Blockchain: An insurance focus

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Imagine an insurance industry without paperwork, a system where some claims are verified and handled almost instantly, and applications/renewals are approved nearly as fast.

Imagine being able to minimize fraudulent claims or loss adjustment expenses with a massive, decentralized database that leverages real-time data sources of almost unimaginable size. Imagine the cost savings to your company of improving efficiency across the insurance value chain (from product management, to underwriting, to claims, to customer service), all while potentially increasing the security of your policyholder's data. Now imagine that the technology to do this already exists. It does. The hot name right now is "blockchain technology."

It's no secret the world is changing faster than ever before with the "Internet of Things" promising to connect billions of people and technologies to the Internet in the next few years. As more and more people (and more and more things) are connected to the Internet, it's important to focus on the risks, but also important to focus on the opportunities. Emerging risks such as cyber liability, and more traditional risks such as catastrophic natural disasters, are affecting people in ways never seen before, simply because of their connectivity to the world. The insurance industry as a whole needs to take the lead on global risk management, and to do so, the industry needs to leverage data. Lots of data. Big data. As of 2012, 2.5 exabytes of data was being created daily (that's 2.5×10^{18} bytes, or 2,500,000,000 GB, or 1.8 trillion 3.5-inch floppy disks, if you prefer), which has certainly increased since then.

Blockchain technology is one of the tools being used to manage these massive, real-time data sets, pledging enhanced security, increased innovation, automation of key functions, more utilization of peer-to-peer insurance, easier identification and prevention of fraud, and many more opportunities that may not have even been conceived yet. Emerging risks lead to emerging opportunities, and blockchain technology is a key component in helping the industry take advantage of these opportunities.

But first, a step back. When the world is changing as fast as it is, it's very easy to be sucked in by buzzwords and overwhelmed by the vocabulary. Let's go back, gain a basic understanding of what this technology is and how it may revolutionize the insurance industry in the years to come, and determine if it is more than just the latest industry buzzword. Put very simply, blockchain is the platform on which bitcoin (the world's most popular digital asset and payment system) operates. It is a distributed database that maintains a continuously growing list of data records secured from tampering and revision. For bitcoin, the technology ensures that financial transactions remain secure and "pseudo-anonymous." While originally developed for bitcoin, blockchain technology has been in use as an open source code since 2009. Recently, other industries are working to adapt this technology for their needs. Secure and pseudo-anonymous data sets sure seem like something the insurance industry could get behind, right?

The basics of the blockchain

At its core, the blockchain is a ledger of transactions and data that is stored on multiple machines. The key component of this technology is that the data is validated and confirmed in multiple "nodes."[1] Each computer (node) that stores the data runs an algorithm to confirm that a transaction is either valid or invalid before appending it onto the previous chain of data. This use of multiple nodes storing the data is known as a "distributed network,"[2] which can take many forms. A network can include every computer connected to the Internet, in the case of a public ledger, or a network of private computers that limit the access to the blockchain, in the case of a private ledger. The construction of the chain is made by "miners" that run algorithms to validate and store the latest ledger of data, the blockchain.

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1   Norton, S. (February 2, 2016). CIO explainer: What is blockchain? Wall Street Journal. Retrieved September 15, 2016, from **http://blogs.wsj.com/cio/2016/02/02/cio-explainer-what-is-blockchain/**.

2   Crawford, S. & Piesse, D. (2016). Blockchain Technology as a Platform for Digitization: Implications for the Insurance Industry. Ernst and Young. Retrieved September 15, 2016, from **http://www.ey.com/Publication/vwLUAssets/EY-blockchain-technology-as-a-platform-for-digitization/$FILE/EY-blockchain-technology-as-a-platform-for-digitization.pdf**.

The basic principles of the chain imply that, once a transaction is validated, it is "glued" on to the existing chain that includes all past valid transactions. As the data is stored on multiple machines, it cannot be changed. The "valid" blockchain is the longest chain of transactions that the majority of the nodes agree is valid.[3] With the addition of time-stamps for the transactions and cryptology applied to the information, this makes hacking in and changing the blockchain incredibly difficult. A hacker would have to break into a majority of the nodes in order to create a fraudulent transaction.

This major security innovation of the blockchain sounds like common sense when you talk about it, but has only been made possible with technological advances in the last few years. For decades, an organization's data has been stored in a centralized data repository. With these systems, a hacker only has to infiltrate the firewall and protocols of a single entity in order to change the information and defraud the data. If you're running an insurance company, would you rather a hacker need to break into one system to ruin your firm or thousands?

Another positive aspect of the blockchain is pseudo-anonymity.[4] Data is encrypted at the transaction level in order to preserve anonymity. This is only pseudo-anonymous because theoretically you can gain the knowledge of the past transactions of an individual, and, as such, may be able to identify that person's blockchain. In reality, this is extremely impractical because a hacker would have to break through the cryptographic protocols of the entire transaction history. Anonymity in transaction data is desirable to guard against data breaches that lead to fraud or identity theft.

Enhanced security?

Blockchain technology comes with many inherent benefits. The main purported benefit of the blockchain is a direct result of the security discussed above, which is the ability to provide a stream of data that can be "trusted" for accuracy. It will enable users to quickly identify the movement of assets from one party to another. Let's visit a somewhat common transaction, buying a house, in a blockchain environment. When buying a house, a mortgage lender needs to verify that the owner of a property for sale has the right to sell it and that the buyer has the right to purchase it. Currently, this process can take a day for a "clean" title and possibly weeks for a title that has had prior liens on it. With the blockchain technology, this process can be done in a few seconds and save considerable cost because all of the property data can be stored in a blockchain. The data stored in a blockchain can readily identify whether the seller still owns

the property and has not already sold it, and it can identify any liens on the property. The blockchain technology does the work of the "middlemen" in the transactions.

However, this doesn't mean that the blockchain is bulletproof. As with any emerging technology, a parallel effort to undermine and manipulate the system has emerged alongside it. In August 2016, 120,000 units of the bitcoin digital currency were stolen from a bitcoin exchange in Hong Kong, valued at $72 million.[5] Vitlay Kamulk, a researcher at Kaspersky Lab (an international software security group), stresses that we need to understand the vulnerabilities before widespread acceptance.[6] While Kamulk's comments were focused on bitcoins, this is an important lesson to keep in mind for all new technologies, including the blockchain. It is important to remember that no system should be considered "invulnerable," and to continue researching advancements in security, even in something as locked down as the blockchain. Just as an insurance company must perform due diligence when entering a new market or changing its claims philosophy, companies must consider the potential risks from adoption of blockchain versus the potential efficiency gains.

Insurance industry blockchain benefits

Security vulnerabilities aside, it doesn't take much imagination to see how this new technology could completely change the way insurance companies work. With this technology, claims costs can be lowered through the use of "smart contracts." These are contracts that automatically enforce terms when certain conditions arise. As a very basic example, consider a smart insurance contract for trip insurance.[7] After the airline posts a cancellation of a covered flight, it can automatically trigger payment to those who have purchased insurance without the need to use a claims department to verify the loss. This has the potential to save the insured the hassle of filing a claim and waiting through the claims process for payment. It saves the insurer the hassle of verifying the claim. This cost savings would be passed to the policyholder in lower rates.

3   Nakamoto, S. Bitcoin: A Peer-to-Peer Electronic Cash System. Bitcoin. Retrieved September 15, 2016, from https://bitcoin.org/bitcoin.pdf.

4   Mainelli, M. & von Gunten, C. (December 2014). Chain of a Lifetime: How Blockchain Technology Might Transform Personal Insurance. Long Finance. Retrieved September 15, 2016, from http://www.longfinance.net/lf-research.html?id=903.

5   Domonoske, C. (August 3, 2016). $72 million in bitcoins stolen from Hong Kong exchange. NPR. Retrieved October 12, 2016, from http://www.npr.org/sections/thetwo-way/2016/08/03/488487615/-72-million-in-bitcoins-stolen-from-hong-kong-exchange.

6   Seals, T. (April 7, 2015). Bitcoin flaws beckon hackers. Infosecurity. Retrieved October 12, 2016, from http://www.infosecurity-magazine.com/news/bitcoin-flaws-beckon-hackers/.

7   Huckstep, R. (January 14, 2016). What does the future hold for blockchain and insurance? Daily Fintech. Retrieved September 15, 2016, from https://dailyfintech.com/2016/01/14/what-does-the-future-hold-for-blockchain-and-insurance/.

Another insurance example is crop insurance.[8] When insured crops are damaged by weather, a smart contract built on blockchain technology can utilize meteorological data to pay claims automatically. Wind speed data, precipitation levels, hail size and frequency, and other weather-related data can be used to identify areas that are affected and trigger the payment of claims without the need of a claims adjuster. This would drastically reduce the loss adjustment expense that is related to these types of claims.

Blockchain technology also has the potential to limit fraudulent claims. False billings and tampered documents are less likely to "fall through the cracks" if the data is decentralized and immutable, which will reduce the amount of erroneous claims payments. Utilizing this technology will enable insurers to lower their loss adjustment expenses and pass on that savings to consumers in the form of lower rates. Furthermore, if this technology becomes widely used, it can help mitigate identity theft and other cyber liability losses.

Identity theft is the fraudulent acquisition and use of a person's private identifying information. Usually this is done in order for the perpetrator to realize a financial gain. Because the data is encrypted at the financial transaction level, the technology minimizes the amount of identifying information available in the blockchain, thus minimizing the risk of identity theft.

The encryption protocol utilized by the blockchain technology has the capability to limit cyber liability as well. Cyber liability is the risk that personally identifiable information will be compromised by a third party storing an individual's data. Current practice is to store this data in a central location with software to protect against hacking. With this technology, it enables data to be run and stored based on the current blockchain without unencrypting the underlying data because the chain itself can be independently verified through separate nodes.

Though this technology may not revolutionize the manner in which insurance operates, it has the potential to introduce new models of business and increase the capacity of insurance. This technology could change the way insureds interact with their insurers.

Limitations of the blockchain

As with any emerging technology, these potential benefits do not come about without a few potential limitations, in addition to the security concerns discussed above. The most problematic of the limitations is scalability. In order for the insurance industry to utilize blockchain technology, it would take a remarkable amount of infrastructure.[9] Currently, blockchain technology is limited by the amount of computing power available. In order for data to be decentralized, each

node must be able to process the requisite data for each transaction for a growing number of participants. While smaller blockchains are currently successful with a limited number of participants, the insurance industry has a much larger population of participants that will need to have their data validated in a timely manner. This will mean not only more storage space, but also enough computing power to quickly be able to validate each new transaction or data point.

Another stumbling block that needs to be overcome is the expertise.[10] The expertise and experience needed to create the blockchains and implement the necessary systems to use this technology are still in their infancy. A few digital currencies use this technology, but it is not widespread enough to support the needs of scaling the technology to a point that can be utilized by most industries, especially insurance. The speed and stability of this technology will require a substantial investment of capital to be viable.

There may be further concerns with regard to data privacy. The most prevalent user of this technology is the bitcoin system, which operates a publicly available blockchain with open source code. Implementing this type of network into a "permissioned" or semiprivate network to protect personal information might pose significant roadblocks. This will include the implementation of standardization in the protocols used to verify each and every transaction, which is a crucial component of creating the blockchains. The total metamorphosis of the way that data is verified and stored will not come without a considerable real dollar cost.

The most problematic challenge that may delay this technology being implemented in the insurance industry is regulation. Insurance needs to be a highly regulated industry in order to protect policyholders and the integrity of the companies that provide coverage. The use of blockchains to offer new insurance services, such as peer-to-peer insurance, will leave questions regarding who the regulatory authority is, as the transactions will be conducted over a widely diversified geographic space. Which regulatory body will ensure that policyholders will be protected in the case where a peer-to-peer contract holder does not have sufficient funds to pay a claim? Currently, regulation in the United States is on a state-by-state basis, which does not lend a great deal of flexibility when dealing with new products that may be funded by those overseas utilizing this technology. The issue of regulatory governance seems to be the largest hurdle that the insurance industry will face if it embraces this technology.

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8   Mainelli & von Gunten, ibid.

9   Crawford & Piesse, ibid.

10   Crawford & Piesse, ibid.

The first industry adoption efforts

It's not difficult to see the potential efficiencies that blockchain technology can introduce into the insurance industry in broad terms. However, this sort of technology really can't shine unless it's implemented in a "consistent and compatible way, based on minimum standards to exchange data and transactions."[11] To that end, a number of insurers and reinsurers have launched the "Blockchain Insurance Industry Initiative" or B3i, in order to "explore the potential of distributed ledger technologies to better serve clients." The member companies tout the speed and efficiencies that blockchain may bring to the insurance industry and are exploring using the technology for inter-group retrocessions.

The ultimate goal of B3i is to "explore whether Blockchain technology can be used to develop standards and processes for industry-wide usage and to catalyze efficiency gains in the insurance industry." With major players in the insurance market exploring the use of the blockchain, it's important for all insurers to monitor the situation. The B3i is the first major effort to implement the technology into solutions across the insurance value chain rather than isolated use in individual companies. It's a big development, and insurers should keep their eyes on it.

Closing

Blockchain technology has many benefits that can aid the insurance industry, but they come with some large question marks. The structure of the blockchain can help to save claims costs and even open up new avenues of marketing insurance as well as the potential for offering new products in a timely manner. The insurance industry has usually lagged behind other industries when it comes to implementation of emerging technologies, and this will most likely continue with regards to blockchain technology. Insurers will likely wait until a larger-scale version is "tried-and-true" for other industries before embracing it themselves.

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11   MunichRE. (2016). Insurers and reinsurers launch Blockchain initiative B3i [Press release]. Retrieved October 30, 2016, from **https://www.munichre. com/en/media-relations/publications/company-news/2016/2016-10- 19-company-news/index.html**.

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