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Blockchain and Smart Contracts

By Mark W. Rasmussen, James A. Cox and Gwen R. Higley of Jones Day – (Sept. 25, 2017) – The North Texas region has a long history of innovation. In the 1870s, Dallas became home to the first railway junction in Texas, allowing it to emerge as a dominant shipping hub. In the 1950s, the integrated circuit, invented here at Texas Instruments, revolutionized the semiconductor industry. More recently, Dallas and Fort Worth have launched numerous "Smart Cities" initiatives, bringing advanced technology to the cities' infrastructure.

Businesses and entrepreneurs thrive on North Texas's culture of innovation. But the rapid pace of change can also bring businesses to their knees if they fail to appreciate the accompanying opportunities and risks. One emerging technology that has the potential to disrupt industries in North Texas and beyond is blockchain.

Overview of blockchain technology

Mark Rasmussen

At its core, a blockchain is a shared electronic ledger or database that can be used to track transactions and information of all types. What makes blockchain technology different from prior implementations of ledgers and databases are four key characteristics.

First, a blockchain is hosted on a peer-to-peer network. Second, identical copies of a blockchain are distributed across many computers on the network. Third, a blockchain allows transactions to be validated using a "trustless" consensus mechanism. Fourth, a blockchain creates a permanent, time-stamped record of all transactions that is mathematically secured from alteration through cryptography.

Currently, most electronic transactions are processed, verified and recorded using trusted third-party intermediaries, such as banks. For example, a purchaser's bank validates that she has money in her account, authorizes the transaction and records it in its ledger. Similarly, a seller's bank records the receipt of money in its own ledger. Neither bank sees the other's records. Instead, confirmations are exchanged between the two, increasing the possibility of recording mistakes. Blockchain technology dispenses with trusted intermediaries and allows parties to engage directly with each other without losing the peace of mind that middlemen provide.

Instead of using a third party to verify transactions, a blockchain relies on group consensus. Members of a blockchain network each have identical copies of the ledger, and new proposed transactions are broadcast to each member. The members then apply a mathematically secure method of achieving consensus as to which transactions to validate and, thus, add to the blockchain.

In the most commonly used method of achieving consensus, "proof of work," members of the network compete against each other to be the first to successfully perform a difficult cryptographic computation against a group of proposed transactions—called a "block."

Once validated, blocks of transactions, accompanied by a proof of work, can be accepted by the other members of the network into the blockchain. Each new block accepted by the majority of users on the network is intertwined with the preceding block, thereby creating an unbreakable chain of blocks, each of which is cryptographically secure and unalterable.

By being available to all users of the peer-to-peer network, this secure chain of data is simple to track and audit and reduces the likelihood of ›

recording mistakes. Blockchains can be either public and open for all to see, like the blockchain for the cryptocurrency Bitcoin, or private and available only to those with permission.

Smart contracts and blockchain technology

The best known applications of blockchain technology allow people to create, buy and sell cryptocurrencies like Bitcoin. But blockchain technology is not limited to cryptocurrencies. It is analogous to a computer operating system, which can be used to run an unlimited variety of applications. One such application that runs on certain blockchains (such as the Ethereum blockchain) is smart contracts.

Jim Cox

A smart contract is computer code that runs on a blockchain and specifies consequences once certain conditions are met. The idea of smart contracts is broader than code that reflects or captures simple agreements, however. It includes what might be termed "smart agents," which can act to manipulate blockchain assets in an autonomous way. An example might be code that implements a complex financial derivative, automatically calculating and tracking ownership interests and awarding financial returns.

One advantage of smart contracts on a blockchain is that they can lower transaction costs. In contrast to smart contracts, performance of traditional contracts can require significant amounts of lawyer time, adjudication time, enforcement actions and intermediary costs. The use of smart contracts can also improve the speed and accuracy of performance because automated transactions occur in real time and are less prone to human errors.

A potential risk of using smart contracts, however, is that they are implemented as computer code and therefore are subject to software bugs and hacking attempts.

Real-world applications of blockchain technology and smart contracts

Gwen Higley

Companies of all sizes are exploring how blockchain technology and smart contracts can help their businesses. Some companies are already using these technologies to help streamline and improve their supply chain management.

For instance, in the first quarter of 2017, a major retailer started using blockchain technology to track pork it purchases from China. Similarly, a large container-shipping company is working on a blockchain system to manage its supply chain. Blockchain technology can improve supply chain management by reducing paperwork, increasing the traceability of products and making records easier to audit.

Similarly, in the financial industry, a group of multinational banks is collaborating on a blockchain platform that will facilitate the settlement and clearing process for transactions in the financial markets. A central feature of this platform is a digital coin called the Utility Settlement Coin, which is fully backed by cash assets held at a central bank and convertible into government-backed currency. Other institutions are likewise testing the use of blockchain technology to improve the work flow of post-trade processes for derivatives transactions. Blockchain applications for asset trading, clearing and settlement could lead to faster transaction times, reduced costs and improved transparency and accuracy. ›

Blockchain technology is also being used to raise capital and track share ownership. Last year, a major online retailer became the first company to successfully issue public securities that exist only on a blockchain. Other companies are using blockchains in Initial Coin Offerings to issue digital coins that carry rights in the company in exchange for capital. This year alone, well over $1.5 billion has been raised through ICOs.

And Delaware recently became the first state to allow corporations to maintain corporate records, including a corporation's stock ledger, on a blockchain. This could help companies establish more reliable records of authorized shares and track ownership, as well as reduce errors and confusion in the proxy voting system.

Blockchain technology also offers the potential for real-time government approvals and oversight. Financial institutions and other regulated businesses could record detailed audit trails on the blockchain and in turn make them available to the government with near real-time access so that the government could be more proactive in its regulatory endeavors. Of course, this type of innovation must be integrated into company policies and procedures on data governance.

Potential legal issues regarding blockchain technology and smart contracts

As blockchain platforms become more prevalent, companies and their lawyers have begun grappling with the legal issues associated with this new technology. Federal and state governments are still in the early stages of adopting laws and regulations pertaining to blockchain-based businesses, and companies should stay alert to new developments.

At the federal level, a Congressional Blockchain Caucus has been formed to analyze what legislation might be appropriate, but to date no specific legislative proposals have emerged. Federal regulators like the U.S. Securities and Exchange Commission and the U.S. Commodities Futures Trading Commission have used existing laws to pursue bad actors.

Notably, the SEC has recently issued several reports and alerts related to the ICO market. In one report, the SEC addressed whether digital coins are securities and thus subject to securities regulations and registration requirements. The SEC has also alerted investors to the potential risks associated with ICOs. Other regulators—such as the IRS, the Financial Industry Regulatory Authority, the Office of the Comptroller of the Currency and U.S. Treasury's Financial Crimes Enforcement Network—have released their own guidance related to blockchain applications and cryptocurrencies.

At the state level, Delaware has strived to create a welcoming environment for users of blockchain technology. For example, Delaware has initiated a project to make all state archival records available on a blockchain and passed the legislation mentioned above regarding corporate recordkeeping. Vermont and Arizona likewise have passed laws to permit the use of blockchain technology in transactions and recordkeeping. And Illinois has explored piloting several blockchain projects, including to track property, record birth certificates and issue medical licenses.

Companies will need to consider a host of other legal issues when evaluating and adopting blockchain technology. These include cybersecurity and data privacy, intellectual property, products liability, contract enforceability and jurisdictional questions. In the end, whether companies can successfully adopt blockchain technology will turn on their ability to carefully evaluate and address these legal risks. ›

Those that do will continue to foster the culture of innovation that has long been the hallmark of North Texas.

The views and opinions set forth herein are the personal views or opinions of the authors; they do not necessarily reflect views or opinions of the law firm with which they are associated.

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