharing of data is very important because the data for each hospital would be completely different. The biggest advantage of using SHA256 and AES algorithms is to make healthcare data accessible to researchers and doctors for study purposes. Thus, using this model can provide dual advantages with Blockchain providing the necessary security of the healthcare record by allowing secure transactions between the doctor and patient, while the filtered data can be used by researchers and doctors because this data need not be secured as it is deprived of all personal information. This data is entirely built to be used for reference purposes. A distributed and decentralized method of managing and storing medical data is offered by the medical blockchain. With this strategy, the information island created by conventional medical information systems is broken, allowing individuals to focus on their own medical information that is dispersed across many healthcare facilities. Patient renounces all rights to their own private medical information. Before others can access the pertinent medical data about the

patient, they must submit a request and obtain the necessary permission. Also, the patient has the right to revoke their consent at any moment. Security of data storage is a key feature of the medical blockchain. Three perspectives—public information, data generation, and data reception—are considered in the analysis of medical data storage security. The medical blockchain offers a decentralized and distributed method to Blocks containing public information about medical data, such as the store address, the hash value, and the authorization of the data. This open data is accessible but cannot be altered. The patient's record and signature are used to encrypt the patient's public key, and the hash value is signed using hash algorithms to process data produced by medical institutions.

#### 4.2 System Architecture

The initial portion of this model's dual blockchain architecture, which was created using Hyperledger Fabric, provides access to health data. The second component of the framework runs all applications and provides all services using Ethereum. Medical data is extremely private and sensitive, so a closed blockchain like Hyperledger Fabric aids in maintaining the necessary secrecy. Public blockchains and permissioned blockchains are the two main categories of blockchains. This can be understood by using the example of a user who wants to sell a book to someone at a discount but does not want to disclose this to the wider public. In this case, the seller can utilize permissioned Blockchain to keep the public from learning about the offer. This design makes use of two encryptions method on a Blockchain with permissions. This is crucial in situations where it's necessary to switch the doctor in charge, therefore using Blockchain will make the information transfer simple and secure. There will be no more data leaks likely in this transaction procedure, and international information transactions can be more cost effective than the traditional methods to accomplish the same. The blockchain network when a patient asks a straightforward question about their health; the model can forecast epidemics and offer advice to physicians. The algorithm can forecast an outbreak and provide recommendations to the doctor, for instance, if a patient gets a test and the data are uploaded to the blockchain network. The medical blockchain system shares resources, like medical health data, through consensus based, industry-standard protocols and peer-to-peer propagation techniques. According to the patient's desires, the doctor will decide whether to anonymously share the medical record with the general public for research purposes. The doctor will make a standard match based on the patient's disease type, age, work type, and other factors and add it to the shared centre of the private network if the patient chooses to share.

### III. RESULTS AND DISCUSSIONS

We illustrate the architecture to facilitate access control of EHR data by using both blockchain and edge node. we first enumerate the following entities which take part in the architecture. Firstly, there is a registration process for patient hospital after that they login into the system. The hospital insert the patient records in the system. Then records is being encrypted with AES algorithm for security purpose. Hash value will be generated for the particular record and Using blockchain

record stored in cloud, the cloud hash value and original records also stored. If another hospital need records they send request to cloud for access of the records using special access key. Request goes to patient and they gives access to there record. After that record is send to hospital and at time of transaction hash value get verify for particular record, that there is any changes doesn't occur in record then the record successfully send to the requested hospital Or any changes occur in blocks at the time of transaction then record goes in temper and alert message will be sent to the hospital through mail.

### IV. CONCLUSION

We propose a hybrid architecture of using both blockchain and edge nodes to impose attribute-based access control of health record data. Health record management system provide high security for patient information by removing intermediaries from the validation chain. This system enhance revolutionize how hospital use patient record and improve healthcare services also revolutionizes the way hospitals leverage this information, ultimately leading to improve healthcare services and better patient outcomes. we aim to significantly enhance the security and privacy of patient information while simultaneously revolutionizing how hospitals utilize and manage patient records, ultimately leading to substantial improvements in healthcare services. A health record system based on blockchain technology has the potential to revolutionize the healthcare industry by improving data security, patient control, interoperability, and administrative processes. Traditional health record systems often suffer from fragmentation, where data is scattered across various healthcare providers and systems, making it difficult to share and access comprehensive patient information. By utilizing blockchain, health records can be stored in a standardized format and accessed securely across different healthcare providers, improving care coordination and patient outcomes.

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