Healthcare Blockchain leads to Transform Healthcare Industry

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ABSTRACT

Blockchain can nail the Healthcare domain. Using the concepts and features of the Distributed ledger, Healthcare industry can be transformed. Blockchain can change the future of Healthcare Industry. Healthcare records, Lab assessment results, doctor's perceptions and Minute details of the healthcare industry in the form of transactions can be stored in a decentralized way in the form of blocks and these blocks can further be linked as per series of event in the form of blockchain in distributed ledgers. Highly complex process and manually intervention can be eliminated. Highly transparent and secure systems can be built on top of blockchain technology by introducing identity manager.

Keywords: - *Blockchain, Healthcare, Healthcare Distributed Ledger, Blockchain and Healthcare ledgers.*

1. INTRODUCTION TO BLOCKCHAIN

The blockchain is distributed decentralized system which records the data and store transaction records in the form of blocks. It is more likely defined as a shared, immutable record of peer to peer transaction called as linked blocks and stored in a distributed ledger. It is similar to a database which stores information in blocks, blocks are stored in distributed decentralized ledger, and legers are located in a network of personal computer called as Nodes. There is no central authority which is controlling the data.

Introduction to Blockchain in healthcare

There are some use cases discussed in detail below, where we can solve day to day issues in the healthcare industry.

1.1 Network of Hospitals

Hospitals can be connected to different hospitals using a network of distributed-decentralized ledgers. Information and data are stored in blocks. As per today's scenarios, health records and operations between hospitals are disjoint. Block\chain will enable nationwide common platform storing records for the individual users. Blockchain will

provide the trustless and collaborative ecosystem of information sharing between different Parties.

- Hospitals can store the information to the blockchain.
- Every transaction is uniquely identified and stored as a block.
- Hospitals can directly query blocks.
- Patients can share their identity. (e.g. UID - Aadhar)

1.2 Network of Blood Banks

Blood Banks will be connected to different blood banks using a network of distributed-decentralized ledgers. Information and data are stored in blocks. Blood banks can efficiently regulate the blood. Surplus blood can be easily moved to the nearest blood bank having lack of blood. Blood bank can manage the blood donors and receivers.

- Blood bank can analyze real-time blood status report by querying the Blockchain.
- Donors and Patients can query the blockchain, after login to the system using unique identification number (UID - Aadhar).

1.3 Network of Labs

The lab can be connected to the blockchain technology using distributed legers. Medical Lab records will be stored in Individual's blockchain hence lab record will be maintained in distributed ledgers in the form of blocks. The user can view their reports using their unique identification number (UID – Aadhar).

1.4 Network of Pharmacy

Pharmacy and chemist can be connected using blockchain technology where each transaction between manufacturers, wholesalers, pharmacists and patients will be maintained in distributed ledger hence Drug traceability will be ensured.

1.5 Network of Insurance Partners

Insurance Organizations can be connected to blockchain network hence fraud related to healthcare insurance can be eliminated.

2. HEALTHCARE BLOCKCHAIN TRANSFORMATION

Healthcare Blockchain along with other streams of technology i.e. Data Analytics, Artificial Intelligence, Machine Learning can open new doors in Healthcare technology. It will help Individuals to maintain their health record efficiently, no need to carry a hard copy of record along with them. The pharmacy will be connected to highly efficient Supply chain management. Doctors can analyze their patient quickly and efficiently. Real-time data monitoring will help to avoid disasters and manage hospitals Institution and Organization data. As shown in Figure 1, User's Blockchain will have all the data stored

And managed in a systematic way. All the Institution and Organization in healthcare domain will be interconnected with each other with permission and private blockchain network. The government can be a regulator to give permission to join the healthcare blockchain to healthcare organization and institution.
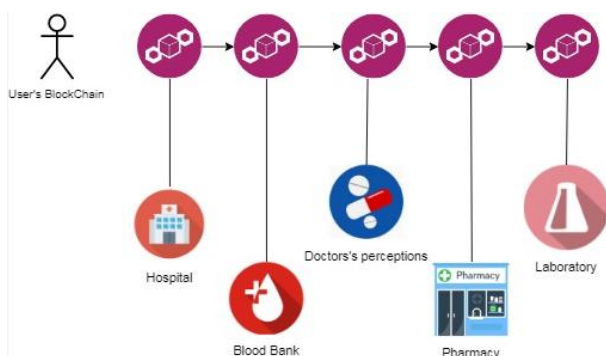

Figure-1 Healthcare Blockchain Network

3. HEALTHCARE BLOCKCHAIN ARCHITECTURE

Architecture is divided into six layers namely User Interface Layer, API Layer, Business logic Layer, Identity Manager, Data Layer, Blockchain Network Layer. The interaction between layers are loosely coupled and easily maintained as shown in Figure 2.This architecture will be flexible enough so that it can adapt different blockchain networks e.g. Ethereum, Hyperledger, Hydrachain, Multichain etc.you can connect to more than one protocol. Architecture has the feasibility to connect to any data store. User and systems across the network will be enforced with key based authentication. Blockchain network will be managed by rest API's. The architecture will be smart enough to manage the auditability of series of events that going on in the network.

Figure-2 Healthcare Blockchain Network Architecture

4. IMPLEMENTATION CHALLENGES

Blockchain can eliminate a lot of existing challenges in the healthcare domain, however, it is not fully mature today and cannot be implemented immediately at larger extent. Institutional and Organizational challenges must be addressed before healthcare blockchain can be implemented worldwide.

5. CONCLUSION

Blockchain and Distributed Ledger will play significant Role in transforming Healthcare Ecosystem. Blockchain along with Data Analytics and Artificial Intelligence will create WEB 3.0 Ecosystem, We just need to connect the dots and mature the system with standardization.

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BIOGRAPHY

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Sourabh Sethi has three years of experience in IT industry. Provided services to banking domain, have worked on multiple technologies i.e. React, Angular, Microservices, and Rest services. Pursed B. Tech in Information Technology from Pune University and Pursuing M. Tech from Birla Institute 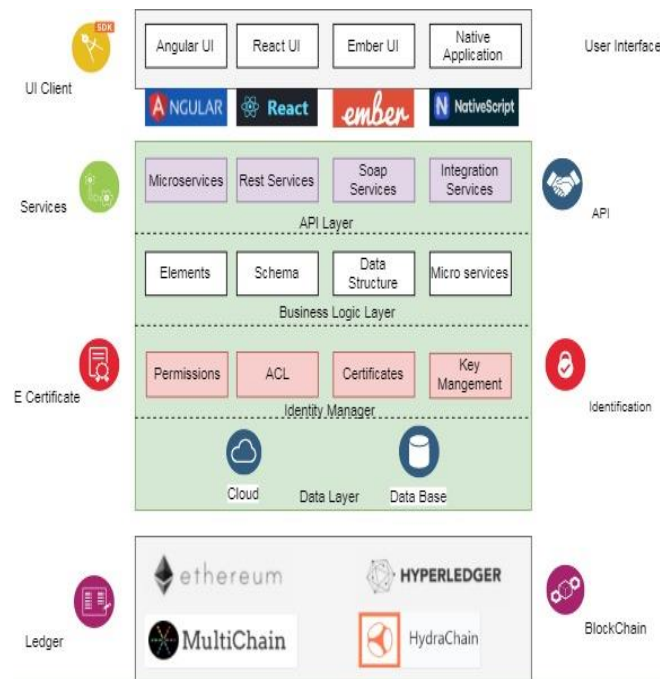of Technology and Science, Pilani