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Q&A

January 2016

What is blockchain?

At a very high level, the blockchain is a decentralized ledger, or list, of all transactions across a peer-to-peer network. This is the technology underlying Bitcoin and other cryptocurrencies, and it has the potential to disrupt a wide variety of business processes.

If the Internet is the foundation for digital innovation of all kinds, blockchain technology is the underpinning of a radical rethinking of how we pay for things—as well as how we verify who owns what and who has the right to buy and sell it.

The details of blockchain technology are complex, although a *lucid overview*[1] from The Economist offers a way in. At a very high level, though, the blockchain is a decentralized ledger, or list, of all transactions across a peer-to-peer network. This is the technology underlying Bitcoin and other cryptocurrencies.

Using this technology, participants can transfer value across the Internet without the need for a central third party. The buyer and seller interact directly without needing verification by a trusted third-party intermediary. Transactions are not anonymous, but they are pseudonymous: a transaction record is created, but identifying information is encrypted, and no personal information is shared.

[1] "How the crypto-currency could become the internet of money," The Economist, March 15, 2014, www.factiva.com, accessed on January 19, 2016.

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Questions and answers

Q: I get that it's a ledger, but what does blockchain technology really mean for financial institutions?

A: From a business perspective, it's helpful to think of blockchain technology as a type of next-generation business process improvement software. Financial institutions are realizing that, after several decades of internally focused business process software investments, it's time to look for efficiencies outside their own four walls.

Collaborative technology, such as blockchain, promises the ability to improve the business processes that occur between companies, radically lowering the "cost of trust." For this reason, it may offer significantly higher returns for each investment dollar spent than traditional internal investments.

So what's the catch? You cannot get the return by yourself; you must be willing and able to collaborate with customers, suppliers, and competitors in ways that you have never done before.

Q: What challenges and opportunities does this technology pose for financial institutions?

A: The challenges: Financial institutions such as banks and brokerages have long held the position of the trusted third party validating the authenticity and accuracy of a transaction. Blockchain significantly alters the need for this trusted third-party middleman.

The opportunities: With the ownership and provenance of a transaction recorded in the blockchain at the earliest stages of a transaction and verified at every subsequent stage, agreement among all parties involved in a transaction is guaranteed. And because the blockchain can record and authenticate every stage of a transaction, it could theoretically be used to secure and verify any type of transaction, from simple goods-for-cash exchanges to complex transaction management, without any third-party interaction.

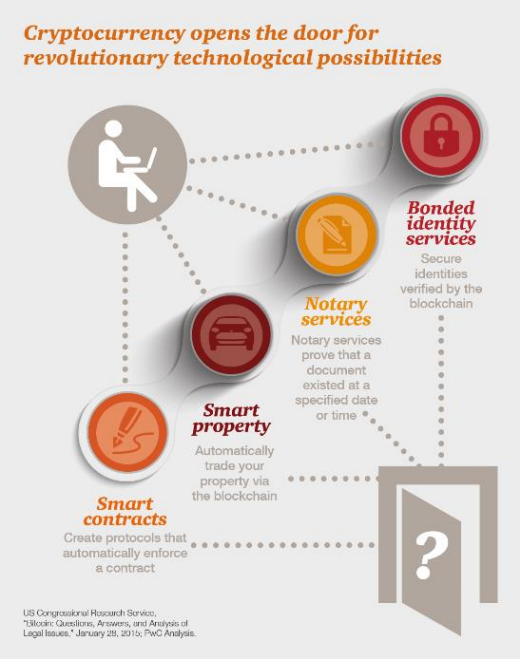
Q: How is blockchain related to Bitcoin?

A: Blockchain is the technology that enables the existence of cryptocurrency. Bitcoin is the name of the best-known cryptocurrency, the one for which blockchain technology was invented. For consumers, cryptocurrencies offer cheaper and faster peer-to-peer payment options than those offered by traditional financial services businesses, without the need to provide personal details.

While cryptocurrencies continue to gain some acceptance as a payment option, price volatility and the opportunity for speculative investments encourage consumers not to use cryptocurrency to purchase goods and services, but rather to trade it. However, cryptocurrencies carry groundbreaking potential to allow consumers access to a global payment system—anywhere, anytime—in which participation is restricted only by access to technology, rather than by factors such as having a credit history or a bank account. For a detailed discussion of cryptocurrencies, please read *Money is no object: Understanding the evolving cryptocurrency market.*

Q: What is the disruptive potential of blockchain technology?

A: In our view, the technology that underlies cryptocurrency has the potential to disrupt a wide variety of transactions beyond the traditional payments system. Financial services organizations could use the blockchain anywhere records are stored digitally and in any type of transaction that currently needs to be verified by a trusted third party (see figure). These transactions include but are not limited to transferring digital or physical assets, protecting intellectual property, and verifying chain of custody. In an era of cybercrime and stringent regulatory requirements, a highly fraud-resistant system for protecting and authenticating almost any kind of transaction could have a revolutionary impact on the financial industry.



Q: What are some potential applications of blockchain technology?

A: In the financial services industry, blockchain technology is already being implemented in innovative ways. For example, the New York-based exchange and clearinghouse Nasdaq recently unveiled a blockchain-based system for its Nasdaq Private Market, which connects institutional investors with companies that are not yet listed on a public exchange. The new system offers electronic services to facilitate the issuance, transfer, and management of private company securities. The firm has even named one of its vice presidents its Blockchain Technology Evangelist.

Numerous other exchanges and banks around the world, including the London Stock Exchange, CME Group, Societe Generale, and UBS, have formed the Post Trade Distributed Ledger Working Group to investigate how blockchain technology can be used to enhance clearing, settlement, and reporting of trades. Citigroup, Barclays, and Deutsche Bank are among the banks investigating incorporating blockchain into their payments system. Further, Goldman Sachs recently filed for a patent on its virtual currency, which the firm calls "SETLcoin."

Blockchain is spreading beyond the financial services industry. At a TechCrunch Disrupt London event in December 2015, for example, Grammy-winning musician Imogen Heap lauded its potential for ensuring fair compensation for musicians, saying, "The biggest problem for an artist right now is payment. [Blockchain] could spark up many new platforms and services that would enrich all of our lives."[2] And the top prizewinner at a blockchain hackathon in early November 2015 was MedVault, a proof-of-concept that would let patients use the technology to store their own medical history securely while creating rules to control who can access it, in an emergency or otherwise.

In future publications, we'll explore the impact of blockchain on insurance, asset management, retail banking, capital markets, and real estate. Expect surprises and innovative new solutions as the technology continues to evolve and mature.

[2] Yessi Bello Perez, "Grammy Winner Imogen Heap: Blockchain Tech Can Empower Artists," CoinDesk, December 9, 2015, http://www.coindesk.com, accessed on January 20, 2016.

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Additional information

For additional information about this **FinTech Q&A** or PwC's FinTech Practice, please contact:

Haskell Garfinkel
(408) 534-4727
haskell.garfinkel@pwc.com
https://www.linkedin.com/in/haskellgarfinkel

Jeremy Drane
(612) 596-6377
jeremy.r.drane@pwc.com
https://www.linkedin.com/in/jeremydrane

Contributor: Cathryn Marsh

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Marie Carr
Principal

Cathryn Marsh
FSI Leader

Kristen Grigorescu
Senior Manager

Greg Filce
Senior Manager

Ryan Alvanos
Senior Manager