



BITCOIN CYBERCURRENCY & BLOCKCHAIN NETWORKS

What Credit Unions Need to Know



Prepared by

CSCU

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Insights by CSCU

Not a day goes by where you don't read or hear news about bitcoin and/or blockchain. Without question, bitcoin and blockchain are the darlings of the financial and business media. What follows in this report is the background and insights on bitcoin, the crypto currency, its relationship to the blockchain, and reasons why bitcoin has generated such a buzz in recent years. This paper also takes a much deeper look into the intriguing and complex world of the blockchain network's distributed ledger technology and discusses why credit unions will want to keep an eye on it.



BITCOIN AND BLOCKCHAIN

Bitcoin and its related blockchain network was started in 2009 by an unknown person or group of people who go by the alias Satoshi Nakamoto (although many are now coming forward to take credit). It is one of more than 669 known cryptocurrencies traded in the world. First, we should define bitcoin and blockchain separately.

WHAT IS BITCOIN?

From a high level, bitcoin is a decentralized digital currency that is used to store and transfer value within the bitcoin network. Although digital, bitcoin is a lot like any other fiat currencies (a currency declared to be legal tender but is not backed by a physical commodity) that we are used to today. You can store, exchange and transact in bitcoin just like you can with any other fiat currency. However, unlike fiat currencies, bitcoin's value is derived by faith in the bitcoin network, not a central government or backer of the currency.

There are some advantages to this structure when we look around the globe and see what can happen to the value of a currency when the backer of that currency is not prudent with their monetary policy. However there are drawbacks as well since in most instances bitcoin is an unregulated currency and therefore does not provide protections that may be afforded to other fiat currencies such as the protection that the US government can provide to the dollar. There will only be 21 million bitcoins available and they will be released throughout the network over time.



TOM DAVIS - SENIOR VICE PRESIDENT, FINANCE & TECHNOLOGY

Tom Davis joined CSCU in 2004 and today wears many hats. He is a highly respected executive and tireless evangelist on new payment technologies and innovations and how they will positively impact the success and growth of credit unions. Along with being a visionary with at least one eye always on the horizon, Tom oversees CSCU's finance & accounting, internal product development, and technology functions.

A graduate from Missouri State University with degrees in accounting and finance, Tom later received his M.B.A. from the University of South Florida where he graduated with honors and became a member of the Phi Kappa Phi honors fraternity. Tom has held several certifications in software development and system design as well as achieving his Project Management Professional (PMP) certification.

BLOCKCHAIN NETWORKS

Blockchain is the distributed database that stores the bitcoin transactions and ultimately the network participant's balances. All participants on the bitcoin network have a copy of the database and therefore are aware of all the transactions made on the network. Although anyone can view the transaction history, the participants remain anonymous through use of a public / private key structure. Transactions are "broadcast" to the network and verified by "miners". Miners bundle transactions into blocks that are added to the chain and placed into the distributed databases.

The process by which transactions are validated, bundled, and added to the network is fairly complex. The short version is that miners solve increasingly complex mathematical formulas that "chain" transactions together in a sequence that is computationally verifiable. This structure deters fraudsters from being able to place fraudulent transactions into the chain since nonconforming transactions would not adhere to the sequencing and therefore be rejected by the network. For their work, miners are paid with new bitcoins and additional bitcoins are released into the network. At some point in the future there will be no new bitcoins to reward miners for their work. When this happens, miners will be rewarded only by fees that can optionally be added to transactions to expedite a transaction being added to the network. According to CNN/Money 25 bitcoins are mined every 10 minutes.



bitcoin transaction, which can take more than 10 minutes, has limited its POS acceptance at this time.

Speculators have also contributed to the allure of the bitcoin network. Although viewed by some to be peripheral players in the bitcoin network who have lived and died through bitcoin's sometimes volatile exchange rate fluctuations, speculators provide an important role in the bitcoin ecosystem. Speculators draw interest and provide a means to exchange fiat currencies for bitcoins. This allows transactors to utilize the network for its transaction capabilities without requiring them to maintain their positions in bitcoins. With a healthy pool of speculators, participants have the means to quickly exchange their currency of choice for bitcoins and vice versa.

Venture capitalists have been very active in the network. Their investments have been the driving force of innovation in developing technologies like bitcoin wallets, currency exchanges, network messaging, and countless other enhancements. Recently, venture capitalists have become really interested in blockchain technology. There are some that feel it is the blockchain, and not bitcoin, that is the real value of the network.

WHAT IS THE ALLURE?

Because bitcoin transactions are anonymous and not regulated, it has earned a somewhat notorious reputation as a favorite payment form for illicit activities (drug dealers, etc.) on the so-called dark web. Many believe that bitcoin payments have been used to fund terrorist activities. With bitcoin, it's easy to move money across international borders without being detected. There are no middle men, no banks or no transaction fees. Bitcoin can also provide utility when there is volatility in the local fiat currencies due to poor monetary policy or civil unrest.

Some merchants are drawn to the potentially lower transaction fee structure. Merchants wanting to accept bitcoin payments can work with companies like Coinbase and BitPay who are now among the largest bitcoin processors providing payment processing services for merchants. BitPay merchant processing mitigates bitcoin price volatility which allows merchants the ability to accept bitcoin and convert immediately to US Dollars or other currencies. Although, the lengthy processing times of a

WHY CREDIT UNIONS SHOULD CARE ABOUT BLOCKCHAIN

It is important for credit unions to know more about blockchain as a global cyber-technology so that you are fully prepared to capitalize on its benefits when presented. As we discussed, blockchain technology is a critical part of the bitcoin network but blockchain does not necessarily need bitcoin to provide utility as a standalone network. How bitcoin fares as a crypto-currency in the global economy is anyone's guess, but it would be tough to argue that the adoption of blockchain is going away anytime soon. The excitement around the use of blockchain as a way of sharing and transmitting data seems to be growing. This is easily seen by the staggering increase in investment in the technology as industries around the world try to find ways to take advantage of the benefits of blockchain technology. In fact, many believe this technology will transform banking and cyber security as we know it.

WHAT IS BLOCKCHAIN?

Blockchain in its simplest form is a network like any other network. Like email (SMTP) and the internet (HTTP), the blockchain can transmit and receive data. Where blockchain differs from other network types is with its distributed ledger concept. The distributed ledgers that reside within the blockchain network are very similar to accounting ledgers that record every transaction that takes place on the network. A copy of this distributed ledger is kept by every node of the network. Transactions are grouped into blocks which are then chained together to form a blockchain, also known as the distributed ledger. Using our email example from above, this would be akin to everyone that participates



in the email network having a copy of every email that was ever sent and in chronological order. Now that may sound a bit scary, but within the blockchain network there are ways to encrypt and validate data so that only the parties that need to see the contents of a transaction have the ability to do so and yet everyone can still agree to the validity of the data within blockchain. The distributed ledger provides the ability to ensure that everyone is in agreement with the chronology and the content of all transactions that have occurred on the network without the need for a central party to validate any claims.

TYPES OF BLOCKCHAIN NETWORKS

There are several types and instances of blockchain networks. Now that we understand what a blockchain network is, we can talk about a few different implementations and the usefulness they provide.

Private - As the name implies, private blockchain networks restrict participation and therefore are also sometimes referred to as "permissioned". This is in contrast to bitcoin's blockchain network which is open and does not restrict access.

Centralized - Blockchain networks can be implemented to have a central authority (centralized). This centralized authority can control many aspects of a network such as who can participate, what data can be sent, and who can read and validate the data on the network. These centralized/controlled networks work well in situations where all of the parties are known to each other and agree to the rules by which the network is intended to be used. This is in contrast to a decentralized blockchain implementation like the one utilized by bitcoin. In the bitcoin implementation of the blockchain, there is no governing authority and no one party can deny entry or change the rules within the network. In the bitcoin network participants called miners fill the role of a central authority. Miners perform the task of building the blockchain and validating the data in place of a central authority. Decentralized blockchain networks provide an open, free access to anyone that wishes to participate and is free of any one party dominating the network or changing the rules.

WHY DO WE NEED A DISTRIBUTED LEDGER NETWORK?

In many circles people believe that bitcoin/blockchain feels like a great tool without a problem to solve. With all the hype surrounding these topics it is certainly worthy of that discrimination. However, what we are beginning to see in the marketplace is an evolution in the blockchain network to make it more adaptable to real world problems, not only in financial services, but across governments and other industry segments as well. The real benefits of a blockchain type network seem to be coalescing around a few central themes.

Sharing of data - The unique ability for blockchain networks to share data among all participants while maintaining data validity has many real world applications. Blockchain provides a network where the data is available for all participants to see at little to no cost. There are many challenges that we face today around the availability of data that the data sharing nature of a blockchain network may be able to help solve. Digital healthcare records, transferring and verifying title and ownership of assets, collection and sharing of data in scientific research, the list can go on and on.

Open Access - Blockchain network's open access feature provides the ability to transact and share data with any party regardless of where they are and how they typically transact. Blockchain networks can break down the walls of our siloed, proprietary, and centralized networks that we use today. In fact, some of the more successful applications of blockchain networks do nothing more than connect closed networks to open them up to other networks around the globe. In essence, blockchain is opening up new markets that were previously not viable to reach due to high transaction cost, transaction latency, or complete inaccessibility.

Provide trust - Another unique ability of blockchain networks is the trust inherent within the network. Because all participants have a copy of all the transactions on the network, it is very difficult for any one party to hijack the network for individual gain. This allows the network to verify transactions without the need for all parties to come to an agreement on a central authority to validate all conditions of the transaction. This may lessen the burden on financial institutions and governments in the execution of contracts and transfer of assets in the future. Smart contracts, which can be executed in a blockchain network, allow parties to agree to terms and have the contract executed automatically on the network. This will allow exporters of goods and services to be



paid automatically once goods are received without escrow accounts and other expensive and lengthy constructs that we use today.

In the end, the unique ability for blockchain networks to provide a decentralized, open access transaction network while still maintaining a resemblance of a central authority to self-police the validity of the data on the network has many real world applications. This provides a network where anyone can transact with anyone in a free and open manner, available for all to see and validate at little to no cost and little risk of fraud and manipulation.

IS IT SAFE?

Just like any other network, it is important for participants of blockchain networks to understand the vulnerabilities that are inherent in the system. Depending on the type of blockchain network, these vulnerabilities can change. For example, private (permissioned) and centralized blockchain networks mitigate the risk of identity theft and fraud, whereas open, decentralized networks may be more concerned with open access and therefore do little to know the actual identity of a participant. It is also important to understand the impact on regulation and compliance when looking at various networks. Can data privacy laws be maintained? Are transaction insurance coverages voided when using various network types?

Many blockchain networks employ SHA-256 cryptography to protect data within the network. Use of public and private keys allow those participants on the network to see what they are allowed to see, while

protecting the data from the rest of the network. Even if encryption is employed, it may be important to understand what data elements within the network are encrypted, and what data elements are not.

While the consensus confirmation process does make tampering very difficult, it is still not foolproof. Blockchain networks can be vulnerable to a "51 percent attack," in which entities on a blockchain network band together to "take over" the network and form a majority with the intent to defraud the minority. Private blockchain networks and very large blockchain networks can minimize this risk.

WHAT SHOULD A CREDIT UNION BE DOING ABOUT BLOCKCHAIN?

While it is easy to get caught up in the excitement and the opportunity created by blockchain, it is important to understand the goals of any initiative and give consideration to the many options that may be available, not just blockchain. After all, blockchain is a means to an end. In most cases, blockchain concepts require scale and acceptance for their business models to work. There are many innovators doing the work for us. Some of these innovators are specifically targeting credit union issues. These credit union specific innovators may have insight into our industry that allow them to understand how blockchain strengths can benefit our unique issues. Their outside perspective may also give them the unique ability to generate the scale where a single credit union would be more challenged to do so.

In a recent article by CUNA, they feel that someone is going to capitalize on blockchain's financial services potential (the big banks), and that credit unions cannot afford to be excluded from the conversation. CUNA also says credit unions who ignore the blockchain, do so at their own peril and they suggest that you follow where the "smart money" is going. With credit unions working together, Blockchain may be a solution in the not so distant future.





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