Mphasis
The Next Applied

Sharing Patient Health Records (PHR) through Blockchain Technology in the US Healthcare Markets

Thought Leadership Article by Ashish Khanna, Manager Consumer & Retail

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1.

Introduction

Imagine a morning, you wake up feeling sick! To make matters worse, you are at a friend's house far from your home, and the nearest hospital facility is new to you. Since you have never been to this hospital, you are worried about going through a series of routine medical tests to have an accurate diagnosis of your illness because this new facility won't have any of your medical history or health records. Now, wouldn't it be nice to have your medical history and health information shared by your usual hospital facility to this new one? In that case, you wouldn't have to go through those routine tests again and shall certainly have received faster care. Well, this sharing of Electronic Health Records (EHR) is certainly possible through the Blockchain technology.

Blockchain is a distributed ledger technology that powers the cryptocurrency, Bitcoin. This technology was introduced to the world through bitcoin and so there is a myth that blockchain is limited only to bitcoin or the finance industry. However, this technology has immense potential to solve multiple business challenges across industries ranging from manufacturing to logistics to supply chain and retail to healthcare. Immutability, transparency, and security being the integral properties to blockchain, make its usage desirable to solve the complex healthcare industry challenges of sharing electronic patient health records across provider facilities.

2.

Challenges in healthcare industry to be addressed by blockchain technology

- Over the years, several healthcare data breach incidents have questioned the ideology of storing patient health records in a single centralized repository. As seen in Fig. 1, there has been a gradual growth in the healthcare data breach incidents in the United States over the past 10 years. Data backups and encryption are best practices to mitigate the risks associated with holding centralized electronic patient records. However, these protections don't eliminate the

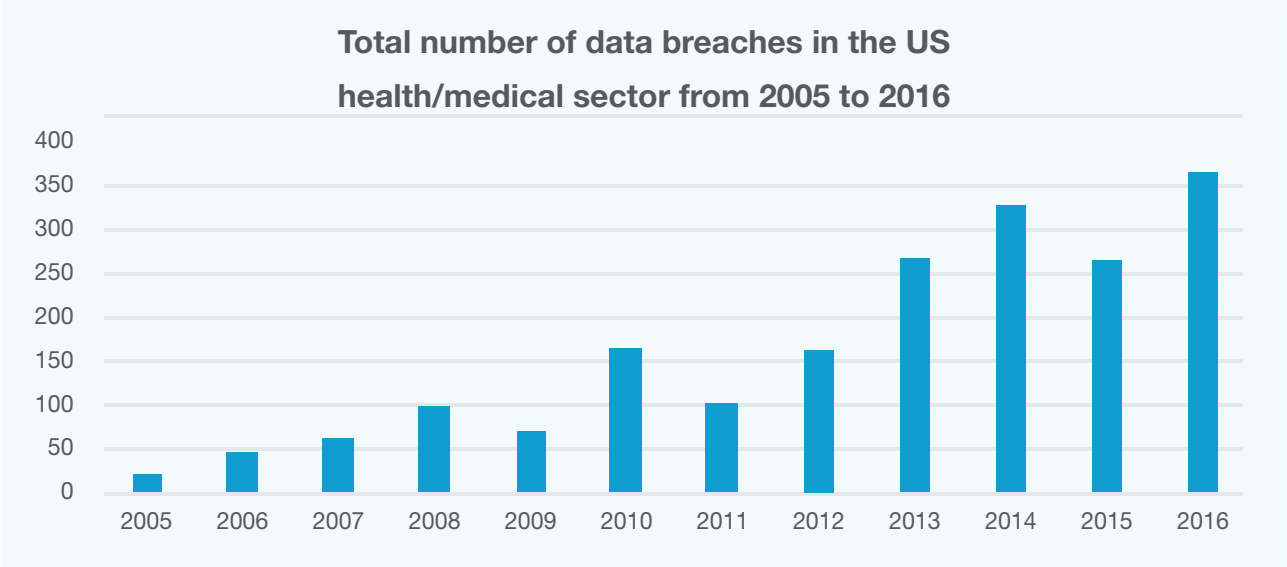


*Fig. 1 * Above statics are reported from statista.com*

risks altogether. With its decentralized nature, a blockchain healthcare platform is modeled to protect PHI in unparalleled new ways. With the ledger of patient records distributed across the participants in a blockchain network, tampering of data would require a hacker to manipulate the records across all the ledgers at the same time which is extremely difficult and certainly impossible

- The United States has been experiencing recurrent catastrophic natural disasters in the form of hurricanes and floods. When such a natural disaster hits, there are sudden surges in demand for hospital care. In cases of floods, patients are evacuated from the affected care facility and transferred to nearby alternative provider facility. In the absence of Electronic Health Records (EHR) at the receiving provider facility, the treatment of these patients is initiated from scratch. This increases the overall healthcare costs as well as time to care.

As shown in Fig. 2, in the last 160 years, hurricane and floods have struck south-eastern states in the United States several times. Florida tops the list followed by Texas and Louisiana. The hospitals in these regions hold a strong business case to implement blockchain-backed electronic health record sharing.

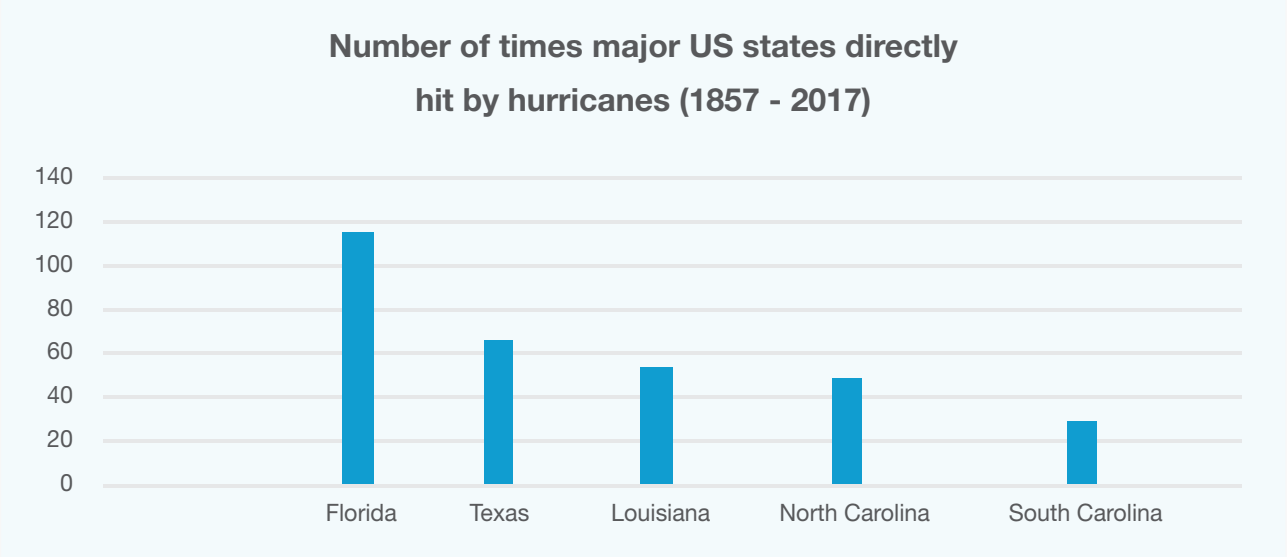


*Fig. 2 * Source CNN news, September 11, 2017*

3.

How will the blockchain-based electronic health record sharing model work?

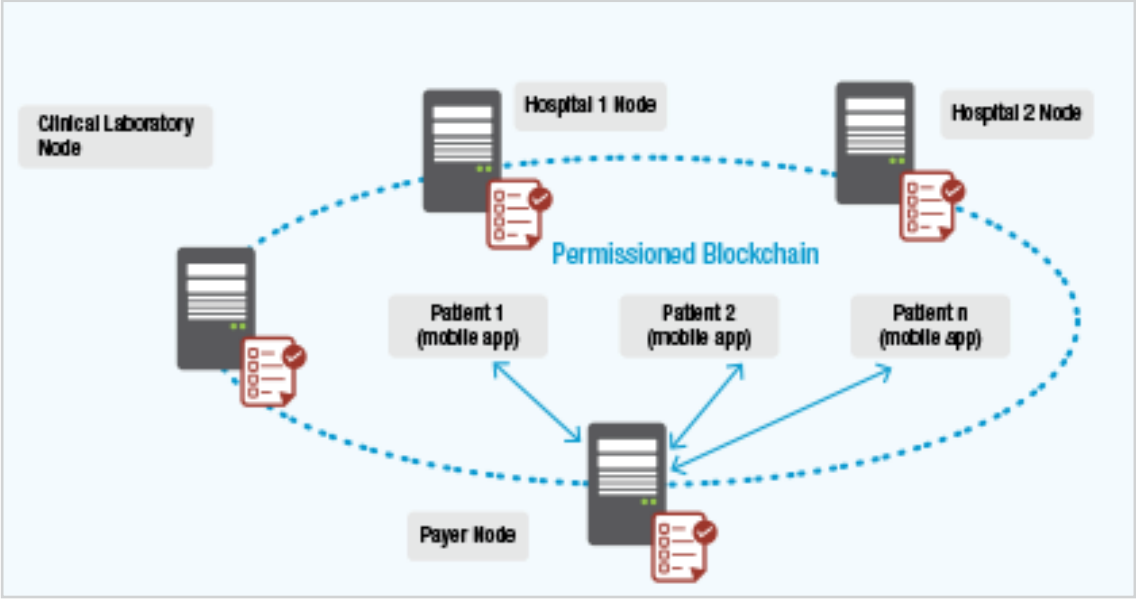
Business Use Case

A person visits a doctor/physician for a diagnosis of medical symptoms. The doctor conducts the required clinical checks to diagnose the patient's health and prescribes medication.
Upon the patient's approval, the doctor uploads respective medical data on to a permissioned public blockchain network.

Suppose the same patient now happens to visit a doctor in some other state. Upon the patient's consent, the doctor can retrieve his/her medical information from blockchain in the following way.

- The patient would have a mobile app that would act as a wallet of his/her medical history. He/she would authorize the doctor to access his/her medical records on the blockchain using the mobile app.

- The doctor would then receive a link granting access to the patient's health records, and he/she shall be included in the blockchain network for a prescribed time.



Permissioned Public Blockchain Network

A permissioned public blockchain network is best suitable for the healthcare industry as it comprises of authorized participants in the network and hence ensures privacy and security of patient health records. As seen above, all crucial healthcare stakeholders can be brought within the same network and the patient's health data could flow seamlessly within the network upon his/her authorization.

Patient visits a hospital and after diagnosis, his/her medication/ diagnosis records are stored in the database at the same hospital facility.

A hash of the SQL query to fetch the newly added patient records from the hospital database is created and stored on blockchain network across all nodes.

Once the same patient visits a new provider facility in the blockchain network, upon his/her authorization, the new provider facility is granted view access to the patient records from the old provider facility for a limited period of time.

The doctors at the new provider facility can then take a better informed decision by referring to the patient's previous medical history and to his/her current medical condition.

4.
Challenges in implementing blockchain in healthcare industry

However promising the blockchain technology landscape might sound, it's still in the nascent stage and multiple POCs are being developed globally to identify the most appropriate business use case where it might have high financial and social viability.

- The US healthcare system is subject to extensive regulations at federal and state government levels, with standards like HIPAA, HL7, and PHI, etc. These regulations have been proposed with the aim of providing affordable and value-based healthcare and to ensure that privacy and security of patient's health records, is never compromised. It's still being debated as to how the benefits of blockchain can be realized while remaining compliant with the federal and state government standards.
- Heavy financial investments have already been made towards setting up the existing technology infrastructures at the healthcare provider facilities and so reinvesting to set up a blockchain ecosystem would require immense confidence amongst the stakeholders in realizing the business and financial value from the underlying technology implementation.

Patient Electronic Health Records (EHR) are the need of the hour, not only because they have the potential to reduce the overall healthcare costs and facilitate more rapid care services, but also because they will reduce the mental burden of patients who might have to otherwise go through unnecessary longer episodes of care. EHRs are integral to effective patient care in the future and will improve the quality of treatment decisions and improve health outcomes.

Blockchain-based ecosystem to promote EHR sharing is just one of the solutions and there could be other equally good or better ways as well. The challenges inherent to the adoption of this ideology are not just limited to technology, but also to the acceptance by the overall healthcare fraternity.

Author

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Ashish Khanna has over 9 years of experience within BFSI, Healthcare & Consumer and Retail industries. Ashish has developed insight and expertise in the areas of IT Delivery management, Account management and Presales. He is currently working as a Pursuit lead in the consumer and retail domain at Mphasis managing American clients. He is playing a key role in building the eCommerce capability. He holds a BE degree from Thadomal Shahani Engineering College, Mumbai, and MBA from the CUHK business school, Hong Kong and Indian School of Business.

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Mphasis (BSE: 526299; NSE: MPHASIS) applies next-generation technology to help enterprises transform businesses globally. Customer centricity is foundational to Mphasis and is reflected in the Mphasis' Front2Back™ Transformation approach. Front2Back™ uses the exponential power of cloud and cognitive to provide hyper-personalized ($C = X2C^{2}_{TM} = 1$) digital experience to clients and their end customers. Mphasis' Service Transformation approach helps 'shrink the core' through the application of digital technologies across legacy environments within an enterprise, enabling businesses to stay ahead in a changing world. Mphasis' core reference architectures and tools, speed and innovation with domain expertise and specialization are key to building strong relationships with marquee clients. To know more, please visit www.mphasis.com

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