

WHITE PAPER

# The blockchain story is still being written

Monitoring the influence and impact of blockchain in healthcare.

AUGUST 2018



## The rise of big data has brought with it a dizzying array

of new technologies to find, manage, move and maintain all those petabytes of new information. Some of the technologies will revolutionize healthcare data management, and some will fail to live up to their hype. The jury is still out when it comes to blockchain's implementation details and its ultimate impact on our industry's operations. We'll be watching what happens, and at LexisNexis® Risk Solutions, we have the experience and the data management muscle to serve up blockchain however our healthcare customers choose to use it. The first step is to level set the dialogue.

- Blockchain can take many different shapes in healthcare, and the benefits and challenges of each vary.
- The industry needs to avoid trying to force problems to fit technology; rather, stakeholders must employ the right technology for the specific problem that needs a solution.
- Healthcare data is a breed apart; blockchain solutions in our industry must start with an emphasis on data access, security and ongoing integrity.

At LexisNexis Risk Solutions, it's our job to maximize technological advances in data management thoughtfully. Blockchain may be worth it, it may not. **The story is still being written.**



### Blockchain is making major noise

The mind-boggling menu of new ways to manage data—the cloud, the Internet of Things, machine learning, artificial intelligence, real-time databases, next-generation memory technologies—means unprecedented change for healthcare company operations.<sup>1</sup> New data sources. New data-gathering tools. New data management technologies. All of them impact the way you manage information; one of the latest is Decentralized Ledger Technology (DLT), in which append-only ledgers are distributed among peer nodes and synchronized via a consensus mechanism. And the superstar DLT is blockchain.

Basically, blockchain is a virtual ledger that records and verifies each transaction precisely; every member entity holds its own local copy of the shared dataset<sup>2</sup>, and when one member wants to change it, it must confirm its identity with a series of cryptographic criteria, then every other member must OK the change. Each local dataset copy is updated, creating a “block”—a fixed event. As blocks are added, a chain of events is formed; conflicting changes can be reconciled, and members control who can make them. Beyond that, there’s still no consensus on how to accurately distinguish between different types<sup>3</sup>, but one common classification is public and private, or permissioned and permissionless.

#### PUBLIC

Public blockchain protocols based on proof-of-work consensus algorithms are open-source and not permissioned.<sup>3</sup> Anyone can download the code and start running a public node, and anyone in the world can send transactions; they’re transparent, but anonymous.

#### HYBRID

A sort of hybrid, federated blockchains are group-run<sup>3</sup>; participation is restricted. Consortium blockchains are mostly used in the banking sector; consensus is controlled by a pre-selected set of nodes, and the right to read may be public or restricted.

#### PRIVATE

In private blockchains, write permission is centralized, and read permission may be public or restricted; they’re a way for groups to use blockchain technology to verify transactions internally—but that strategy risks security breaches similar to those a centralized system faces. They got their start when private companies used DLT to create permissioned blockchains; interestingly, calling a permissioned private ledger a “blockchain” is highly controversial and disputed.<sup>3</sup> DLT is still the more general alternative. Also, blockchain is just getting started, and it’s unclear how it will be adopted; some already argue that private blockchains could go the way of Intranets in the 1990s.<sup>3</sup>

### It all began with Bitcoin

Blockchains started a decade ago, when Satoshi Nakamoto, a pseudonym, released a white paper titled “Bitcoin: A Peer-to-Peer Electronic Cash System”.<sup>4</sup> Blockchain was the technology behind Bitcoin; it was hailed as transparent, time-stamped and decentralized. The expansion beyond Bitcoin gained speed in 2014; entrepreneurs early on recognized its potential.<sup>5</sup> A second public network, Ethereum, arose; it could record loans and contracts in addition to currency, and Smart Contracts were created.

The financial services sector got involved in a big way early on. The Australian Securities Exchange has switched to blockchain, aiming to make clearing and settling trades faster, easier and cheaper.<sup>6</sup> It was just the first: The London Stock Exchange, the Japan Exchange Group and the Nasdaq Stock Market are looking into it, too. And the European Commission developed a proof of concept for the European Financial Transparency Gateway<sup>7</sup>, a blockchain-enabled, European Union-wide index of public company financial statements.

Blockchain technology also holds promise in supply chain management, human resources, financial services, energy management, telecommunications, insurance services, transportation and utilities<sup>8,9</sup>...

### ... and healthcare?

Blockchain’s design doesn’t suit all of healthcare users’ needs.

- A blockchain network is designed to be transparent; there’s no mechanism for hiding a transaction. That means everyone could see patients’ PHI, for example, so blockchain isn’t compliant with the Health Insurance Portability and Accountability Act.
- And everyone could potentially see details of each payer member’s provider networks.
- Control issues exist, too. If a patient is unable to authorize access to his or her data in an emergency, who else will be able to?
- And blockchain was designed for transactions, not data, so sending it tends to eat up a ton of bandwidth. That means it’s slow, also possibly limiting its use for emergency services.

## THE BLOCKCHAIN STORY IS STILL BEING WRITTEN

It's no surprise that there's more talk than action. Healthcare players tend to move slowly in adopting new information technologies, generally resisting the temptation of brand-new bells and whistles, and blockchain is as yet no exception.



Survey found **16%** had plans to implement blockchain,

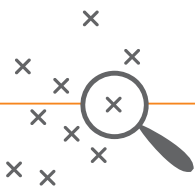
while **56%** were considering implementation

One survey found that 16% of respondents had “concrete plans” to implement a commercial blockchain<sup>10</sup>, and 56% said they likely would do so, too. In the same survey, 70% of likely early adopters said blockchain will help improve health record data management, and 60% said it will aid access to secure information. About two-thirds cited its applicability in reducing data breaches, analyzing medical device data and improving billing and claims processes.



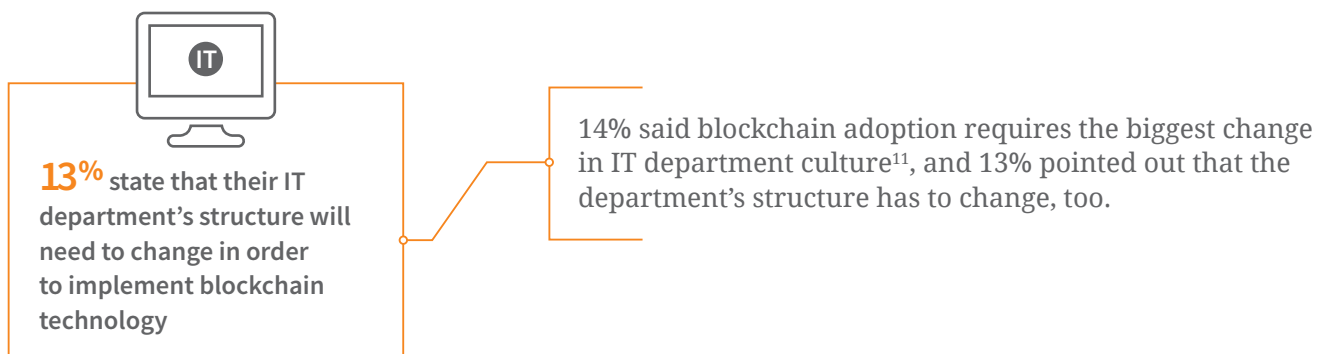
Different survey shows **77%** of CIOs have no interest in blockchain

Another survey<sup>11</sup> revealed the “scarcity” of blockchain deployments and cautioned against “overestimating the short-term benefits;” it found that just 1% of Chief Information Officers report “any kind of adoption,” and just 8% note any type of planning or experimentation. And fully 77% express no interest in blockchain—now or ever.



**18%** of companies with blockchain initiatives state those skills are the hardest to find

Of the companies with blockchain initiatives or plans, 23% lamented that it's the technology that requires the most new skills to implement—not to mention “understanding of, at a fundamental level, aspects of security, law, value exchange, decentralized governance, process and commercial architectures”—and 18% note that those skills are also the hardest to find.<sup>11</sup>



But while blockchain's understanding, adoption and support are immature, it isn't likely to go away. Financial services, telecom and insurance companies lead the early adopters<sup>11</sup>—and transportation, government and utilities are getting involved, too. At LexisNexis Risk Solutions, we're laying the groundwork—and building out plans—for a number of thoughtful blockchain strategies for our healthcare customers.

Our customers don't need a data management partner with a solution that's looking for problems.

Our customers need a partner with the experience and expertise to evaluate their unmet data management challenges and help them determine if blockchain—or any new technology—can help solve them.

We understand that much of the strategy behind blockchain adoption will be driven by “the psychological acceptance of the innovations it brings<sup>11</sup>, as much as by the technology itself.” The strategy that works best for our customers is the strategy that works best for us.



### Healthcare organizations (HCOs) explore a variety of options

HCOs are busy with blockchain.

Proponents claim it will transform them and the quality of care they provide and pay for, with better ways to store information and share it among providers, payers and patients—and even pharmacies, PBMs and pharmaceutical manufacturers and distributors. Blockchain-enabled outcomes-based contracts may better connect costs and clinical results. For example, blockchain could play a part in improving

auditability, provenance tracking and control for clinical trial managers by automatically aggregating, replicating and distributing data. As well, blockchain could reduce patient documentation errors and problems with conflicting data from multiple entities<sup>12</sup>, and it could minimize hacking.

At LexisNexis Risk Solutions, we're observing, evaluating—and working with—many of healthcare's major and emerging players as they start to explore blockchain's potential in meeting healthcare data's unique management needs. Its use in many segments of our industry is being examined—and in some cases, put in place.

In the payer sector, Humana, MultiPlan, Quest Diagnostics and UnitedHealth Group subsidiaries Optum and UnitedHealthcare are part of a blockchain pilot providing simultaneous access to directory data to all five<sup>13</sup>. They'll focus on accuracy, administration and access, and may also apply blockchain to cost data if the directory demonstration works out.

Patients enjoy “complete control” over access to their personal health records at Beth Israel Deaconess Medical Center, according to a recent white paper<sup>15</sup>, where they monitor the accuracy of edits—such as new diagnoses—and determine which providers can see sensitive information. The hospital's blockchain-based MedRec patient record management system offers patients “a holistic, transparent picture of their medical history,” it says; indeed, a blockchain approach could increase patient agency, foster empowerment and offer new data management tools that help improve patient engagement<sup>2</sup>.

Providers across a care team can benefit from a more unified view of the patient; TrustedCare Inc. offers a cloud-based data management tool to facilitate it. In a paper submitted to the US Department of Health and Human Services<sup>14</sup>, the company pointed to siloed data as a problem, and lauded blockchain's ability to centralize patient records, facilitating better coordination.

### Tech companies and governments get on board, too

The technology sector is well-represented as well.

IBM sees blockchain as a “major focus area,” citing Watson Health’s potential impact on data storage, sharing and use; indeed, Watson and the US Food and Drug Administration recently launched a two-year collaboration to look at applying blockchain to exchanging data across the care continuum<sup>12</sup>; specific areas of focus include sharing owner-mediated data and precision medicine data sources, and the company says blockchain could also help standardize and streamline use of IoT data for clinical care<sup>16</sup>. IBM also participates in the open-source Hyperledger collaboration run by the Linux Foundation<sup>12</sup>, and was one of 15 winners of the HHS Office of the National Coordinator’s blockchain challenge<sup>17</sup>. Papers in the challenge examined the technology’s potential in EHR development, Big Data analytics tools, research and IoT devices; applications discussed included improved medication management, patient consent, clinical documentation governance and patient engagement.

Change Healthcare, another IT company, launched an enterprise-scale blockchain solution last fall<sup>18</sup>—Change Healthcare Intelligent Healthcare Network—saying it will “enable payers and providers to boost revenue cycle efficiency, improve real-time analytics, cut costs and create innovative new services;” the initial focus is creating a distributed ledger for claims processing and secure payment transactions.

And Hashed Health—a “blockchain innovation company”—is testing a provider credentialing solution using blockchain to connect member entities and facilitate data exchange<sup>19</sup>. The Professional Credentials Exchange addresses “the effort, cost, redundancy and complexity of obtaining and verifying practitioner identity and credentialing information,” the company says.



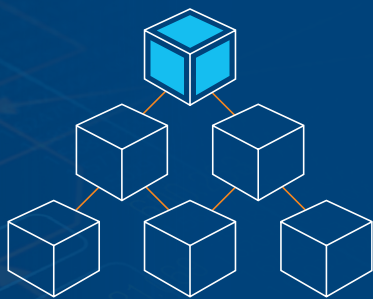
And blockchain-based start-up activity continues.<sup>20</sup> Several new entities—MedRec, SimplyVital Health and Gem, for example—use blockchain to manage and move medical records. Brand-new IncentHealth.io created a smoking cessation program using blockchain, and Medicalchain launched a telemedicine program. Multiple companies—including Medicalchain and Nano Vision—are developing cryptocurrency and records management combinations.

The US government is getting involved, too<sup>16</sup>, in addition to the HHS challenge. Gem partnered with the Centers for Disease Control and Prevention to look at using blockchain to monitor infectious diseases, for example. As well, the Decentralized Identity Foundation just formed with key players Microsoft and Gem, aiming to foster cross-industry collaboration on an open-source network, and multiple meetings and conventions discuss clever ways to put blockchain to better use.

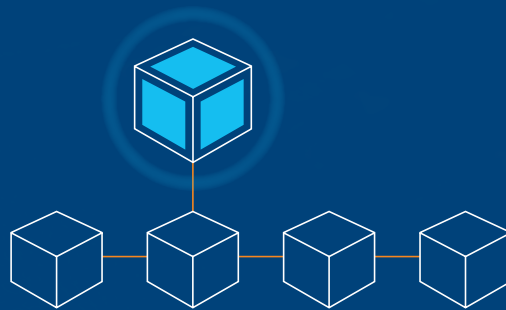
### Still limited demonstration of blockchain's abilities

But most of the high-profile projects under way are small tests of specific bits of blockchain functionality; start-ups are generally based on the building blocks of a blockchain network, not the strategic imperatives behind transferring to that technology. Expert consensus is there's palpable excitement about blockchain's possibilities, a lot of talk, a lot of theories and proposals—but no major, validated evidence as of yet that it can actually solve the problems healthcare data presents.

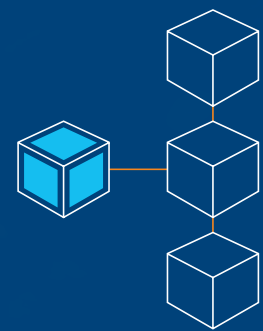
The bottom line is this: Data quality is still fundamental. If data isn't correct, the “errors will immutably persist”<sup>21</sup>, a problem when the “largest driver of the blockchain business model design” is trust<sup>22</sup>. Basically, blockchain in healthcare has three plays<sup>3</sup>.



You can build a network, assembling and assessing individual member nodes.



You can be an “oracle node,” resolving a chain’s consensus conflicts.



Or you can be a standard node, using blockchain to facilitate some aspects of data storage and management.

## THE BLOCKCHAIN STORY IS STILL BEING WRITTEN

Healthcare organizations have a lot of options for maximizing the benefits of all three. The LexisNexis Risk Solutions healthcare business can help customers make the right choice.



**Blockchain's potential evaporates—and users' benefit dries up—if the data isn't accurate.**



**Moving data to and from the chain is vulnerable to human error.**



**Managing new sources of data demands experience and innovation.**



**So does unlocking all the information data can deliver.**

LexisNexis Risk Solutions understands the DLT ecosystem and the potential opportunities to maximize it.

### Data management expertise will be required

Because of the misinformation that occurs naturally, while blockchains are independent, they'll likely require some kind of outside central authority for validation purposes, especially around identity and location information. Situations such as prescribing opioids show that, for example, blockchain offers no help in ensuring individual providers' authorization to distribute narcotics. Corroboration doesn't count; someone must verify that the doctor can prescribe the pill.

Having up-to-date data and the insight to add appropriate data from external sources—plus knowing how to handle it all—can make solving such dilemmas fairly simple. And that's what we do. Blockchain is still more potential than results—we get that. We'll help HCOs optimize their blockchain options, making sure that an emphasis on data accuracy drives every decision.

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Health Care

### About LexisNexis® Risk Solutions

LexisNexis Risk Solutions harnesses the power of data and advanced analytics to provide insights that help businesses and governmental entities reduce risk and improve decisions to benefit people around the globe. We provide data and technology solutions for a wide range of industries including insurance, financial services, healthcare and government. Headquartered in metro Atlanta, Georgia, we have offices throughout the world and are part of RELX Group (LSE: REL/NYSE: RELX), a global provider of information and analytics for professional and business customers across industries. RELX is a FTSE 100 company and is based in London. For more information, please visit [www.risk.lexisnexis.com](http://www.risk.lexisnexis.com) and [www.relx.com](http://www.relx.com).

Our healthcare solutions combine proprietary analytics, science and technology with the industry's leading sources of provider, member, claims and public records information to improve cost savings, health outcomes, data quality and compliance and minimize exposure to fraud, waste and abuse.

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