The 5-Minute Guide to Blockchain Technology

- SPECIAL REPORT -

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It seems that everyone these days is talking about Bitcoin and how you can make a fortune investing in the cryptocurrency. However, even with the triple-digit increase in Bitcoin's value, the most significant opportunity, for businesses, is related to the technology that underlies Bitcoin. Blockchain technology is a public ledger that records every bitcoin transaction and is more than just a fad. The implications that blockchain has on everything from healthcare to voting will change life as we know it.

When the U.S. housing bubble burst in 2008, it underpinned the global financial crisis that caused the value of securities that were linked to U.S. real estate to plummet. The once easy access to subprime loans and the overvaluation of bundled subprime mortgages all depended on the idea that the housing prices in the country would continue to climb.

Ultimately, the Financial Crisis Inquiry Commission determined that the entire crisis was avoidable and was caused by the widespread failures in financial supervision and regulation. The reasons behind the financial crisis included subprime lending, easy credit conditions, and the growth of the housing bubble. At the time, the world believed that banks and financial institutes, that they had felt were considered trusted third parties were dependable. Unfortunately, the 2008 global financial crisis proved that intermediaries were fallible. The disaster resulted in widespread convictions, foreclosures, and extended unemployment and was considered the worst financial crisis since the Great Depression.

In response to the global financial upheaval, Satoshi Nakamoto wrote a white paper titled, Bitcoin: A Peer-to-Peer Electronic Cash System. The article suggested that "trusted third parties" could be eliminated from all financial transactions.

What is Bitcoin and How Does it Relate to Blockchain?

Bitcoin, is merely a peer-to-peer system for sending payments, that are digitally signed, to the entire Bitcoin network. It is essential to understand that when the "b" is capitalized, "Bitcoin" it is referring to the network. For example, I want to understand how the Bitcoin network operates. However, when it isn't capitalized, the word bitcoin is used to describe a unit of currency or account, as in, I sent one bitcoin to a friend. The digital signature in the transactions is created with public keys, which are given to anyone for sending assets, and private keys that are held by the asset owner.

The public ledger where the Bitcoin transactions are recorded is referred to as a blockchain. Bitcoin also runs on top of the technology known as blockchain. Blockchains are permission less public records, or permission less distributed databases, of all the transactions in chronological order. What blockchain technology essentially does is it creates a decentralized digital public record of operations that is secure and anonymous, as well as being tamper-proof and unchangeable. Blockchain technology can be applied to any industry where information is transferred. The sectors that could benefit from blockchain technology fall into the following five classifications.

* Currency, like electronic cash systems without intermediaries.
* Payment infrastructure for remittance and sending money in payment.
* Digital assets, or the exchange of information.
* Digital identity, with IDs for digitally signing to reduce fraud.
* Verifiable data, to verify the authenticity of processes or information.

What is Blockchain?

In simple terms, as stated earlier, blockchain technology is a ledger system that uses open, distributed records to keep track of transactions in everything from buying and selling cryptocurrencies, recording medical information, home records, and even voting.

The transactions are packaged into blocks, and each block of data gets verified by other users in the system by completing complex math problems. Once they verify a block, the information within that block can't be altered and gets added to the chain of other permanent blocks that have already been confirmed. The records that are held within the blocks form the blockchain. The blockchains users all keep track of the record. Essentially, blockchains are nothing more than giant, shared ledgers.

For the first time in history, blockchain technology removes the middleman from business transactions. This improves the value of existing products, services and interactions. With blockchain technology, you can’t spend money more than once by presenting a solution to ensure the authenticity of all assets and prevents duplicate expenditures in real estate, insurance, medical claims, voting ballots, and so much more.

Blockchain also works to establish consensus. In the new model, crowds are nothing more than networks of computers that work together to reach an agreement. When 51 percent of the computers in the system agree, a consensus has been reached, and the transaction can be recorded in the blockchain. Each computer in the network contains a full copy of the entire blockchain, which includes an infinite ordered list of transactions. If one computer attempts to submit an invalid transaction, a consensus would not be reached, and the transaction wouldn't be added to the chain.

There are four principles of blockchain networks that make them an ideal technology.

* Distributed: the blockchain is spread across all peers that are participating in the network. Blockchains are decentralized, and every computer has a copy of the entire blockchain.
* Public: while those participating in recording blockchain transactions are hidden, everyone who wants to can see all of the transactions that are included in the blockchain.
* Time-stamped: All of the dates and times of each transaction are recorded in plain view for anyone to see.
* Persistent: because of the consensus and the digital record, the transactions in a blockchain can't get misplaced, catch fire, or get damaged by water.

How a Blockchain Works

Although there are several different ways to set up a blockchain, Harvard Business Review laid out the following five principles that all blockchains have in common.

1. All blockchains use a distributed database. This means that every user in the blockchain has access to the complete database, including its past transaction history. This kind of transparency allows users to verify the information they need and complete transactions without any intermediaries.

2. Any communications and transactions get connected between peers. Each user of the blockchain stores records and sends information directly to all the other parties in the blockchain. Blockchain technology renders intermediaries, and central storage institutions are unnecessary. With blockchain technology, users have all the information they need to vet other users.

3. Even though blockchains are transparent, each user that is associated with the blockchain can remain anonymous. Each user has a unique, 30-plus character alphanumeric address that they use in place of their name to protect their identity. The alphanumeric number is also used to verify transactions in the chain.

4. The entire process can be automated using algorithms because blockchain uses a digital ledger. Today, when you purchase a house, you have to pay for a lot of small costs, like inspection fees, title registration, legal fees, and mortgage lender fees. There are numerous people involved to provide access, regulate, and administer the sale. However, with blockchain technology, a lot of this complexity is eliminated. The technology allows you to record property data and build smart contracts that will enable the system to transfer a property title or money for the purchase automatically.

5. One a record is created it can't be changed. When miners verify a transaction, the record is shared with everyone else on the blockchain as part of the decentralized ledger. A portion of each authenticated block is also then used to generate the math puzzle for the next block, resulting in each transaction getting linked to the ones before it. Then all of the transactions are stored across multiple computers so that there is no single point of failure.

Both public and private blockchains share these five characteristics but have one significant difference between the two. Public blockchains are open to the general public making it so that anyone can join, execute and verify transactions. With public blockchains, everyone who participates maintains a copy of the decentralized ledger. With a private blockchain, there is a limited number of participants who receive an invitation to join the network. Along with the increased security, private blockchains are more cost effective because less computing power is needed to verify the transactions on the smaller system.

Benefits of Blockchain Technology

Blockchains are complicated, there is no doubt about it, but they can also provide anyone who uses them with substantial benefits. One of the most significant benefits that blockchain has to offer is that it is an ultra-secure network. The data that is transmitted using blockchain technology is inherently encrypted, making them much more secure than the standard username/password security systems we are used to dealing with. However, the real security benefits come from the users on the blockchain network.

Blockchain Security

Since there is no single point of failure when using blockchain to store decentralized data, it makes it extremely difficult to hack. Under usual circumstances, a hack would need to overwhelm more than 50 percent of the network in order to break into a blockchain. And these needs to be accomplished in less time than it would take to create a new block. The amount of computing power to achieve this is tremendous.

It is also easier to detect when a block has been tampered with thanks to what is known as hash functions. Hashes from one verified block are added to the data in the next block. When someone tries to alter a block, they will end up completely changing the hash, which sets off a red flag, completely disabling the block.

Blockchain technology also offers anonymity. Rather than supplying your name, address, social security numbers and card numbers to verify transactions, you utilize private keys. Each blockchain user is given two keys, a public key, and a private key. Without a private key, it is impossible to verify transactions to the public address.

Smart Contracts

Currently, smart contracts represent the most significant application for blockchain technology. Essentially, smart contracts utilize blockchain technology to automate payments and transfers based on a set of conditions that have been predetermined. With smart contracts, you'd be able to pay your electric bill once your usage hits a predetermined amount. This can eliminate late fees and stolen financial information, and you wouldn't have to think about scheduling a payment again. Smart contracts will eventually eliminate the need for intermediaries to complete transactions.

Speed and Efficiency

Manual data entry is extremely tedious and is prone to error. Most companies today maintain multiple systems for recording data for different tasks. Reviewing the separate records takes a lot of time, but with blockchain, the information gets stored and verified as it gets generated.

The verification process of blockchain has many benefits as well. For example, it can take up to a week for a simple stock purchase to be verified using today's methods. With blockchain, you don't need a third-party to check the information because all of the information that you need to verify and complete the transaction are included in the ledger. This means that transfers of stock could happen instantaneously, rather than a week later.

Conclusion

The blockchain is an emerging technology that is still in its infancy. Before it becomes commonplace, it will take many years and buy-in from various industries. However, it's important to keep an eye on the developments as larger enterprise businesses begin to develop more blockchain applications. While you may still kick yourself for not jumping on the bitcoin wagon when it was still affordable, don't forget that the most rewarding technology, the blockchain, is still far from reaching its potential.

If you want to get involved with blockchain technology, the best advice is to continue to do your research and read up on the latest developments so you can place yourself in a position to take advantage of the continued excitement over blockchain technology and all of its future applications.