

A Study of technologies to further research in Health Care Data Security in Medical Report using Block Chain

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Abstract— In today's healthcare system one of the most important requirement is to protect the data of patient's medical report against potential attackers. This is basic to secure information that can just approve people can get to the patient's medical report. To grant the security for the data of the patient we proposed Block Chain technology. Which is decentralized architecture, where data is stored in from of blocks for processing. In this health care sector the security of patient data is to be maintained. This block chain is composed in three phases: 1. Authentication— we use Quantum Cryptography, 2. Encryption – we use AES and for, 3. Data Retrieval – we use SHA algorithms are used to resist the frequent attacks. This framework ensure the protection of the patients and moreover keeps up the security and trustworthiness of the health care system.

Keywords— Block chain , Medical Report Data , Security, Privacy, Authentication, Encryption, Data Retrieval.

I. INTRODUCTION

The Block chain is the fastest growing technology through various applications in a secure manner. The various implementations make use of block chain technology among stakeholders. Blockchain could be a public ledger for all committed transactions and is stored in a list of blocks. The blockchain technology contains some key features such as decentralized, open source, immutable, transparent, persistency and anonymity. Anonymity is when each user can interact with the blockchain with a generated address, which does not reveal the real identity of the user.

Blockchain is a new technology that supports sharing of values. In recent years, it has been applied in various areas, the most important is the financial one. Blockchain is a digital ledger where there are stored all the executed transactions. When the transaction is done again, the chain will grow continuously. It does not use any third party tools for any transaction or for any other process. From a business perspective, the blockchain is an exchange network for moving transactions, value and assets between peers. The blockchain is a technology to validate the transactions and replacing trusted entities.

Block chain technology plays a major role in the

medical and healthcare system. Because of the decentralized and distributed technology, Block chain provides security services in healthcare. The centralized design in current health care services is not so secure among the various medical services, which provides a delay in accessing the data and it has a major risk in leakage of information. In such a case, the medical reports can be archived without the knowledge of the patient. Accessing the data in a secure manner within the network is the major issue in current health care maintaining system.

For accessing the data, Block chain is the efficient way and a promised technology. In block chain technology, the information is stored as a ledger feature which can monitor the patients in accessing the medical records.

II. LITERATURE REVIEW

A literature review is necessary to know about the research area and what problem in that area has been solved and what need to be solved in future. A proper literature review provides solid background for a noble research work. A good literature review is comprehensive, critical and contextual. It provides a theory base, a survey of published works that is in consideration to the investigation, and an

analysis is of that work. It is a critical, factual overview of what has gone before. A good literature review shows awareness of reviewer in the field. One has to start initially with preparing a knowledge base and then its sub parts and while doing study of literature narrow down the domain to specific point of its various issues to decide upon. Literature survey includes the study of various sources of literature in the area of research. It includes finding the related material from magazines, books, research articles, scientific research papers published in various conferences, journals & transactions. One may take few days to a few weeks to understand a research paper published in standard peer reviewed journals. The researchers need to adopt a certain path for doing literature review of such literature. There has been many procedures and process defined by the researchers to undergo through and arrive at certain conclusions of research objectives. The five stages of the

review process adopted are discussed in this chapter. It also includes categorical review, common findings, strengths, weaknesses of researchers, gaps, problem statement and objective in various sections & sub sections.

A detailed review of research papers on Health Care using Block Chain, published within the period of year 2017 to the year 2020 is presented in this section

In these papers discussed about the health care services industry is always showing signs of change and supporting new advancements and advances. One of the predominant requirements in today's health care systems is to protect the patient's medical report against potential attackers. Hence, it is basic to have secure information that can just approve people can get to the patient's medical report. So, in these papers discussed about Block chain technology for medical report of a patient.

Table 1 Comparative Analysis of Research Works Reviewed

Technique Used	I/P Parameters	Output							
Block Chain	Validation of Blockchain 1) Pow 2)PoS 3)PoA 4) DPoS	1.Identity management 2.Transaction process 3.Insurance claim management							
	Smart Contracts								
Block Chain	It's composed of three phases 1.Authentication, 2.Encryption and 3.Data Retrieval using Block Chain technology. For authentication – Quantum Cryptography, for Encryption – AES and for Data Retrieval – SHA algorithms are used to resist the frequent attacks.	Feature	Helth-Com	Mederc	Med-Share	Bbds	Our Proposed System		
		Scalability	Y	N	Y	Y	Y		
		Doctor/Patient Authentication	N	N	Y	Y	Y		
		Integrity	N	Y	Y	N	Y		
		Confidentiality	N	Y	Y	N	Y		
		Access Control	Y	Y	Y	Y	Y		
Block Chain	Biosensor nodes in the Bio Sensor Network	In the paper we merged the BSN and the health blockchain, and used the biosensor nodes in the BSN to propose a lightweight backup and efficient recovery scheme for keys of health blockchain. The scheme has the following advantages: <ol style="list-style-type: none"> (1) Biosensor nodes in the BSN are in charge of generation, backup and recovery of the keys of health blockchain, and it will increase the security of these keys. (2) In the scheme each block on the blockchain can be encrypted by a distinguished key with lower storage cost and high performance, and it will greatly improve the security of privacy physiological data on the health blockchain. 							

IOT & Blockchain	IoT and blockchain network integration with three main actors : wearable sensing devices, gateway device and IoT-blockchain platform.	The result and analysis of the testing performed to the proposed IoT blockchain platform in term of privacy, data synchronization and write latency testing. As the testing environment, we deploy peers into three different virtual machines
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III. BLOCKCHAIN

Blockchain technology is one of the most important and disruptive technologies in the world. Multiple industries are adopting the blockchain technology to innovate the way they function. One of the industries that are looking to adopt the blockchain is the healthcare industry.

The blockchain is generally defined as a decentralized system in which transactional or historical records are recorded, stored, and maintained across a peer-to-peer network of personal computers called nodes.

The blockchain is a technology that's already getting massive attention in healthcare. In fact, as we mentioned before, 40 percent of health execs see blockchain as top 5 priorities. Furthermore, the global healthcare market spend on blockchain is expected to hit \$5.61 billion by 2025, according to a report by BIS Research. The adoption of the blockchain technology could save the healthcare industry up to \$100-\$150 billion per year by

2025 in data breach-related costs, IT costs, operations costs, support function costs and personnel costs, and through a reduction in frauds and counterfeit products. When all's said and done, blockchain in healthcare is ALL about removing the middleman. This article will talk about various middlemen that can be removed and mistakes that can be avoided when the healthcare industry adopts blockchain at scale.

Blockchain in Healthcare Industry and Innovation

No matter what we say, it will be impossible for us to overstate the importance of the healthcare industry. Having said that, this is easily one of the slowest growing industries in the entire space. We realize that this is a very controversial thing to say, however, the proof is in the pudding.

Compared to two decades ago, hospitals, overall, still function pretty much the same way. The reason, as Richie Etwaru says, states is its lack of innovation. This is actually pretty surprising when you consider the fact that this space, in particular, has some of the smartest and well-educated people in the entire world.

Blockchain and Decentralization

In order to understand why the concept of decentralization and running a trustless system is important, you need to

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understand the relationship that we humans have had with trust since the beginning of time.

Early cavemen learned the importance of trusting each other. It was literally a matter of life and death. A caveman by himself had 0 chance of surviving.

Think of all the elements in the nature that could have killed them, from wild beasts to changes in the weather. A man had to learn how to live in communities with people that they can trust, just to survive.

As time moved on, you could see this trust evolve in a lot of interesting ways.

Firstly, we had the barter system, wherein people trusted each other to give them a product of value to exchange with theirs in order to carry out transactions. However, as time went on, our transaction system became infinitely more complex.

Our population exploded thanks to improved medical care in a large part and our businesses became a lot more complex. As a result, we moved from trusting an individual, to trusting a centralized institute, like a bank. However, as time grew, these banks became more and more powerful.

With the number of responsibilities that these banks were dealing with a point had to come where they were going to fail so badly, that people would have to look for an alternative financial system.

This point came in the 2008 financial collapse. Many banks, and Lehman Brothers, in particular, were guilty of excessive risk-taking which plunged the whole planet into the worst recession since the 1930s great depression.

Disillusioned by the centralized banking system, an anonymous person(s) named Satoshi Nakamoto came up with the idea of Bitcoin. Bitcoin was the world's first decentralized cryptocurrency which was powered by blockchain technology.

So, how is the blockchain decentralized?

It really is a pretty simple concept. All the records that are stored within the blockchain, isn't saved inside one centralized storage unit. There are multiple computers running within the network who own a copy of all the data in the blockchain. This is why, whenever anything is

updated in the blockchain, all the nodes in the network get notified of this at once.

This is what we mean by decentralization. There is no single source that is in charge of all the data anymore.

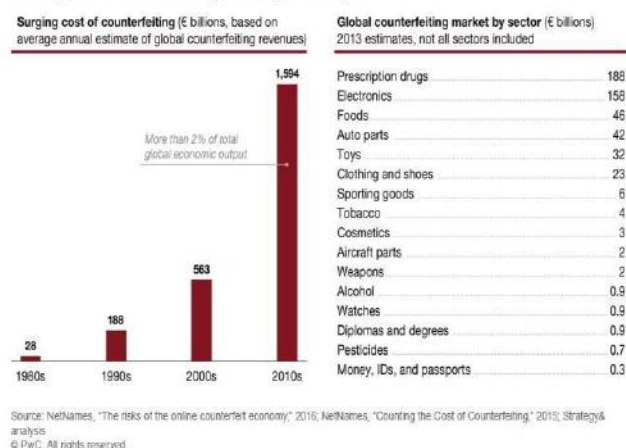
IV. ADVANTAGES OF BLOCK CHAIN

Amazing Advantages of Block Chain are:

- Since the blockchain is Immutable and traceable, patients can easily send records to anyone without the fear of data corruption or tampering.
- Similarly, a medical record that has been generated and added to the blockchain will be completely secure.
- The patient can have some control over how their medical data gets used and shared by the institutes. Any party which is looking to get the medical data about a patient could check with the blockchain to get

Exhibit 1

Damage from counterfeit goods, by industry



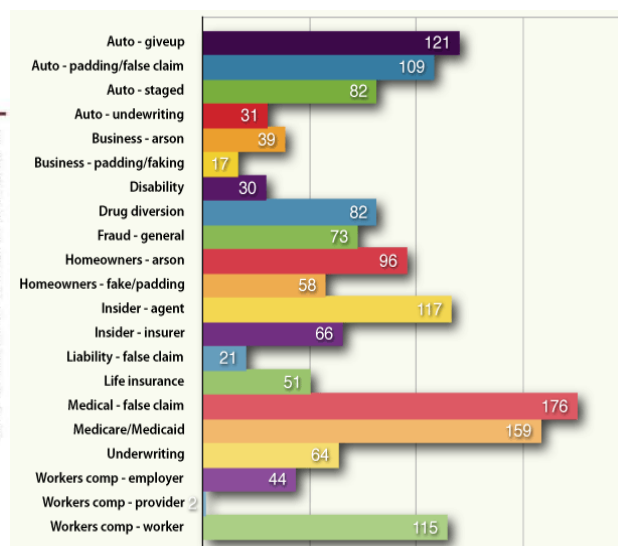
- Various medical institutes around the world conduct their own research and clinical trials on various new drugs and medications. A blockchain will help create a single global database to collect all this data and put them in one place.
- Insurance fraud is a major problem that is affecting the healthcare industry. This happens when dishonest providers and patients submit false claims/information to receive payable benefits. To get an understanding of how serious this problem is, try to wrap your head around this: According to Boyd Insurance, Medicare fraud in the U.S. alone costs about \$68 billion a year.

V. CONCLUSION

The health blockchain is a good solution to address the problem of monopoly of physiological data and improve the robustness of storing these data, and has a broad application prospect in the area of healthcare

the necessary permission.

- The patient can also be incentivized for good behavior via a reward mechanism. Eg. they can get tokens for following a care plan or for staying healthy. Also, they can be rewarded by tokens for giving their data for clinical trials and research.
- Pharma companies need to have an extremely secure supply chain because of the kind of product they carry. Pharma drugs are consistently stolen from the supply chain to be sold illegally to various consumers. Also, counterfeit drugs alone cost these companies, nearly \$200 billion annually. A transparent blockchain will help these companies to enable close tracking of drugs to their point of origin and thus help eliminate falsified medication.



system. Block chain in medicinal services frameworks has gotten gigantic open doors terms of not just giving secure and productive data putting away, sharing and access yet additionally creates a potential degree in the social insurance business for an assortment of partners. However, before the popularization of the health blockchain, we must address the problem of protecting private physiological data. The core problem is designing an effective key management scheme.

The future is to conduct depth investigation in block chain and make it better in security and storing data of medical data in healthcare infrastructure, and try to make it in level of international level infrastructure for medical data storage.

ACKNOWLEDGMENT

I would like to express my deep gratitude and thanks to Dr Vikas Lamba, Associate Professor, Department of

Computer Science Engineering, VIT College, Jaipur and my Husband Rohit Munjal for giving me an opportunity to work under his guidance for preparing the paper.

Finally thanks to my Munjal and Arora Family for their constant encouragement and support throughout the research.

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