

CPAs leveraging blockchain TECHNOLOGY

EXECUTIVE SUMMARY

Blockchain has been around for a decade, yet for most of that time it was anything but a topic of mainstream attention. That has changed dramatically in recent years. Today, many view blockchain as one of the emerging technologies most associated with words such as “disruption,” “elimination,” and “transformation”.

There’s no question blockchain has the potential to significantly alter the way many professions operate, including accounting.

This report provides an overview of what blockchain technology is, the changes it could bring, as well as the impact it is already having on the profession. Key areas of disruption are explored in-depth, as are key areas of opportunity.

Often, these go hand-in-hand. While the technology has the potential to eliminate tasks currently performed by accountants, such as data integrity, it could also vastly expand the types of documents and systems that accountants need to assess, such as smart contracts. Other functions, such as the traditional audit, will be transformed. “In an immutable blockchain world, the challenges of reconciliation and error checking begin to approach zero,” Ron Quaranta, the founder and chairman of the Wall Street Blockchain Alliance (WSBA), says.

These coming changes will force accountants to ask themselves important questions, Quaranta continued, namely, how do you do what you do, and why do

you do it? Blockchain reduces a firm’s ability to simply rely on, “well, that’s how we’ve been doing it for X number of years.” As a symbol of disruptive change, it creates an opportunity for firms to reassess their strategy for incorporating emerging technologies. The role accountants play in clients’ lives won’t be diminished, but it will change. Firms that are alert and prepared for this reality have a lot to gain.

In addition to the changes and opportunities blockchain presents, this report highlights some of the additional resources and initiatives the AICPA and CPA.com are taking to ensure the profession stays informed and can better serve their clients.

This past May, the AICPA and CPA.com, in partnership with the WSBA, held the first Blockchain in Accounting Symposium¹. The event was a one-day brainstorming session that brought together more than 60 leaders in accounting to map out how the accounting profession can advance blockchain as a united front. Insights and key initiatives discussed at the Symposium are included throughout this report.

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BLOCKCHAIN

You've likely heard the term before, perhaps in connection with Bitcoin or another digital currency. But it is blockchain, the technology behind Bitcoin, that has the potential to change the way the world does business. Before we get into its applications and future use cases, we need to answer some important questions, starting with:

WHAT, EXACTLY, IS BLOCKCHAIN?

Blockchain is a distributed public ledger that makes a record of every new transaction and adds it to a chain of all the transactions that have come before. This chain of transactions exists as a database shared by a distributed network of computers, which can run into the hundreds of thousands.

The blockchain network makes additions by consensus methodology. New transactions, which are grouped together to form a "block", are regularly authenticated and verified by the network via a predetermined mechanism before they are added to the public ledger. Once this happens, the record is immutable – it cannot be altered.

WHY IS EVERYONE SO EXCITED ABOUT BLOCKCHAIN?

In short, the technology has the potential to change the way a variety of systems work, including (potentially) the Internet itself². Blockchain replaces a singular record of information with a shared database that is distributed across a network of computers, a format that elegantly solves some fundamental problems with how sensitive data is stored today. Because of its distributed nature, public blockchains aren't owned by anyone. This also means they lack a single point of failure, which makes them remarkably resistant to hacking and fraud. All Bitcoin transactions, for example, are verified before the new version of the ledger is confirmed, which means a user can't send

someone else money or another value representation unless she actually has the assets available in her wallet. What's more, since new blocks of information are written and affirmed to the blockchain by consensus, if someone tries to alter information on the blockchain, the network of computers won't agree with the fraudulent version of the ledger, and it will be rejected.

In this case, "The only ledger you would have screwed up is your own," says Rod Brennan, an adjunct professor at Rutgers University and the audit technologies director at Libra³, a middle and back office technology provider that collects, standardizes, reconciles, processes and reports audit-ready financial and operational information.



BITCOIN VS. BLOCKCHAIN

Despite the potential of its underlying technology, blockchain for many people is still synonymous with Bitcoin and the cryptocurrency's spectacular rise in value. (From May to December 2017, Bitcoin's value rose from under \$2,000 to just over \$19,000. Since then, Bitcoin's value has weathered a series of dramatic ups and downs⁴.)



Created in 2008 by a person (or persons) known only by the alias "Satoshi Nakamoto," Bitcoin "was the first open-source, publicly available cryptocurrency that leveraged a global blockchain to exist," Erik Asgeirsson, CPA.com CEO says. "Everything happening since then have been iterations of that original blockchain implementation for Bitcoin."

Despite its significance, Bitcoin is something of a red herring in the blockchain discussion. Bitcoin is simply one implementation of the disruptive technology. Since its creation, there have been hundreds of additional ones, the most famous being Ethereum, a decentralized platform that allows for the creation of smart contracts and distributed applications. In other words, blockchain's transformative power and potential applications are so much bigger than Bitcoin's, or any other individual network. "You can have blockchain without Bitcoin," explains Quaranta. "You cannot have Bitcoin with-

out blockchain."

Bitcoin's underlying design is nonetheless important to understand, as it's been copied by various other blockchains. New versions of the Bitcoin ledger are validated via complex mathematical calculations solved by a network of computers, for example. The first computer to come up with the solution to the problem is rewarded with a small amount of Bitcoin, in amounts that have gradually decreased as the blockchain has matured.

Other blockchains have issued their own tokens; as of this writing, there are more than 1,600 of them. Startup founders have started holding ICOs, in which they create their own cryptocurrency, or tokens, and sell them to raise money for their business in exchange for Bitcoin or Ether. ICOs have, unsurprisingly, been used to fund outright scams in addition to legitimate businesses.

According to the SEC⁵, "While these

digital assets and the technology behind them may present a new and efficient means for carrying out financial transactions, they also bring increased risk of fraud and manipulation because the markets for these assets are less regulated than traditional capital markets." That said, regulators are beginning to crack down⁶ on the practice.

A quick note about public blockchains versus private blockchains⁷. Blockchains can be public, which means the distributed network has no access restrictions. Anyone can join.

This openness is powerful: New blocks are added by consensus, and because the network is so big, it's virtually impossible for any person or entity to seize control and manipulate the ledger. Bitcoin and Ethereum are examples of high-profile public blockchains⁷; I'd suggest we say "...because these networks can become very big...", simply because all public blockchains start small and need to grow over time. They are not automatically large scale networks.

Blockchains can also be private, in which case access is permissioned and determined by an individual, company, or groups of entities. Private blockchains allow companies to use the technology to optimize internal operations without forgoing control or publicizing too much information. Ford, Walmart, Visa, and Maersk, among other Fortune 500 companies, are using private blockchains⁸ in some capacity.

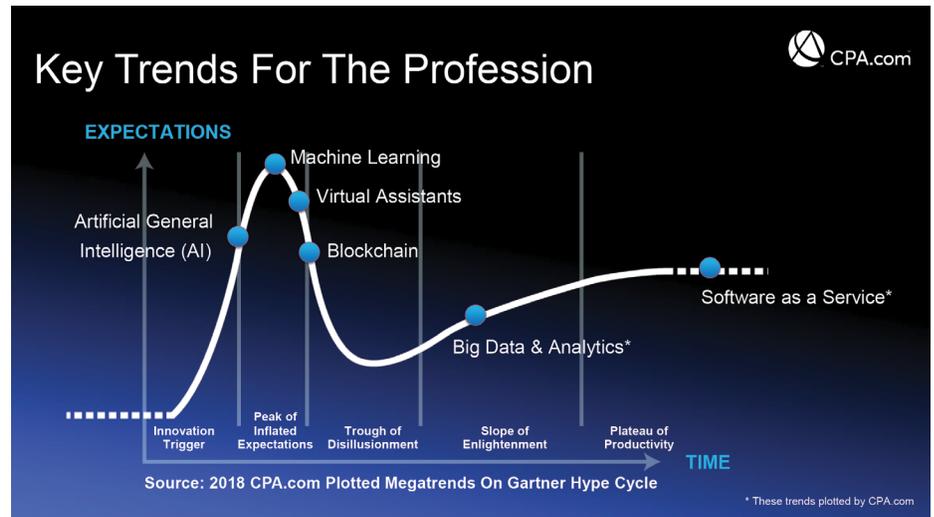
BLOCKCHAIN IN REAL LIFE

Already, blockchain is being incorporated across a variety of industries. Perhaps the most obvious uses are in financial services. Blockchain could allow banks and other financial institutions to eliminate the middlemen and transfer assets to one another directly.

In May, the banks HSBC and ING announced⁹ they had completed the world's first financial trade on a single blockchain (the transaction was related to a shipment of soybeans.)

But blockchain's applications extend far beyond Wall Street. Companies have already begun using the technology¹⁰ to track inventory (including livestock and diamonds), streamline the supply chain, execute contracts, distribute medicine¹¹ and grant diplomas¹². In the future, blockchain technology could facilitate direct interactions and payments between individuals, eliminating the need for third-party sharing economy companies¹³ such as Uber and Airbnb.

Despite its potential, it's important to note that blockchain is still in its infancy. Historically, when a revolutionary technology is introduced, there is a period of frothy speculation. More often than not, real-life adoption takes longer than predicted. There's even a name for this phenomenon: The hype cycle¹⁴. Coined by the research and advisory firm Gartner, the term refers to the five phases emerging technologies typically pass through: innovation trigger, peak of inflated expectations, trough of disillusionment, slope of enlightenment, and, finally plateau of productivity.



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According to this methodology, expectations spike after a new technology is triggered, but inevitably fall as progress is stalled by kinks and obstacles. Some technologies never recover, and fizzle into obscurity. Others weather the setbacks, and eventually prove out their value. As of Gartner's 2018 report on emerging technologies¹⁵, blockchain is entering the "trough of disillusionment" phase of the hype cycle.

Indeed, a blockchain backlash already exists, with some experts arguing that a) the technology is not as revolutionary as it's being portrayed¹⁶, b) its applications won't play out for years to come¹⁷, or c) it will have unintended, unwanted consequences¹⁸.

Quaranta, of the WSBA, disagrees with the skeptics. "I can't emphasize this enough. What's happening in the blockchain space may sound like hyperbole, but it's moving faster than anything I've ever seen."

BLOCKCHAIN & THE PROFESSION

According to Libra's[†] Brennan, there's a perception among the profession that blockchain is a theoretical technology, years away from implementation. In reality, it's already here. "People have made millions in the last six months from crypto," he says. "And they have real tax issues."

Indeed, CPAs have begun fielding questions regarding how to report crypto assets. As cryptocurrency continues to move into the mainstream, these will become more commonplace. The AICPA is currently working to develop guidelines and educational materials to help CPAs better understand the technology, as well as how it impacts their clients.

On its face, the reporting process is relatively simple – cryptocurrencies are defined as intangible assets¹⁹. A sale is a taxable event, and capital gains are handled accordingly.

In reality, it can be difficult to track and validate the sale of cryptocurrencies.

Whereas in most areas of online life, we use usernames and passwords to identify and protect our identities, on the blockchain, information is encrypted and unlocked via public and private keys. A private key is like a password,

and should never be shared. A public key corresponds to a user's address on the ledger. A public identifier, it can be used by third-parties to track transactions.

Accountants can therefore trace and document clients' crypto activity by obtaining their public keys. This is often easier said than done, however. While the public ledger includes basic information about each transaction, including a time stamp and the public keys involved, it does "does not contain information on how much the cryptocurrency was worth on that particular date," Brennan says. As a result, once a client's data has been pulled from the ledger, it will likely need to be enriched before it can be reported.

In addition, while professional exchanges such as Coinbase provide tax reports, exchanges in other countries often "don't care about American tax-

ation rules," Quaranta says, making it nearly impossible for CPAs to get a relevant tax information.

Finally, for traditional assets, a client's holdings and identity are verified by a third-party report. There's no way to do this on the blockchain. A client can provide her public key, but that does not verify that she actually owns it. The only way she can prove ownership is by handing over her private key, which creates "a cybersecurity nightmare," says Quaranta. Obtaining a client's private key is the rough equivalent of accessing her password, social security number, and anything else you need to gain blanket access to her assets.

These issues reinforce the need for professional standards or guidelines.

[†] Libra is a leading provider of software and data to support operations for the crypto asset ecosystem.





BEYOND CRYPTOCURRENCY

In the future, the technology's influence could extend far beyond cryptocurrency. In a breakout discussion at the Blockchain in Accounting Symposium Amy Pawlicki, CPA, the AICPA's Vice President of Assurance and Advisory Innovation, equated blockchain's impact to that of the cloud: "Totally transformational in terms of how we do our jobs across the profession."

Like all emerging forces, blockchain can be intimidating. But as we've seen with the adoption of previous technologies – again, notably the cloud – disruption also enables firms to enhance their services and gain a strategic advantage.

"Seven years ago, people were saying the cloud would automate the profession," Asgeirsson said at the symposium. While cloud computing has fundamentally reshaped many aspects of the job, it has also empowered CPAs to transition from bookkeepers to trusted advisors. "That's how we see blockchain," Asgeirsson continued. Instead of eliminating the audit, "we think it's going to make the role of the auditor better."

Already, companies using private blockchains are turning to accountants and asking them to verify and legitimize the technology. "We know firms that are executing on how to do assurance related to private blockchains, and their billable rates are pretty good," Asgeirsson said. "This is an opportunity."

BLOCKCHAIN & ACCOUNTING

Blockchain could transform accounting entirely. This sounds dramatic, perhaps, but the technology has the potential to upend the double-entry system, which forms the bedrock of modern-day financial reporting.

Using blockchain, corporations and consortiums are able to create immutable but continually-updated financial records that are easy to verify and difficult to tamper with, thus, enabling them to build more secure, transparent frameworks for monitoring transactions and assets²⁰. And because blockchains are living, secure records, they eliminate much of the manual labor involved in traditional financial reporting.

BLOCKCHAIN & THE AUDIT

A distributed, immutable ledger of all transactions, blockchain technology could disrupt the audit process²¹. While today, auditors comb through randomly selected samples from financial statements, on the blockchain, financial data could be audited in its entirety. What's more, instead of performing audits at the end of a financial quarter or year, audits could occur on a close to real-time basis. Such a robust and up-to-date system would provide a higher degree of assurance, making it far more difficult for mistakes, anomalies, and fraud to slip through the cracks. In lieu of the four-eye principle, "on a blockchain you have hundreds of thousands of eyes looking at every transaction," says Libra's Brennan.

As blockchain technology evolves and is integrated into more operations, the audit could become a fully automated, continual process. As a result, the costs associated with sampling and validating transactions would fall significantly (if not dissipate entirely), as would the time partners need to spend on the process, freeing them to focus on other areas²², such as managing complex transactions and investigating anomalies.

CHALLENGES

On a public blockchain, there is no third-party that can intervene to fix a mistake should one occur. For example, if an amount of Bitcoin is inadvertently or fraudulently sent to the wrong account, the transaction cannot be reversed.

As a result, auditors must assess the blockchain itself to ensure the protocols, i.e. the rules that govern the blockchain in question, are sufficient to prevent activities such as fraud and ensure that the in-

formation included on the ledger is trustworthy. This is particularly vital for private blockchains. As more companies store and track information on digital ledgers, auditors will also need to assess whether a blockchain's consensus code and protocols provide adequate safeguards against manipulation and fraud.

"A blockchain makes a claim that its immutable. That's not something we've ever addressed in our accounting standards," Will Bible, an audit and assurance partner at Deloitte & Touche LLP, said during a breakout discussion at the Symposium. "The technical task that needs to be solved is, when does a record or entry into a blockchain in-and-of itself constitute sufficient evidence?"

In other words, because of the nature of the technology, a blockchain's code and consensus protocols need to be audited as an assurance that all information contained on the ledger is accurate and trustworthy. Once this verification is made and the information on the ledger is deemed immutable, the audit becomes a much simpler process. Firms are already providing tools²³ and assurances for auditing information on private blockchains.

Audits for public blockchains such as Bitcoin could prove more difficult. On one hand, Bitcoin's protocol and consensus

codes have proven impressively hacker and manipulation-resistant. However, it's unclear who would pay for a firm to audit these controls. The beauty and power of Bitcoin, after all, is that no one owns it. Auditing Bitcoin "would be like auditing the Internet," Brennan said in the breakout session.

NEXT STEPS

In order to integrate blockchain technology into the audit process, a set of auditing standards could be developed.

Reaching a consensus is paramount, said Bible. "The way we protect ourselves as an industry group is to have standards." Once these are in place, CPAs can focus on additional pressing questions, including how to identify and verify ownership of assets on the blockchain.

Unlike paper statements, which clearly list an asset's owner, identities on the blockchain are often anonymous. "How do I know that you are who you say you are?" asked Jay Schulman, a principal at RSM, during the breakout session. Additionally, how should auditors go about verifying balances or the number of wallets owned by an individual or corporation? Before these questions can be addressed, the profession must first de-

velop standards to assess the immutability of various blockchain networks.

Again, blockchain is in its infancy. There is nothing approaching a consensus as of yet. In the interim, several of the larger accounting firms are devising their own guidelines.

SMART CONTRACTS

A smart contract²⁴ is a computer program stored on a blockchain that automatically transfers digital assets from one party to another provided certain encoded conditions are fulfilled, eliminating the need to for a middle-man to facilitate the transaction (thus reducing costs and avoiding potential conflicts).

While Bitcoin does not allow for the creation of smart contracts, the open source blockchain project Ethereum does. At the moment, the majority of smart contracts executed on Ethereum are relatively simple, triggered by If/Then conditions. But in future, use cases could grow more sophisticated²⁵.

As the technology evolves, a vast range of smart contracts could be embedded and stored on the blockchain. In



this plausible version of a not-to-distant future, contracts would be automatically fulfilled and recorded on the ledger provided the encoded conditions are met. For example, a smart contract could simplify the delivery of goods by triggering an automatic transfer of funds on the condition that the goods arrive as specified (a transaction that would then be registered on the blockchain). This streamlining could have big implications²⁶ for the way invoices, documents, contracts, and payments are sent and processed, reducing errors, lowering costs, and speeding up transaction times.

CHALLENGES

Once a smart contract is added to the ledger, the terms cannot be altered even if errors have occurred. A contract's conditions should therefore be reviewed and verified before it is triggered and registered on the blockchain.

Adding smart contracts to a blockchain can also introduce security holes²⁷,

and thus make the ledger vulnerable to theft, hacking, and manipulation. Such capabilities add "risk and the potential for failure," says Libra's Brennan. Whereas Bitcoin, which is designed to exclusively track transactions involving its eponymous currency, has proven itself to be remarkably hacker-proof; Ethereum has weathered a string of security setbacks caused, in part, by vulnerabilities inside smart contracts embedded in the blockchain.

In November, a digital wallet service built on Ethereum froze more than \$150 million in cryptocurrency after a user seized control of a smart contract²⁸ that contained coded transaction instructions for multiple wallets.

Perhaps more crucially, the adoption of smart contracts would require buy-in from corporations, and a shift in thinking from top executives. As a result, mainstream use of smart contracts is likely years away²⁹, particularly as their legitimacy has yet to be tested in court. As with the audit, developing assurance standards for smart contracts is paramount.

REAL LIFE APPLICATIONS

At the moment, CPAs must navigate how to manage cryptocurrencies and crypto-assets as it applies to their clients. As previously outlined, this can get tricky, particularly when multiple exchanges are involved.

There are a variety of vendors, that provide software and tools to help firms report on crypto-assets on behalf of their clients. "Look at the tools now being created by vendors that are there to help these practitioners in the cryptocurrency world," advises Quaranta. "That's step number one across the board."

Next, he recommends firms implement an educational plan to keep partners up-to-date on the technology. Firms and individual CPAs "need to dedicate some resources and time to understanding blockchain and understanding crypto assets."



CONCLUSION

Blockchain is still an emerging technology. We have more questions than answers about how it will evolve, including its impact on the audit and the profession as a whole. While organizations are working to create guidelines, the development of accounting and auditing standards will take some time. As a result, blockchain will not replace financial reporting and financial statement auditing anytime soon. After all, regulators are just beginning to grapple with how they will handle the technology's many applications.

Despite this uncertainty, one thing is clear: change is coming. As blockchain evolves and is incorporated into more aspects of financial life, it's important to stay educated, informed, and ready to update your practices as your clients update their own. As with any other emerging technology, blockchain is an opportunity for growth, provided you recognize and treat it as such.

FURTHER READING

PAPERS & REPORTS

[Blockchain Technology and Its Potential Impact on the Audit and Assurance Profession](#) – a paper from the Chartered Professional Accountants of Canada (CPA Canada) and the American Institute of CPAs (AICPA)³⁰

[Brace Yourself for AI and Blockchain](#) – a rundown of the two emerging technologies from CPA.com³¹

[Blockchain Enigma. Paradox. Opportunity.](#) – a paper from Deloitte³²

[Blockchain How This Technology Could Impact the CFO](#) – a paper from EY³³

[Making Sense of Bitcoin, Cryptocurrency and Blockchain](#) – a paper from PwC³⁴

[Accounting Firm Leaders Strategize on Blockchain and the Profession](#) – a report on the Blockchain Symposium, hosted by the AICPA in partnership with the Wall Street Blockchain Alliance³⁵

[Beyond the Bitcoin Bubble](#) – an overview from The New York Times of blockchain's potential impact beyond cryptocurrencies³⁶

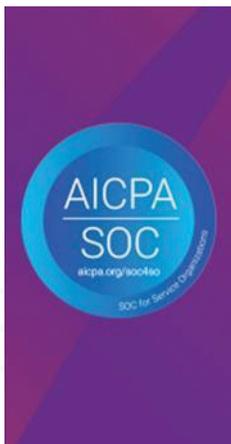
[Why Big Business Is Racing to Build Blockchains](#) – a deep dive from Fortune that examines how the technology is being used by Fortune 500 companies³⁷

[The Truth About Blockchain](#) – an examination from Harvard Business Review of blockchain's disruptive capabilities (including smart contracts), as well as the obstacles to adoption³⁸

NEWS RESOURCES

[The Ledger](#) – a newsletter from Fortune Magazine on all things blockchain³⁹

[Coinbase](#) – a site specializing in news about bitcoin and digital currencies⁴⁰



MEMBER GUIDANCE

SOC FOR BLOCKCHAIN: [ASEC Trust Information Integrity Task Force](#) formed a new working group in August 2018 to explore possible practitioner guidance/materials regarding impact blockchain may have on SOC 1 and SOC 2 engagements.

CRYPTO ASSETS: The Chairs of the ASEC, ASB and FinRec Committee met in June 2018 and agreed to form a joint working group to develop accounting and auditing guidance on cryptocurrencies. An initial list of items has been developed and the working group will begin to prioritize the issues in its first meeting in September 2018.

FOOTNOTES

- 1 <https://www.aicpa.org/content/aicpa/press/pressreleases/2018/firm-leaders-innovators-gather-for-discussions-on-blockchain.html>
- 2 <https://www.nytimes.com/2018/01/16/magazine/beyond-the-bitcoin-bubble.html>
- 3 <https://www.libra.tech>
- 4 <http://fortune.com/2018/01/17/bitcoin-price-crash-regulation>
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- 7 <https://www.ibm.com/blogs/blockchain/2017/05/the-difference-between-public-and-private-blockchain>
- 8 <http://fortune.com/2017/08/22/blockchain-walmart-maersk-banking>
- 9 <https://www.reuters.com/article/us-hsbc-blockchain/hsbc-says-performs-first-trade-finance-transaction-using-blockchain-idUSKCN11F01X>
- 10 <http://fortune.com/2017/12/26/blockchain-tech-companies-ibm>
- 11 <http://www.healthcareitnews.com/news/next-big-thing-pharmacy-supply-chain-blockchain>
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- 26 <https://www.accountingtoday.com/opinion/blockchain-accounting-and-audit-what-accountants-need-to-know>
- 27 <https://www.technologyreview.com/s/610392/ethereums-smart-contracts-are-full-of-holes>
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