

USAGE OF BLOCK CHAIN FOR HEALTHCARE

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Abstract

The data management in Health care domain has been achieved a lot of importance and recognition in recent years because of its tendency to provide correct healthcare and it is mostly worth effective and more accurate. The old methodology of healthcare hitch is Client – Server System, suffers a big problem of single point failure Stewardship of centralized data, privacy of data and system vulnerability. But on the other hand if the block chain is taken they have a very promising future because of their replication mechanism and privacy security features with them. But recent research and surveys in Block chain in healthcare industry had suffered major drawback because of high energy consumption and this have focused on the permission less bit coin network. Thus as the resultant of this, it has been given out the light weight block chain architecture for health care management system that actually reduces the computational and communicational overheads. This architecture gives with the canal that gives the safe and secured transactions within a group of networks. In the architecture security and privacy are given when compared with the Bit coin networks. As a resultant of this a ledger update is developed which is 1.13 times faster than the bit coin's.

Keywords : Block chain, Healthcare, Data management

I. INTRODUCTION

The health care domain and industry are seeing an abrupt growth in the last decade. Each and every year there is something new updated technology comes, grows and

enhances in its own way. The data management system has completely changed and revolutionized with a big range of software, hardware and networking technologies [1]. All these share a common aim of improving the methodology for tracking the attack and their causes with their related medical analysis.

Nowadays EHR and its uses are very important. EHR – Electronic Health Records must be maintained in online and frequently allocated and shared among various hospitals, patients, clinics, pharmacist and medical insurance providers in order to hand over a well-timed gentle care[2][3]. The allotment of this EHR is becoming time consuming because of this Client – Server model is used in the traditional methodology. Because of this there is so much delay in the treatment of patient and there is a heavy loss or suffering from the patient's side [4] [5]. It really consumes lot of time in collecting and transferring the patients' details and reports to other place or other hospitals in the region. Moreover, most of the times, the tests must be repeated for the patient again. There is a single point of failure faced with security issues also.

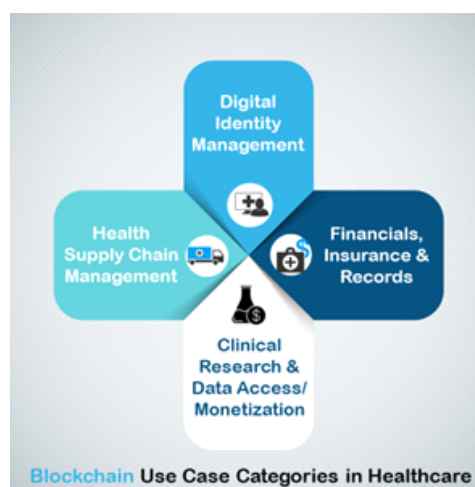


Figure 1: Blockchain use case categories Healthcare

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But the proposed Lightweight block chain architecture for the health care data management actually gives low computational as well as communication overheads [6]. In this architecture, the canals are introduced to secure the confidential transactions.

And finally when we actually compare our proposed block chain, our architecture actually out performs and the traffic generated is high and the time required to process the data is low.

II. LITERATURE REVIEW

A. RECENT WORKS DONE

React ally is integrated with the very few research works that have shown progressive results in Health Information System using block chain for sharing the medical reports of a patient among various hospitals. The authors give block chain based on the sharing application [7]. The Med Rec actually integrates with the doctor's present data storage system. This actually helps doctors to share a particular patient's data and medical records in a block chain [8] [9].

The authors give out a framework that can access medical data using a smart etherium based block chain network.

In addition to it the block chain network used in the study actually first uses crypt currency network to initialise it [9] [10].Block Chain: Immutable record of many activities is stored in a register and distributed among the shareholders to ensure decentralization to secure actions is called a block chain [11]. The events are grouped into various different blocks and they are linked by a chain and this is how the terminology arises. The formulation of the block chain is given as.

Block Chain = (DL, CP, C)

Where DL- Distributed ledger

CP- Consent protocols

C – Crypt-analysis

The Block chain transaction involves the following:

- Transactions
- Blocks
- Markel tree root hash
- Previous block hash
- Time's tamp
- Block report
- Nodes
- Mining
- Genesis block

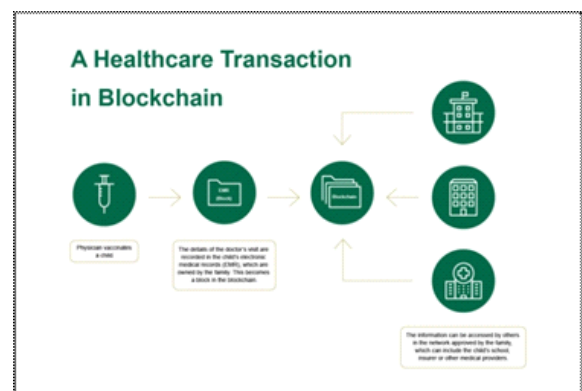


Figure 2: A Healthcare Transaction in BlockChain

III. THE PROPOSED BLOCK CHAIN BASED HEALTH-CARE MANAGEMENT DATA SYSTEM

The proposed architecture of block chain based health care system is as follows,

- A. Head Block Chain Manager: The main authority of the block chain is the head block chain manager; its main duty is to regulate the network. This enacts as a certified authority and gives valid digital identities.
- B. Block Chain Manager: The architecture actually creates a big cluster of hospitals where the record is maintained by only one cluster node and this highly helps in reduction of the computational and network overheads charges.
- C. Canal: The permission and safe network for the transaction of data is called a canal. Here the medical data is privately and securely transacted.
- D. Ledger: The collection of all transactions is called as a ledger.

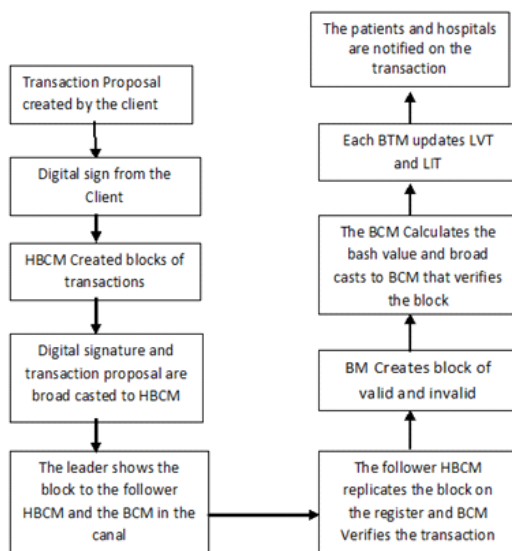
E. Notification Manager: The event notification is managed by the notification manager in the network.

F. Consensus: Consensus actually helps to agree the order of the transactions in the network and helps in updating the ledger.

IV. DATA REPLICATION

The geographically distributed nodes gets shared access to the replicated data in their system, Each BCM in a canal shares a trace register within them.

V. TRANSACTION HANDLING



VI. CONSENSUS RULE

The outline results indicate that a range of accord algorithms square measures are being used for blockchain ideas within the health-care domain. The foremost iterated uses accord rule within the enclosed declaration is prisoner of war, accounting for twenty one when you observe after the cases that are being reported. Additionally, it's a noteworthy that not all ideas that is used as square measure engineer for deployment of the Ethereum platform or Ethereum protocols used prisoner of war. The second most used iterated accord rule was PBTF (16 %). Many (42 %) of the declarations did not state that accord protocol their thought meant to use.

VII. ENCRYPTION AND SYNOPTIC PUBLIC

HEALTH DATA

By totally attaining the identity of patients through crypt-analysis and storing individual health records to a block-chain we will create obtainable AN combination database of community health registers which will be utilized in community-focused preventative care programme, driving public health while not disrupting the important protocols of HIPAA. This could create it an attainable to use all knowledge from all medical registers for public instead of looking forward to voluntary in harness and it emphasis on patient-focused on health suggestions. The maximum exciting chance of this state of affairs is that the encrypted health advisories and warnings. In a situation wherever the identity of a private remains secure however their health info are often contributed to AN combination of information on a block chain it'd be possible to blindly relay on encrypted patient-specific health recommendations firmly back to the patient based on their knowledge in period.

The advice, though delivered to AN anonymous patient, would be based on their own info, risk factors, etc. The overcoming trend in aid to drive towards more proactive and community-focused prevent active care models (preventing malady or injury before they occur or metastasis) create this potential state of affairs in all the additional relevant models of the patients. Future wherever medical records will be absolutely shared however additionally secured and encrypted may escort in a brand new era of understanding for population health and care. One of the distinctive properties concerning block chains is that they are not centralized systems. If you think that concerning the current aid system, it is primarily based around a collection of centralized systems – whether or not it's EHR companies that area unit managing medical records on behalf of the business or medical processors that area unit acting as messenger within the middle of suppliers or insurers – these intermediaries area

unit basically becoming big centralized warehouses of patient knowledge.

A. Confidentiality: Stop sensitive data from reaching the incorrect folks, whereas ensuring that the correct folks will in truth apprehend.

B. Integrity: The data is accurate, finalized, and compatible and merely licensed people could adjust it.

C. Availability: The data is always attainable to licensed users once needed.

D. Authentication: The system guarantees that users square measure AN agency they claim to be.

E. Public Block chains: Everybody will play a part within the allocated network, check information proceedings and confirm them, and participate the method of holdout accord.

F. Pool Block chains: The node that has control is also chosen earlier and regularly has collaborations, like business-to-business partnerships. The data within the Block chain scan be open or personal and it's thought-about a circumscribe network.

G. Personal Block chains: Nodes are going to be confined, and not everybody will participate within the Block chain, that hastens authoritarian governing of information access.

VIII. CONCLUSION

Health care Data management is something that can provide increased attention and can efficiently provide medical care at a cheaper rate. The block chain technology has solid potential to develop the management of medical database and address most of the issues found by using the traditional methods.

IX. FUTURE WORK

In this study, a scientific literature a survey regarding

EHRs at intervals of Blockchain was conducted, with the target of well defined and examined the most problems, challenges, and agitated edges from Blockchain assumption within the aid field. The applying of Blockchain has outreached the range of the sphere of social science and that we have spotted Blockchain's prospective for the aid area, whereas mutually exhibiting that it still extremely depends on the acceptance of the latest technology within the aid system. Analyzing the outcomes that were collectively got from the literature review, we have an inclination to conclude that Blockchain technology could be a future relevant decision for common strategies among the aid field, such as EHR ability, establishing sharing trust between aid suppliers, controllability, seclusion, and granting of health information access management by patients, which may change them to decide on whom they are required to trust and with whom should they share their medical records.

However, additional research, trials, and experiments should be dole out to make sure that a secure and established system is being introduced before the deception of Blockchain technology on an oversized scale in aid, since a patient's health information are personal, sensitive and important information. This study could justify a basis or it may be an inspiration for future works and studies.

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