



Blockchain Technology & the Back Office

**What Capital Markets
Firms Need to Know**

A Firm58 Whitepaper

December 2015

INTRODUCTION

Bitcoin took the world by storm and left an interesting new technology in its wake—Blockchain. Now, Blockchain is on a collision course with the broader financial markets. Its widespread adoption and impact on broker dealers is a question of when and how, not if.

Blockchain technology functions as a decentralized public ledger and verification system, most notable for its foundational role behind bitcoin and other cryptocurrencies. It is the worldwide ledger system for a digitized asset—initially limited to bitcoin. The technology's success has translated into use cases as varied as artistic design and contract verification, and applications in the financial markets are close behind.^{1,2} Within 2015 alone, the Australian Securities Exchange began to consider replacing its existing trading and settlement system with blockchain, and R3 forged a partnership of major banks (including UBS, JPMorgan Chase and Barclays) working to create industry-wide blockchain standards.^{3,4}

However, blockchain's ultimate success hinges on its status as an open platform. Much like the Internet, attempts to centralize authority or otherwise segment access to the blockchain threaten to preemptively short-circuit its potential.

Despite its promise, blockchain isn't quite ready for the limelight, and maybe capital markets aren't quite ready for blockchain. The financial industry must overcome a handful of major technological and logistical hurdles before blockchain could feasibly become the de-facto system of record, settlement and clearing for any existing asset class.



SHAKING UP INDUSTRY ROLES

While broad blockchain adoption would instantly upend some staples of the industry, like the three day settlement process, the need for reconciliation, or payment, it would, perhaps unexpectedly, also leave much of the industry's existing infrastructure intact. In a market where trades are recorded on the blockchain, traditional clearing, settlement and reconciliation activities become nearly instantaneous. At the very least, settlement would be immediate, reconciliation redundant, and traders' funds would no longer be tied up for as long as three days.

Even in post-blockchain markets, however, broker dealers would remain relevant, particularly for their

role in securing loans and executing trades. In fact, broker dealers may be presented with opportunities to handle new types of digitalized assets, expanding their role in a blockchain-enabled industry. Since buyers and sellers would still need a pairing mechanism, exchanges' longevity wouldn't be jeopardized either. Venues are unlikely to be eliminated, but their roles may change to include new responsibilities while shedding others to blockchain. In particular, trust and verification mechanisms would be automated, while dispute arbitration, matchmaking and trade execution would remain uniquely human activities.



NAVIGATING THE BLOCKCHAIN TRANSITION

Before blockchain-based trading can become a reality, the capital markets industry must agree on what form and framework it will take. Questions regarding private networks (and their role within a broader market), standards, security and shifting duties must be resolved—not to mention technology investment and broad stakeholder buy-in—to ensure successful industry-wide adoption.

THE STRUGGLE TO STANDARDIZE

Though financial institutions are currently hard at work hashing out blockchain implementation standards, serious changes will be required to make blockchain-supported trading a reality. As more entities develop proprietary blockchain implementations (such as Nasdaq's Linq), it will take longer to unify around a common standard.

Once industry leaders create and agree upon blockchain standards, firms will need to invest in the software and supporting systems that make blockchain possible. Firms, especially mid-market broker dealers, would require strong incentives to invest in blockchain-enabling

technology, through significant and tangible financial benefits. Since businesses have traditionally passed the costs associated with clearing, settlement and reconciliation on to clients, eliminating or reducing them would not have enough of an impact to motivate change. Once the ability to instantly settle and avoid unnecessary back-office costs and delays becomes a true competitive advantage, more firms may find reason to invest in critical blockchain infrastructure. Those that don't embrace blockchain, (at least for assets that have moved to a digital ledger), will likely not survive.

For firms to thrive in a blockchain world, they must free themselves of some of the industry's cultural habits and penchant for risk-aversion. Caution is wise, but

organizations unwilling to break with the status quo risk being left behind. Blockchain adoption will likely entail a gradual transition period, beginning with internal experimentation and the emergence of niche blockchain-based digital assets before gaining widespread asset coverage. Mainstream adoption may be years off, but now is the time for firms to become familiar with the technology through low-stakes internal discovery and research.

WEAKNESSES OF DECENTRALIZATION

Blockchain represents a significant paradigm shift, moving from a system based around trusted authorities to one where digitally distributed verification rules the day. The decentralized nature of blockchain prevents abuses of power and offers increased efficiency, but it also introduces difficulties in arbitrating disputes since there is no agreed upon authority. It's unlikely any government will fill that role due to hesitation from both investors and regulators, leaving no clear power to step into the void left by clearing houses (unless they evolve into arbitrators themselves). Alternatively, the technology itself may require modification to support mediation. Ultimately, the industry would still need a means (technological or legal) to reverse a transaction if a trade is misrepresented or performed in error.

Knowing the state of blockchain today, security and compliance remain acute obstacles. For example, the public records are only as secure as the software used to write to the blockchain, and will require careful development and oversight from the capital markets industry. Enabling public visibility into transactional data also introduces a host of privacy concerns. Firms will need to manage a delicate balance between ensuring trade information transparency and data integrity. Given enough time, savvy bad actors could develop tactics for analyzing publicly available data to reveal trader identities or other confidential information, mirroring efforts to reverse engineer Social Security numbers

based on birth dates.⁵ Blockchain won't eliminate the need for private recordkeeping or compliance technology, nor would it negate firms' investments in monitoring and surveillance tools.

SCALABILITY BARRIERS

Blockchain technology is constantly evolving, but it's still missing certain capabilities critical for scalability within the financial markets. The more transactions added to the blockchain, the larger it swells, requiring more storage space and bandwidth to update a distributed ledger. Multiplied by the large volumes of transactions that result from high frequency trading, "block bloat" could become unmanageable, fast. Although hard drive sizes and Internet speeds continue to increase, they can't keep up with the storage demand hundreds of millions of transactions would generate. Before it can be seriously implemented, blockchain must be optimized to mitigate these storage and performance-based chokepoints.

Additionally, blockchain's current transaction processing capabilities are too slow to accommodate any large-scale implementation. Currently, the average time to write a transaction to a block is around 10 minutes, and even the best reported times (around two minutes) are sluggish. Barring a sudden IT infrastructure spending spree, we can expect firms to keep running hardware similar to what they rely on today, necessitating a slate of software-side improvements instead. Similarly, blockchain can currently only handle seven concurrent transactions on a global scale, a limit far too low to be of practical use without further development.

Like other foundational technologies, blockchain's progress will be incremental and represents an evolutionary, rather than revolutionary, shift. From more modest adaptations like the Nasdaq Private Market to nontraditional uses like Everledger's diamond certification, the platform's potential is only beginning to be realized.

EMBRACING THE BLOCKCHAIN, EVENTUALLY

Blockchain promises a more efficient, faster future for the capital markets industry, but widespread adoption is still years away.

Barriers to capital markets' blockchain adoption are as much psychological and cultural as they are technological—and, arguably, more tedious to overcome. For now, organizations can stay ahead of the curve by developing familiarity with blockchain sooner rather than later. We're still firmly in the planning and testing phase, where firms are experimenting with blockchain technology internally and developing standards. Scalability, standardization and concerns around decentralized security and arbitration will be open-ended questions for the foreseeable future. As coalitions, regulators and innovators strive to determine how blockchain can best serve the industry as a whole, individual firms should still look for answers specific to their business models.

Blockchain adoption is in the cards, but it will take time for the capital markets to work through the technology's unique challenges and uncover its opportunities.

SOURCES

- 1 Myers, Rob. "Plantoid, the blockchain-based art that makes itself." Furtherfield. Oct. 26, 2015.
<http://furtherfield.org/features/reviews/plantoid-blockchain-based-art-makes-itself>
- 2 Bradbury, Danny. "BlockSign Utilises Block Chain to Verify Signed Contracts." CoinDesk. Aug. 27, 2014.
<http://www.coindesk.com/blocksign-utilises-block-chain-verify-signed-contracts/>
- 3 Drummond, Shaun. "ASX considers blockchain for clearing and settlement." The Sydney Morning Herald. Oct. 26, 2015.
<http://www.smh.com.au/business/banking-and-finance/asx-consider-blockchain-for-clearing-and-settlement-20151024-gkhs46.html>
- 4 Williams-Grut, Oscar. "Nine massive banks just teamed up to take the technology behind bitcoin mainstream." Business Insider. Sep. 15, 2015.
- 5 Van de Walle, Mark. "Reverse-Engineering Social Security Numbers." The New York Times. Dec. 13, 2009.
<http://query.nytimes.com/gst/fullpage.html?r=UK&IR=T&http://www.businessinsider.com/jpmorgan-barclays-and-others-join-r3-on-blockchain-project-2015-9?r=UK&IR=T>

ABOUT FIRM58

Firm58 helps capital markets firms become more efficient by leveraging the back office for post-trade process improvements.

With our solutions, businesses benefit from lower staffing requirements, better compliance and simplified processes for fees and commissions.

To learn more about Firm58, visit our website at

firm58.com