

Bringing Home the Blockchain Promise: Two Promising Applications



If you are thinking about a blockchain solution for your organization, it's good to know which solutions are poised to deliver the greatest return on investment. This article highlights two of the most promising uses of blockchain in decentralized health care: digital distributed transactional ledgers and smart contracts.

The promise of blockchain technology as a practical means of solving elusive health care data and transactional challenges has rapidly advanced. Look no further than a recent Deloitte [global survey](#), which found that 55 percent of health care IT executives strongly believe blockchain will become a “disruptive force” in health care.

Indeed, nearly half (49 percent) of health care executives say they plan to develop or adopt blockchain solutions in their own organizations, according to a new PwC Health Research Institute [survey](#). The key to the success of these blockchain solutions – and in turn wider adoption – will center around blockchain implementation, with vendors and health care participants partnering on proofs of concept and refining development tools and platforms.

If you are thinking about a blockchain solution for your organization, it's good to know which solutions are poised to deliver the greatest return on investment. This article highlights two of the most promising uses of blockchain in decentralized health care: digital distributed transactional ledgers and smart contracts. Digital distributed ledgers provide easily shared but immutable recordkeeping with sophisticated, built-in security characteristics which promote trust of the data. They also enable easy sharing and verifying of data content. Smart contracts are programmable business rules, like those governing transactional logic, providing extended transactional

functionality. Let's explore both further.

Leveraging Digital Distributed Ledgers

The “trustless” distributed digital ledger of transactions comprising a specific blockchain reflects the technology's promise to provide transactional transparency and interoperability and eliminate third-party transactional validations. With digitally distributed ledgers, business rules governing transactional processing are stored within the structure, meaning third-party validations are not required to complete a transaction.

Transactions and transactional data are stored uniquely and are immutable in the blockchain ledger. The ledger is distributed across all network nodes and each node has blockchain hashing algorithms, a mathematical calculation making each record unique and immutable, to validate transactions. If a consensus of the blockchain's status can't be validated across the nodes, a transaction is rejected. In addition, records cannot be deleted from the ledger. These features provide the transparency and traceability which make them particularly beneficial for health care.

For example, U.S. national drug supply chain participants could collaboratively use distributed ledger transactional content to determine a drug's chain of custody in the event of a manufacturer recall. The distributed blockchain ledger offers a unique security paradigm for decentralized health care processes. These processes are often complex and involve multiple participants like patients, physicians, health plans, government and vendor supply chains.

Blockchain platforms provide interactive development environments (IDEs), application programming interfaces (APIs) and programming enabling users to store and process data on blockchain nodes. Vendors in this space are marketing “blockchain virtual machines,” or similar language, around this concept.

The obvious benefit of using a vendor solution (as opposed to doing it yourself) is that much of the heavy lifting is done for you; however, keep in mind you're buying into that vendor's approach and tools. This is reminiscent of the early days of EHR, with many vendors initially marketing their own tools and platforms; over time, consolidations and market demand reduced vendor numbers.

The goal for these platforms and tools is to drive efficient code development, quality and code reusability, all of which promote standardization of smart contracts and other embedded blockchain features.

The Appeal of Smart Contracts

The trustless concept of blockchain also blends the inherent hashing and transactional validation of status and content across all nodes of the blockchain (security constructs). This enables users to employ smart contracts which can be written to validate conditions of a contract without needing third parties to perform that function. For example, a smart contract can automatically verify that the associated transactions meet specified contract

requirements to approve provider claims payments. This reduces processing costs and denials management appeals and strengthens contract-specific claims data quality.

Smart contracts are built into the blockchain and can help with managing implementing and verifying conditions of health care contracts, such as those for a drug supply chain, provider/institutional claims payments, provider credentialing and similar applications. Smart contracts are a key technical enabling feature of a “trustless” blockchain.

Various programming languages are being used for blockchain and vendor platforms offering their own versions of IDEs. Some provide users with more flexibility around programming paradigms; others are more structured, offering varying degrees of storage and memory management stacks, and program design support and advice. Popular programming tools include Solidity, Go, Java Script, JQuery and Python.

If you undertake a build-your-own blockchain approach, consult with your organization’s IT leadership and seek out lessons learned from other organizations. Important considerations to consider include maintaining a robust code management environment and selecting “standard” programming tools to manage develop cost and maintenance. Since blockchain is still new, evaluate the programming soft skills needed to design and code solutions.

Conclusion

Given the relatively recent advent of blockchain into the health care industry and the complexity of organizational inter-relationships and data security needs, it is likely your organization will need to be in a private or closed organizational network structure for a blockchain. This is a partnership in which you and other participants agree on the blockchain’s purpose and governance and data protocols.

An organizational network structure can provide the governance needed to support smart contract functionality, ledger data content and shared analytics. It also gives participants a better understanding of the implementation and maintenance commitments necessary with blockchain in order to realize its benefits.

In summary, while we have yet to see large-scale blockchain implementations in health care demonstrating proven returns on investment, we are seeing more collaborative blockchain projects among stakeholders in the private sector, government and non-profit research organizations. All are rigorously pursuing blockchain in an ongoing quest to lower health care costs and improve the quality of patient and population health care.