WHAT IS BLOCKCHAIN—AND WHY DO I NEED TO KNOW ABOUT IT?

BY ABBAS FOROUGHI

Blockchain is a new digital technology developed in 2008 that has already been implemented in the financial world, with digital currencies like Bitcoin, Litecoin and Ethereum, and will soon impact the life of the average person.

At the core of blockchain technology is a publicly shared, permanent digital ledger. Until blockchain, ledgers were usually controlled by a single entity and could be manipulated without others knowing. Today's private ledgers, whether in banking, real estate, taxes or health care require us to 'trust' the organization that controls it. This middle-man model has made many global organizations very powerful, since individuals are required to use it to execute a transaction. However, networks of privately controlled ledgers, that are not connected to each other, cause transactions to take a long time to execute.

This is why blockchain has so much potential. Blockchain can be described as a public spreadsheet that is duplicated thousands of times across a network of computers and regularly updated, somewhat similar to the dynamic updating that occurs in Wikipedia. With blockchain, information and transactions are reconciled into a public database that is stored in multiple locations, updated and time-stamped with new blocks of information every 10 minutes, making the records public, permanent and verifiable.

Each block is a record of new transactions that occur in a specific time frame. A bank is not needed to verify the transfer of money or take a cut of the transaction, and blockchain is harder to hack since the information exists simultaneously in millions of places. To further secure this public ledger, encryption keys are created for each entry that tie it to the next entry, forming a chain of interconnected entries to the ledger. Every block gets a unique digital signature or cryptographic hash that corresponds exactly to the string of data in that block. Any attempt to modify an entry would result in the breaking of the chain, which would be noticed by the millions of other connected ledgers that had the authentic entry. The offending computer would be kicked from the ledger.

Blockchain has already begun to be used for more than just currency and transactions. IBM has 1,000 employees working on blockchain-powered projects and is investing $200 million for development. Financial and tech firms invested an estimated $1.4 billion in blockchain in 2016, with an increase to $2.1 billion in 2018. At the same time, the number of openings for employees with blockchain technology expertise in startups, tech companies and government are increasing rapidly.

Here are just a few of the many potential applications of blockchain technology:

• **Financial transactions**: Transferring funds to another bank will occur instantaneously.
• **Eliminating the middleman**: Peer-to-peer payments enabled by blockchain OpenBazaar technology enables customers to avoid charges for services like Uber and AirBnB.
• **Voting security**: By making the results fully transparent and publicly accessible, distributed database technology can improve the reliability of the voting process.
• **Stock Trading**: When executed peer-to-peer, trade confirmations become almost instantaneous (compared to three days for clearance by a clearing house, auditors and custodians).
• **Product Authenticity**: Distributed ledgers that detail supply chains help certify that the backstories of items customers buy—high-end fashion items, food, pharmaceuticals—are genuine.

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BLOCKCHAIN

BLOCK

NODE

CONFIRM

LEDGER

DISTRIBUTE

TRANSACT

PROOF

MINE

REWARD