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Managing Healthcare Records Using Blockchain

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Abstract: Decentralization and programmable nature of the blockchain applications can be used to change health information technology to gain greater efficiency in public and private health care systems. Current general health information technology, for example, qualification and enrolment and electronic health records have reported issues with interoperability and are ease back to adjust to changing project and innovation requests. The fundamental promise of the blockchain is the underlying Information Technology (IT) architecture and its 'unbreakable' chain of data entries that allow for secure and open transactions. This project aims to build a blockchain based access control manager for healthcare records and it illustrate possible influences, goals and potential connected to this technology.
Keywords: Blockchain, decentralization, healthcare, secure, technology.

I. INTRODUCTION

A blockchain is a distributed digital ledger of records that is arranged in chunks of data called blocks which link with one another using hash functions to form an unbroken chain—a blockchain. Blockchain is a decentralized peer-to-peer (P2P) architecture for a new generation of transactional applications that establishes transparency and trust.

Decentralized meaning no node instructs any other node as to what to do. The records in the chain aren't stored in any single location, are accessible by everyone, and are immutable by any one party.

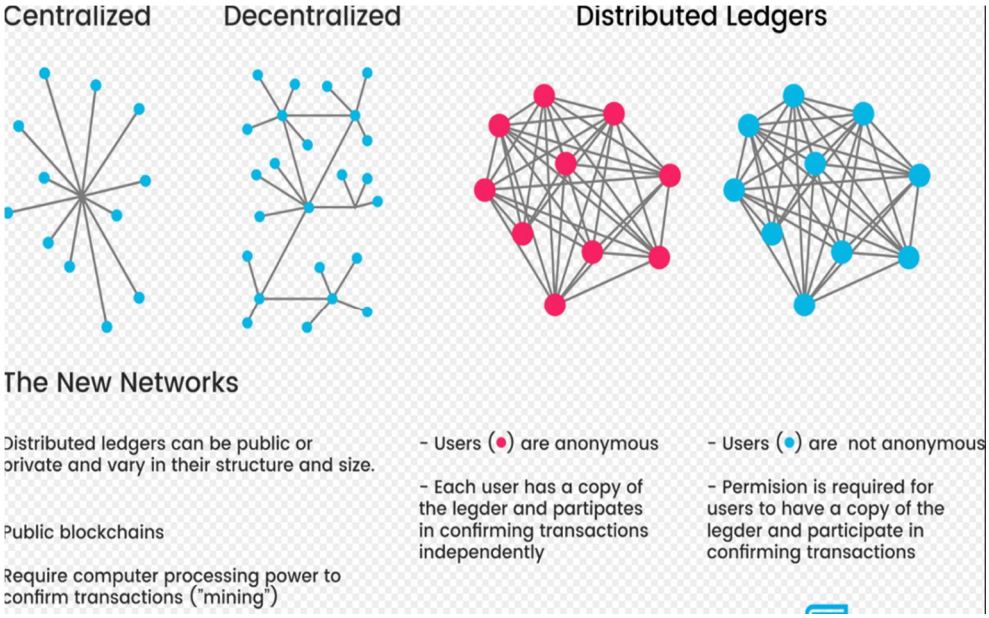

Fig 1. Differences between centralized, decentralized and distributed systems.

II. EXISTING SYSTEM

A. Problem Definition

From the beginning of Healthcare IT, though storing and retrieving data has been easier, there has been no security of that data.

The current state of health care records is disjointed and stovepipe due to a lack of common architectures and standards that would allow the safe transfer of sensitive information among stakeholders in the system.

Health care providers track and update a patient's common clinical data set each time a medical service is provided. The information includes standard data, such as the patient's gender and date of birth, as well as unique information pursuant to the specific service provided, such as the procedure performed, care plan, and other notes.

B. Limitations of the Existing System

1) *Human error:* If a blockchain is utilized as a database, the data going into the database should be of high calibre. The information put away on a blockchain isn't inherently dependable, so occasions should be recorded precisely in any case.
2) *Unavoidable Security Flaw :* There is one remarkable security defect in bitcoin and different blockchains: if the greater part of the PCs filling in as hubs to benefit the system tell a lie, the lie will turn into reality. This is known as a '51% assault' and was featured by Satoshi Nakamoto when he propelled bitcoin. Hence, bitcoin mining pools are observed intently by the group, guaranteeing nobody unconsciously increases such system impact.
3) *Complexity:* Blockchain has made cryptography more standard, however the profoundly specific industry is packed with language. Gratefully, there are a few endeavours at giving glossaries and lists that are intensive and straightforward.
4) *Network Size :* Blockchains (like every single conveyed framework) are less impervious to terrible on-screen characters as they may be 'antifragile' – that is, they react to attacks and become more stronger. This requires a vast system of clients, be that as it may. In the event that a blockchain isn't a powerful system with a broadly disseminated lattice of hubs, it turns out to be more hard to receive the full reward.
5) *Throughput:* Like any database, the processing power of a blockchain is based on how fast it can move data around.

III. PROPOSED SYSTEM

A. Objectives

To build a decentralized application using blockchain technologies for healthcare records. Blockchain Technology will include application to verify a patient's digital identity, or prescriptions history and gives patients complete ownership of their medical records, allowing them to grant and revoke provider access to their data by use of their private keys with providers in turn being able to issue prescriptions on the blockchain. Data put away on the blockchain could be all around accessible to a particular individual through the blockchain private key components, empowering patients to impart their data to healthcare organizations considerably more flawlessly.

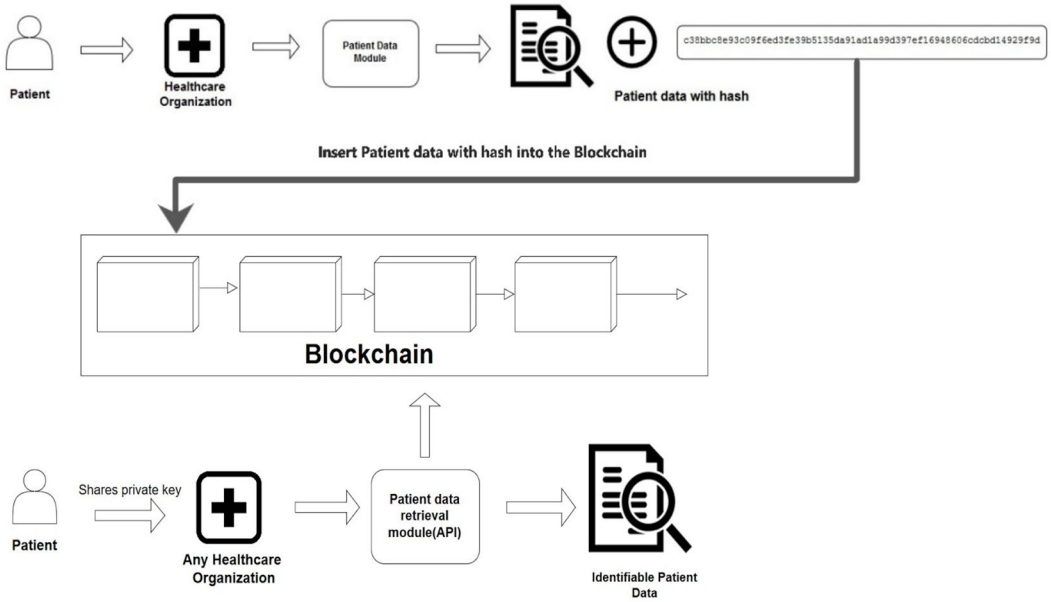

Fig.2 Data flow diagram of a patient.

B. Implementation

1) *Creating a dynamic website*

a) A dynamic website is a website that contains several web pages that changes its content dynamically according to the user's choice. It uses database to access content.
b) This website (dynamic), is created using HTML, CSS and JavaScript.

c) This website will have a login page, and a registration page in which the users will have to enter their information that will be saved on to the database.

2) *Creating and Deploying SMART Contract that Retrieves Public key From user And Generates Private key For User*

a) Smart contracts, also called as crypto contracts are compute programs or protocols that facilitate digitally, not only rules and regulation but also verify negotiations on the contract.

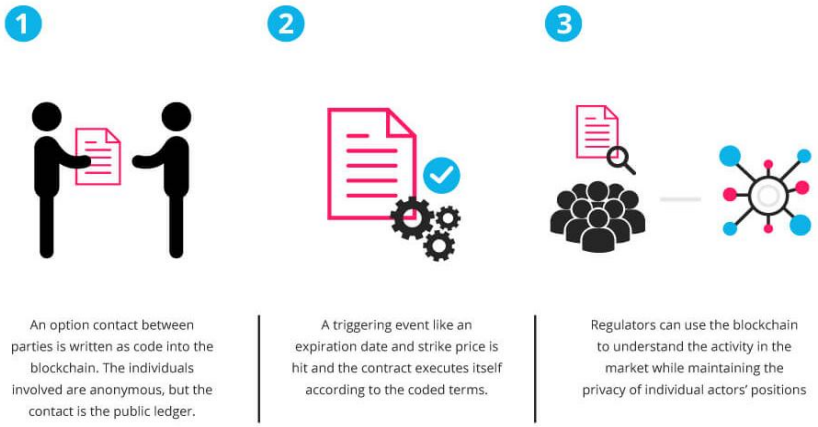

Fig 3. Pictorial representation of the working of smart contracts

b) These smart contracts are programmed using Solidity. Solidity is a high level language that is contract oriented which is used to create smart contracts.

c) The framework used for managing these smart contracts is Truffle. Truffle is a testing framework and a developing environment for Ethereum.

d) A way to deploy these Decentralized applications through the web browser is by using Metamask. It is an easy way to interact with dApps in a browser.

3) *Integrating Smart Contracts With A Front End*

a) Integrating the front of the application can be done with web3-JavaScript API. Asynchronous functions are provided to act on in multiple ways.

b) Blockchain has levels of "finality" and hence needs to return multiple "stages" of action. We return a "promiEvent" for functions or contract methods. "promiEvent" is a promise combined with an event emitter to allow acting on different stages of action on the blockchain, like a transaction.

c) The next step would be to initiate or run Metamask through the program to verify whether the transactions are taking place.

```
"Patient HASH:"
"QmPL6QnegwvfWjNrYfe31wB1maVBFPoeMdCHrKEFucr8XA"
```

Fig 4. An example of a hash code being generated for a patient

```
"Hash Passed!"
"Blood count: 6.9"
```

Fig 5. An example of the hash being passed and giving blood count results

4) Deploying the Decentralized Application on a Server

a) Flask Application Interface is used as a backend for hosting the dynamic website on to a server.

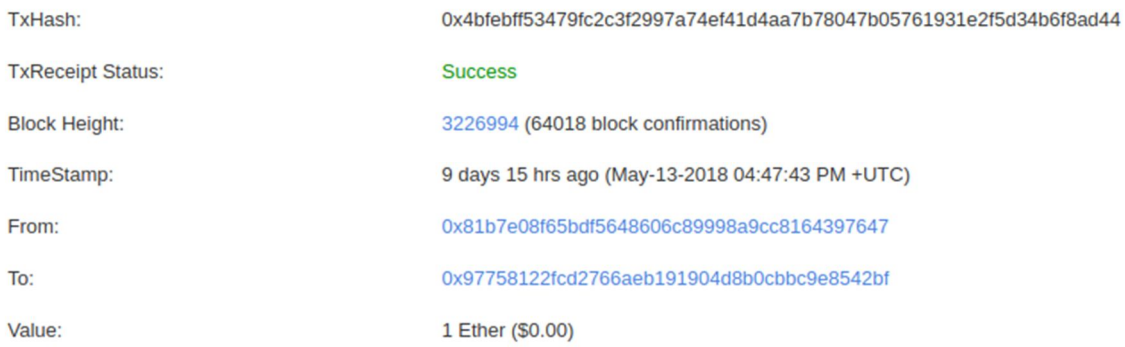

Fig 6.An example of a complete transaction history.

IV. CONCLUSION

Blockchain technology and its many concepts and features can be extensible for a wide variety of situations. These highlights not only apply to the context of currency and payments, or to contracts and financial market. It extends beyond all these to categories such as healthcare industry, economic development, even governmental organizations. Medical data management is a noteworthy favourable position of Blockchain innovation. By empowering wellbeing IT frameworks with the innovation, all the current difficulties like security, reliability, privacy and even data interoperability are met with. It gives timely access to data that the health care professionals use to make crucial diagnosis and deliver appropriate treatments. Everybody identified with the patient-care group can have their own particular nearby duplicate of the dataset, and when one individual wishes to roll out improvements to the information, they should experience a progression of cryptographic criteria to be sufficiently qualified to roll out improvements. Once the alters are made, it would be transformed into a 'block', approved and secured. Usage of this innovation in this way will connect with a large number of people health care entities, medical researchers, health care providers share vast amounts of data released to every aspect of life with guaranteed privacy protection and security.

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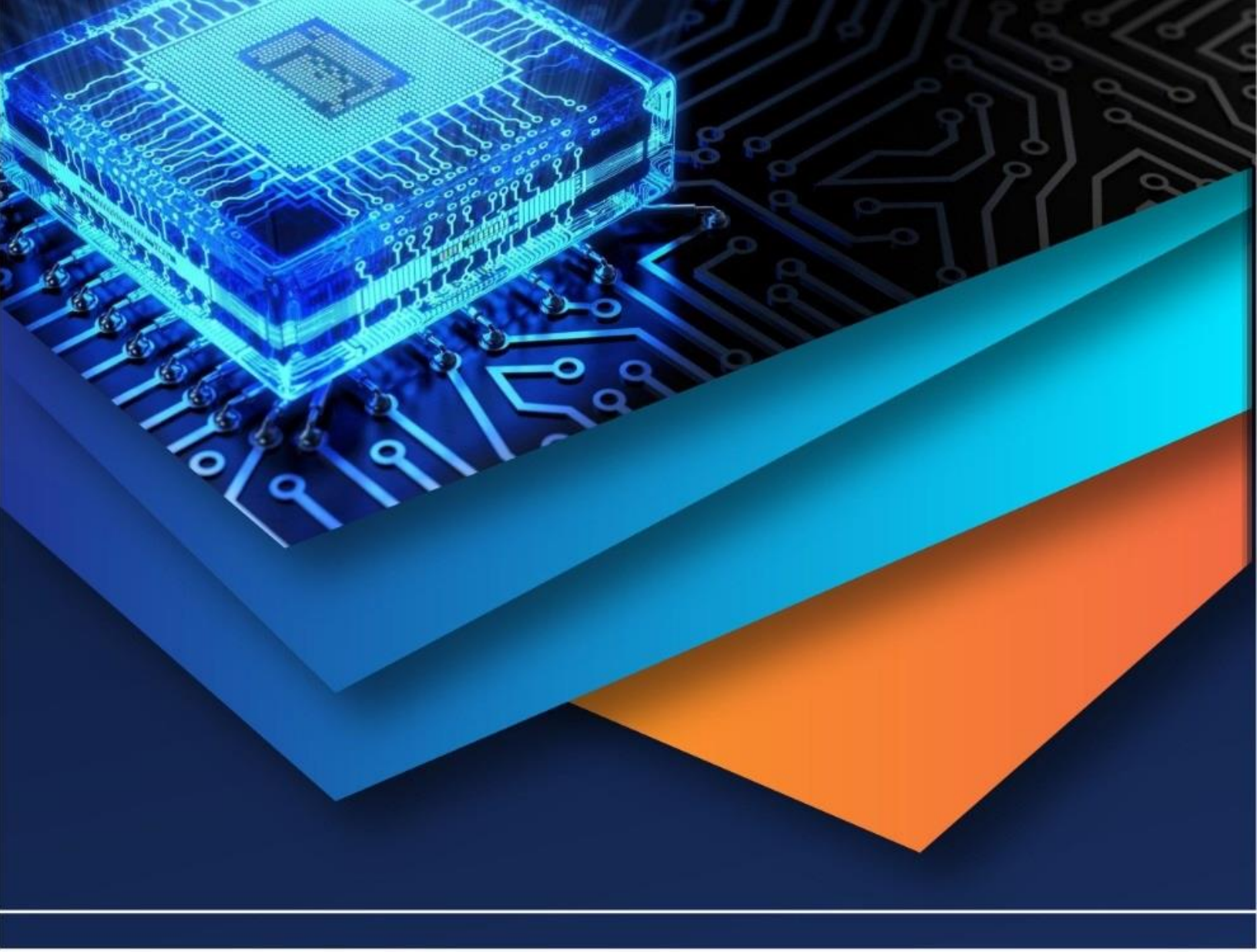

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