

ABUZZ ABOUT BLOCKCHAIN TECHNOLOGY



WHAT IS BLOCKCHAIN TECHNOLOGY?

Have you heard the buzz about blockchain? It's the online record-keeping technology used to create and trade cryptocurrency. While initially used as the online public ledger system for Bitcoin, blockchain is emerging as a potentially valuable innovation across many other industries. It could even become the new standard for how companies store, track, and extract data. In fact, Executive Chairman of the Blockchain Research Institute Don Tapscott in a 2018 interview with website 52 Insights, made the bold claim that "blockchain represents the second era of the internet."

To understand blockchain's growing appeal, let's go back to the 1990s and the birth of the internet age. While the internet ushered in untold opportunity, it also posed never-before-seen challenges. Among them? How to ensure the integrity and safety of purchases and personal information online. Of special concern was how to help parties unknown to each other securely conduct transactions with one another. That's where blockchain, or distributed ledger technology, comes in.

Blockchain gives anonymous parties the comfort of being able to exchange assets with one another without

first having to establish a relationship. Tapscott referred to blockchain as the "trust protocol."¹ To understand why, one needs to know how it works.

HOW BLOCKCHAIN WORKS

Unlike traditional databases that compile information in tables, blockchain collects information in groups referred to as blocks. New information gets added to a fresh block, and when the block is full, it gets linked—or "chained"—to the previous block.

Once new information has been added to the chain, it is impossible to alter. In other words, transactions get permanently recorded in the order in which they happen. That's because each block contains a distinct code called a hash. Hash codes are encrypted codes that connect the blocks using an exact time-stamp format.

Each block has its own hash code and also references the hash code of the previous block. So, a new block gets added to the previous block in precise chronological order. This process happens again and again, resulting in one long chain of unbreakable, immutable transaction records. Hence the name, blockchain.

¹ Don Tapscott 'Blockchain represents the second era of the internet.' (2018, April 5). 52 Insights. <https://www.52-insights.com/don-tapscott-blockchain-represents-the-second-era-of-the-internet-interview/#postComments>

WHAT MAKES BLOCKCHAIN SECURE? THE NODES KNOW

Unlike traditional databases that store information on private servers owned by a single entity, a blockchain is distributed and public. Computers are still needed to store a blockchain, but—as in the case of Bitcoin—those computers are in different places and owned and operated by different individuals. Each computer, called a node, contains the full record of transactions stored in the blockchain.

The nodes maintain blockchain security by unanimously authenticating and authorizing transactions. Because

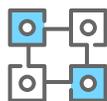
each node stores the blockchain's entire history, it can validate new transactions or pick up on attempts to manipulate blocks by cross-referencing all the other nodes in the network.

Once a transaction is unanimously verified by the network, it gets added to a block using a hash. That block then gets chained to the previous block to create the chronological history of transactions. In this way, the provenance or ownership of the asset being bought or sold is transparent and verifiable in real time.

HOW BLOCKCHAIN WORKS STEP-BY-STEP



1. A transaction is requested.



3. The network verifies the transaction, providing consensus.



5. The new block is added to the block-chain in precise chronological order using the hash.



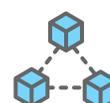
7. The transaction is complete.



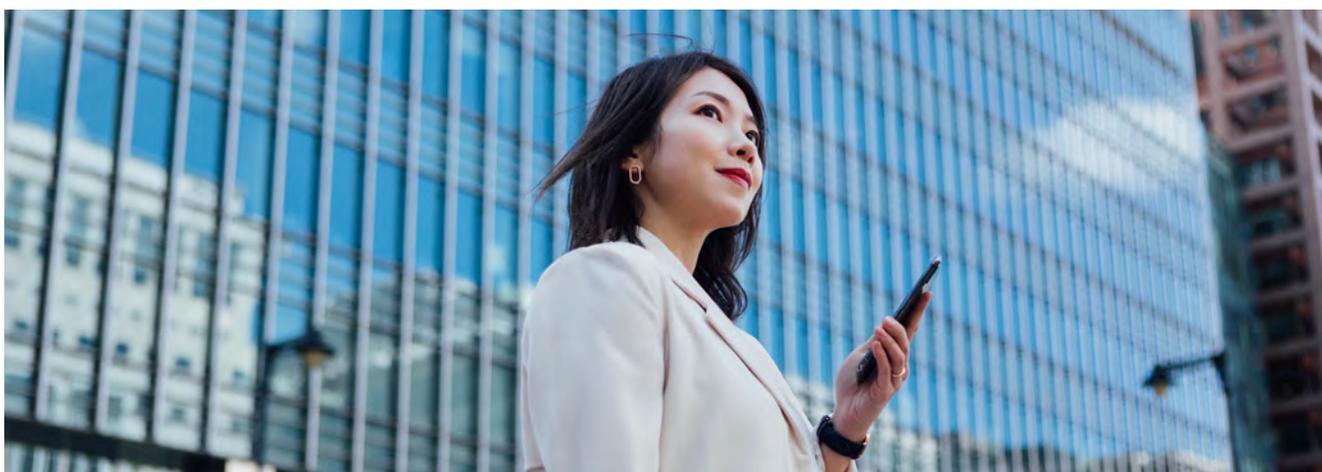
2. The transaction gets distributed across a peer-to-peer network of computers called nodes.



4. Verified transactions are added to a new block. Each new block contains a unique code called a hash—and also contains the hash of the previous block in the chain.



6. A copy of the blockchain gets updated across the network of nodes.



PROPERTIES OF BLOCKCHAIN TECHNOLOGY

Secure and Time-stamped

All records are individually encrypted and a timestamp is added to each block.

Immutable

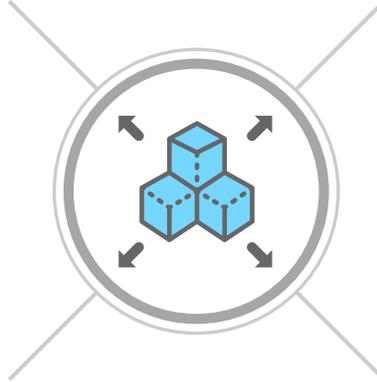
Validated transactions, or records, are permanent and unalterable.

Distributed and Transparent

All of the nodes in the network have a copy of the blockchain for complete transparency.

Unanimous

The network reaches consensus as to the validity of transactions or records.



WHY IS BLOCKCHAIN A GAME-CHANGER?

Blockchain's inherent security is what makes the technology so disruptive. Traditionally, when financial institutions transfer assets like stocks, securities, or real estate, they use a trusted third-party intermediary to process the transaction. Why? Because they don't know or, more aptly, trust the market participants. But intermediaries charge fees. That's where blockchain disrupts.

Because of its ability to transparently verify transaction history, blockchain eliminates the need for trusted third parties and their associated fees. This could make transactions both cheaper and faster.

DRIVING VALUE BEYOND CRYPTOCURRENCIES

The simple truth is blockchain's potential may be limited only by the human imagination. People and institutions are just now beginning to uncover its potential value.

GLOBAL MANUFACTURING AND SUPPLY CHAIN MANAGEMENT

Blockchain could revolutionize supply chain management. Global manufacturers, for example, are exploring using blockchain to monitor and increase their supply chain efficiency via improved transparency, quality assurance, asset tracking, material origin, counterfeit detection, and regulatory compliance.



HEALTHCARE

Blockchain could disrupt healthcare by enabling patients, doctors, and providers to share information faster and more cheaply—all while maintaining the integrity of health records and strict compliance with regulations.

BANKING

More than 1.7 billion adults worldwide do not have a bank account. While a portion of this population doesn't have the money to use a bank at all, many simply lack access to financial services infrastructure. Blockchain technology that enables trusted peer-to-peer transactions could increase the ease and efficiency with which these individuals can exchange assets, potentially helping to reduce the financial gap between emerging and developed economies.

AIR TRAVEL

For the tightly regulated airline industry, which is focused on safety and burdened by high fixed costs, blockchain has the potential to improve the customer experience and boost operational efficiency. Blockchain-enabled “smart contracts” could automate the booking process and, as a result, alleviate the risk of errors.

Airlines may be able to use the emerging technology to improve the accuracy of aircraft maintenance reports, such as fuel logs, airline part depreciation, and equipment availability. It could even facilitate improved ground operations and on-time departures by verifying completed milestones on the detailed flight checklist in real-time.

ONLINE RETAIL

Blockchain's ability to facilitate better inventory management could transform retail. Manufacturers and retailers could increase end-to-end production capabilities through a transparent, multilevel blockchain system. Businesses may be able to use blockchain to expand their product reach by decentralizing how retailers showcase their products. This is already at work today in how Amazon recommends products based on your search and order history.

Potential applications for this innovative technology go well beyond even the examples above—everything from identity management and voting technology to music royalties tracking, and wills and estates.

HOW BRIGHT IS BLOCKCHAIN'S FUTURE?

The bottom line is that transparency in transactions keeps both buyers and sellers better informed and more honest. Because blockchain is transparent and can't be easily manipulated to the advantage of either side of the transaction, it's a near-perfect record-keeper for almost any type of asset. That makes it one of the more exciting and innovative technologies to emerge in the last 20-plus years.

Bitcoin brought blockchain into the mainstream, but its promise extends well beyond crypto or currency investing. Its potential to improve efficiency for so many different businesses should lead to higher profits—and stock prices—for companies able to implement it successfully.

ⁱⁱ Source: Global Findex database

SHOULD YOU INVEST IN BLOCKCHAIN?

While we expect investment in blockchain technology companies (and companies successfully using blockchain) to increase, it's not our intent to recommend specific stocks here. In fact, stock prices have likely already adjusted upwards for those companies and industries poised to take advantage of this new technology.

We do think that investors should be aware of blockchain, however, given its potential to transform how business gets done: It has the promise to stimulate growth both for a single company and entire industries.

We believe investors who are broadly diversified across many different industries will be best-positioned to capture this growth, including any blockchain-related surprises to the upside not yet priced into the market.

What's the best way for an investor to create a well-diversified portfolio—one that manages risk, while still capturing market upside? Work with your financial advisor. Not only do they have investors' best interests at heart, they also have the knowledge and skills to answer questions you may have about your overall financial plan.

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in capital raising and financial markets, it can be a challenge for investors to verify information about these products to make informed decisions. The markets for digital assets continue to display high levels of volatility, involve speculative risk and the potential for fraud. All investments come with some degree of risk, and cryptocurrencies are no exception.

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