



POINT OF VIEW | HEALTHCARE & LIFE SCIENCES | BUSINESS PROCESS OUTSOURCING

How Blockchain Will Transform Healthcare

DECEMBER 2018

Introduction

Blockchain is poised to make our digital transactions more efficient by removing intermediaries from the process. Forrester’s “Top 10 Technology Trends to Watch: 2018 to 2020” report predicts that by 2019 “a viable blockchain-based market will be commercialized.”¹ Large financial institutions and IT giants have jumped in to invest and explore the application of blockchain in many current business models. But what about healthcare? Can the industry benefit from this technology?

A blockchain is a chain of records, called blocks, used to maintain a cumulatively growing list of digital transactions, such as electronic healthcare records (EHR) or electronic medical records (EMR) in the healthcare industry. Each block contains a timestamp and a digital signature, and links to a previous block. The blocks also contain a nonce, which is an integer used during the mining process. The nonce fortifies the block from hackers or unwanted users by making the integer as unique as possible and extremely difficult to re-run or reuse.

Why blockchain matters

- Industry disruptor
- No central authority or third-party transaction verifiers such as auditors, legal services, payment processors, brokerages and other similar organizations needed to verify trust and the transfer of value
- Less oversight and fewer intermediaries save costs
- All participants have access to a copy of the ledger, eliminating the duplication of effort
- A smaller number of participants can use it privately by deploying a “permissioned blockchain” to control who participates in transaction activity

All blockchains are distributed ledgers, but not all distributed ledgers are blockchains. Unlike a traditional ledger system, blockchain doesn’t include a node with special rights to edit or delete transactions. Blockchain technology isn’t new; it’s a combination of several proven technologies applied in a new way. Most blockchains use six major technologies:

- **Asymmetric encryption**, which secures your data using a two-way mechanism of public and private keys
- **Hash functions**, which validate the authenticity of data with an integer
- **Peer-to-peer communications**, which ensures both parties have equal responsibility
- **Merkle trees**, which verify data consistency with efficiency
- **Key-value database**, which stores, manages and helps retrieve data
- **Proof of work**, which confirms transactions and creates new blocks

How can blockchain help healthcare?

In a recent survey by PwC, financial services is a leader in blockchain development, at 46%, compared to energy and utilities (12%), industrial products (12%) and healthcare (11%).² Although the benefits of blockchain are multifold, we still need to evaluate and identify transactions that are a natural fit for this technology.

Because blockchain is immutable, trustless, decentralized and distributed, it holds the potential to disintermediate processes, optimize workflows, cut operational costs, eliminate duplication of work and fight fraud. All of this improves transparency in the healthcare industry, saving billions of dollars.

Blockchain can benefit healthcare in the following ways:



Claims and billing management.

Blockchain implemented in the claims adjudication and billing management process will help all parties be aware of their share of the projected cost for a service. It can further reduce administrative costs by automating the billing and insurance related (BIR) activities.



Medical data management.

Blockchain can improve interoperability and secure the exchange of healthcare information. The ability to track patients in real time improves care coordination, which is also a fundamental requirement for value-based and cost-effective care.



Reducing fraud. Fraud costs the insurance industry more than \$80 billion annually.³ Blockchain can help determine if a submission is valid, mitigating fraudulent activities by securely pulling data from multiple sources at any point in a transaction.



Health research and clinical trials.

An estimated 50% of clinical trials go unreported.⁴ Using time-stamped records and results, blockchain advancements can address selective reporting and the manipulation of results, which will reduce fraud and errors in clinical trial records.

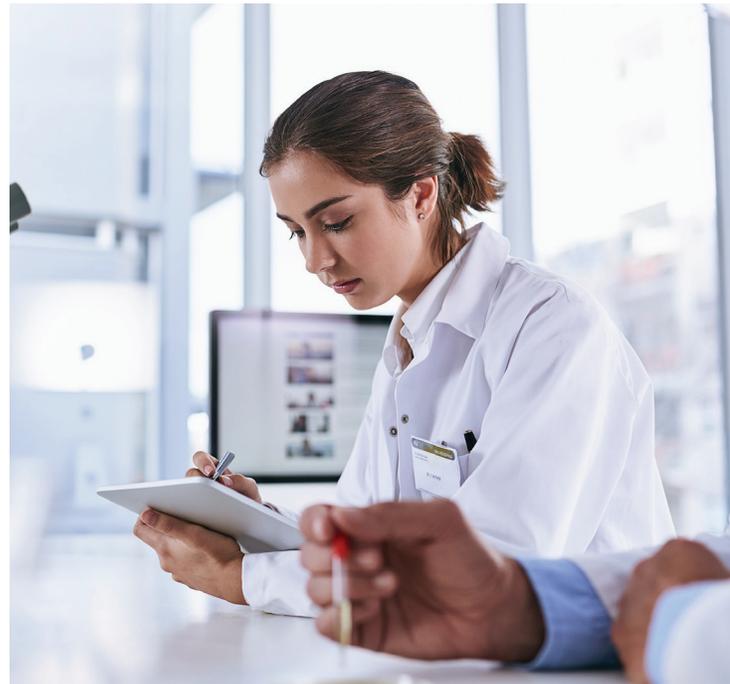


Tracking counterfeit drugs. Pharmaceutical companies incur an estimated annual loss of \$200 billion due to counterfeit drugs.⁵ Blockchain could create a “single source of truth” surrounding the movement of goods and help maintain integrity by tracking each step of the drug supply chain at the individual drug/product level.



Securing protected health information (PHI).

From 2015 through 2016, 140 million patient records were breached, affecting more than 27 million patient records.⁶ Apart from hacking and ransomware, 43% of such breaches (192 incidents) were internal due to insider error or wrongdoing.⁶ The existing healthcare IT architecture may not be sufficient to monitor and secure connected devices (internet of medical things, or IoMT). Using blockchain can alleviate privacy and reliability concerns.



NTT DATA can help global pharmaceutical companies with blockchain solutions

- Health data sharing platform for clinical trials. This seamless collaborative platform is for patients, healthcare providers, and pharmaceuticals and clinical research organizations involved in clinical trials and other research. It enables patients to capture health data from wearables, store it and securely share the information with healthcare providers. Patients control their health data, which improves transparency, traceability and efficiency of the clinical trial process.
- Global clinical supply chain solution. This solution tracks and traces product information with end-to-end visibility, from manufacturing to the warehouse, pharmacy, clinical research units and patients, until the drug is consumed. It provides a trust-based single system of record with immutable data that improves security, speed and traceability. It also addresses concerns about anti-counterfeiting and product recalls.

Reducing healthcare costs and improving transparency with blockchain

Today, the healthcare industry is using automation and artificial intelligence (AI) across the payer and provider landscape. While payers can significantly reduce costs and improve efficiencies with robotic process automation (RPA), providers are using AI-powered systems to improve the accuracy of diagnostics and create seamless patient experiences. As the healthcare industry gets smarter about the use of data analytics and starts adopting automation and AI-powered solutions, many innovative and expedient solutions will be implemented across the industry.

But the real benefit will come from adding blockchain technology to this AI-powered system, what NTT DATA calls AI-blended blockchain.

Let's put this into context. Although the healthcare industry has been adopting electronic transaction systems over the last 20 years, manual transaction processes still account for roughly \$10 billion USD and Eligibility and Benefit verification accounts for more than half of this spend.⁷ Several factors contribute to this, including convoluted rules that actually decrease efficiency, complex administration costs primarily associated with BIR, gaps in care coordination such as fragmented care delivery processes, and loss of continuity of both patient data and provider assessments. Other challenges include recent changes in the legislative landscape, namely the Health Insurance Portability and Accountability Act of 1996 (HIPAA) and the Patient Protection and Affordable Care Act (ACA).

Introducing blockchain solutions and weaving in RPA across the provider, agent and payer landscape can have a tremendous impact on the healthcare industry. The blockchain solutions can bring much-needed efficiency and transparency by making every transaction unique, immutable and accessible in real time, while automation can bring in speed and cost efficiencies. Such a system can ensure patients are better informed of projected costs, because payers and providers will have all the data (both historical and current) at hand. It will also enable accurate reporting, hitherto a difficult task, because all data will be available and processed in near real time.

Together, blockchain and AI-powered systems can drive down overall costs, significantly reduce BIR and, most importantly, root out fraudulent transactions. This can improve the customer experience by expediting overall system performance from days or weeks to minutes and even seconds.

NTT DATA and blockchain



More than 170 blockchain subject matter experts across the globe
(U.S., Japan, Germany, Italy, Spain and India)

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Four Innovation labs to foster technology evaluation (U.S., Japan, Germany and Spain)

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Over 40 use cases in flight across industries

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Member of the blockchain consortiums:
Hyperledger Project, Enterprise Ethereum Alliance (EEA), R3 Corda and Ripple

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Established our own blockchain consortium with members representing a number of industries, such as insurance, logistics, and import and export trade

Conclusion

Even as blockchain promises to revolutionize the way enterprises conduct business, most industries and vendors are still limited to pilot and exploratory projects. Financial services is the most mature of all the industries, with other verticals, including healthcare, playing catch up. Several challenges impede the healthcare industry, among them heavy regulations, cumbersome administrative complexities and fragmented care delivery. But blockchain holds great potential and promise across the provider and payer landscape. And when combined with automation, the results will be disruptive, to say the least.

About the authors



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Dr. Vinayak heads the Offshore operations for the Business Process Services line of business, R&D and the Global Shared Services Division. Dr. Vinayak has extensive expertise in designing and executing innovative solutions for wide-ranging issues, including complex outsourcing architecture, collections and recovery operations and rotary wing vehicles. His background in advanced research and development positions him uniquely to provide clients with informed solutions based on extensive data analysis and forecasting.



Dhurai Ganesan, Senior Director, Intelligent Automation & R&D at NTT DATA Services

Dhurai's interests include AI and Cognitive automation. He has helped build end-to-end RPA creation, deployment and management ecosystem for identifying automation opportunities, through an enterprise innovation program. Dhurai has scaled businesses, teams and operations and maximized opportunities using Robotic Process Automation and has delivered ~3000 FTEs savings worth of automation (Healthcare Payer, Provider, Life Insurance, Hospitality, Life Sciences and Banking Domains).

Let's get started

Get ahead with the next wave of innovative solutions with NTT DATA's Blockchain Services. More information is available at <https://us.nttdata.com/en/services/digital-services/blockchain-services>.

Sources

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