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Blockchain-Enabled Distributed Ledgers: Are Investment Banks Ready?
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In mid-2015, Accenture published a report on the potential impact of blockchain technology on the investment banking industry. Since then, interest in and funding for this type of financial technology (FinTech) have grown exponentially. An estimated $75 million was invested in blockchain efforts specific to capital markets in 2015, up from $30 million in 2014. By 2019, that figure is expected to reach $400 million, amounting to a compound annual growth rate (CAGR) of 54 percent—forecasts that may prove conservative.[1]

In addition, a number of groups have announced plans to explore blockchain technology for banks. The Linux Hyperledger Project aims to "develop an enterprise-grade, open-source distributed ledger framework and free developers to focus on building robust, industry-specific applications, platforms and hardware systems to support business transactions."[2] Similarly, an R3-led consortium of more than 40 institutions is developing blockchain-enabled solutions specifically for capital markets.[3] Even major central banks are exploring how to leverage opportunities created by blockchain technologies.

All signs suggest that blockchain-enabled distributed ledgers are coming. The question is: are you ready?

The technology disconnect

Despite significant technological gains in capital markets over the past 20 years, middle- and back-office functions remain antiquated, slow and inefficient thanks to overly complex processes involving many counterparties, manual tasks and third-party service providers.

Although improvements have been made in trade- and post-trade processing, they have not kept pace with front-office advancements by any stretch of the imagination. Assets that trade electronically in the blink of an eye often take days to settle.

In a blockchain-based distributed ledger environment, clearing and settlement could occur within seconds. Perhaps more important, blockchain distributed ledgers could be optimized to clear and settle at different speeds depending on the market participant's needs. Retail traders typically want to access money from a stock sale immediately, whereas market makers usually need a longer settlement time to net trading activity.

In addition to reducing settlement times, blockchain technology creates an opportunity for new products that optimize settlement for participants and price the service accordingly. Other benefits include lower collateral requirements and counterparty risk, improved contractual term performance, and greater transparency for regulatory reporting—not to mention better capital optimization as the need for risk capital is reduced. A recent Santander report estimates that blockchain technology could save the industry between $15-20 billion annually by 2022.[4]

Accenture does not believe that distributed ledger and blockchain technology will replace the current capital markets ecosystem, as some have predicted. Instead, we envision banks using it to improve efficiency and client service by fundamentally restructuring existing processes. In a post-crisis world, it is unlikely that regulators will allow "trustless" transactions in capital markets. However, they may be interested in examining how distributed ledger and blockchain technology can improve the current financial system by optimizing execution and settlement, and increasing transparency.

Recognizing blockchain technology's potential in the capital markets ecosystem, Santander begins to invest in FinTech and assess its impact:

July 2014: Santander InnoVentures, a $100 million incubator fund for FinTech innovation, is launched.[5]

June 2015: A white paper titled "FinTech 2.0" highlights distributed ledgers in conjunction with the Internet of Things (IoT), identifying between 20 and 25 use cases that could save banks between $15-20 billion annually by 2022.[6]

In the "FinTech 2.0" release, Santander states: "We believe that, by extending the use of data and frictionless processes, FinTechs can and will expand well beyond the confines of payments and consumer credit. It will move deeper into middle- and back-office processes, providing new, richer propositions for end customers."

How it works

Distributed ledger and blockchain technology fundamentally changes how data is managed, moving from a scenario where each organization maintains its own copy of a data set to one where everyone has controlled access to a shared copy. This "mutualization" of data is only possible with strong cryptographic techniques that use public and private "keys" to ensure confidentiality and privacy.

Blockchains offer a way to verify and order transactions in a distributed ledger, a record of consensus that is validated and held within a network of separate nodes. Entries can be altered but not deleted from a blockchain-based distributed ledger. Maintenance and validation of the distributed ledger is performed by a network of communicating nodes that run dedicated software that replicates the ledger among participants in a peer-to-peer network. All transactions have an auditable trail and a traceable digital fingerprint. The data on the ledger is pervasive and persistent, creating a reliable "transaction cloud" where transaction data cannot be lost.

Another key difference between distributed ledger and traditional database technology is how they approach security. Distributed ledgers encrypt individual transactions or messages in the data stored on the blockchain, whereas traditional databases typically have a database-wide layer of security that, once breached, offers access to all of the data inside. In a world where the threats of hacking, data manipulation and compromised data are very real, the security and risk management implications of these two different approaches are important considerations.

The smart contract controversy, explained

The "smart contract" debate is really a question of where the business logic for transactions should live. With millions of contracts executed daily, it is daunting to consider a scenario where the business logic code would be attached to individual transactions.

If there was a problem with the code or business/commercial relationship, how would it be identified and by whom? Which counterparty would be legally required to fix it? Conceivably, it would be possible to anticipate and account for a wide variety of issues and events by embedding that logic into each of the millions of contracts executed every day, but that approach is highly inefficient.

A centralized business logic engine can manage a consolidated set of rules and constructs, leaving distributed ledgers and blockchains to focus on recording transaction outcomes and details. Furthermore, capital market participants value having a responsible party to turn to in the inevitable event of challenges, including:

- Source data availability.
- Credit defaults.
- Funding issues.
- "Give-up" situations.

The counterargument in favor of smart contracts has many businesses excited. There are many opportunities for failure within bank operations and reconciliation processes. When things go awry, it can be difficult to determine where the failure was generated. Smart contracts are auditable, making it possible to pinpoint whether a nefarious actor or a technological anomaly was responsible for an undesirable outcome. Furthermore, smart contracts can introduce design constraints (e.g., using several data feeds to calculate the median LIBOR rate instead of relying on a single source) that reduce the likelihood of certain types of errors.

Given the relative immaturity of distributed ledger and blockchain technology, and in light of the concerns outlined above, Accenture does not believe that embedding business logic rules for capital markets transactions in the blockchain is a viable approach in the near future. However, as blockchain solutions mature and new capabilities are developed, smart contracts may come to play a significant role in capital markets.

Reaping the benefits of blockchains

Blockchains are most valuable when:

- There are multiple participants with multiple data stores requiring reconciliation.
- There is a material need for an immutable and reliable audit trail for financial accounting exercises and regulatory reporting.
- Increased data security and access control would be beneficial.

The kind of heavyweight stack traditionally used to manage ledgers keeps parallel copies in sync, while double-checking data validity at different stages and writing audit trails to unalterable media—a costly and cumbersome process. Blockchains offer the promise of a dynamic ledger that rivals the robustness of a traditional proprietary database, but with significant cost savings possible. Other potential benefits include:

- Ledger consolidation.
- Controlled sharing and continual updating of the system of record.
- Near-real-time delivery-versus-payment (DvP) swaps of cash and securities—compared to overnight batches, which are often multi-stage, multi-day processes.

Regulatory acceptance

The most mature distributed ledger blockchains to date are cryptocurrencies, and regulators have reacted positively to them, even licensing a number of exchanges.

Given the technology's ability to remove single points of failure, provide a cryptographically secure and immutable audit trail, and reduce counterparty risk, they appear to be cautiously optimistic about the potential for distributed ledgers and blockchains in capital markets.

In the next phase of discovery, participants will be working with regulators to explore:

- Regulatory and legal classifications; where is it simply a new tool, versus where is it an asset and what does that mean?
- Assets traded on and off chain, and how to reconcile assets that trade in both environments.
- Standards, laws and regulations as they apply to on-chain asset ownership rights.

Despite obvious challenges, distributed ledger and blockchain technology could offer significant benefits. Regulators would be able to track individual transactions and asset movements across multiple counterparties easily over time. Capital market players would benefit from lower regulatory reporting costs since the transaction ledger would be shared and regulators would be able to access the distributed ledger or blockchain directly.

What's the catch?

Like any great idea or new technology, distributed ledgers and blockchains are not perfect. Key challenges include:

Privacy versus traceability:

Finding a way to meet auditability and regulatory reporting needs while maintaining the confidentiality of trading activity data will be critical.

Security:

Although unlikely, distributed ledgers and blockchains are subject to reorganization should a participant, or group of participants, choose to overpower the network by taking control of a majority of nodes.

Scalability:

Some distributed ledger and blockchain applications have been known to scale poorly and suffer from extreme latency.

Implementation:

No standard tools or administration interfaces are available yet.

Governance:

It is unclear what will be the "new normal" threat matrix for shared ledgers among large banks, which need to connect within the corporate environment and conform to very rigid standards.

Latency:

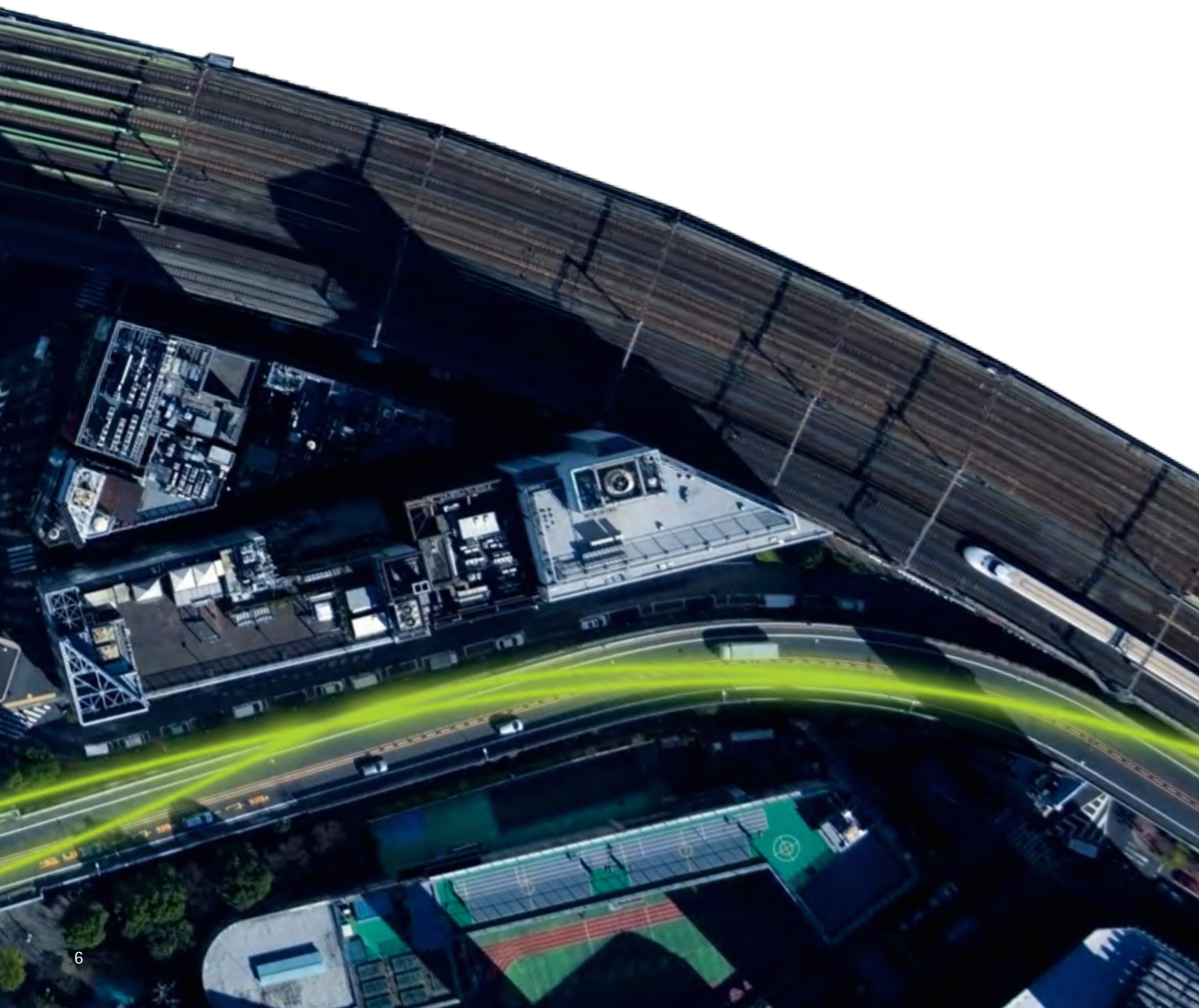
There have been latency issues in some existing blockchain solutions, but they can be addressed by consensus mechanisms such as Practical Byzantine Fault Tolerance (PBFT).

Accenture's point of view

Distributed ledger and blockchain technology solves two of the most fundamental challenges associated with financial transactions: reconciliation and auditability. It also holds the promise of settlement optimization, which would remove a tremendous amount of friction from the current trading lifecycle and unlock a vast amount of capital that is trapped in the settlement process.

Accenture believes that certain types of distributed ledger and blockchain solutions—namely permissioned or gated systems—offer advantages for capital markets. Specifically:

- Participants are known to one another, and customers are still required to comply with know-your-client (KYC) and anti-money laundering (AML) requirements.
- Because the actors are known and tied to real-world identities, there is no need for a cumbersome consensus mechanism like proof of work. Latency and scalability issues could be mitigated in a gated system more easily using an alternative consensus mechanism, such as Practical Byzantine Fault Tolerance (PBFT). There is no doubt that blockchain technology will continue to advance until it reaches the transaction volumes of current legacy systems.
- Single-point-of-failure concerns are eliminated because ledgers are distributed across multiple nodes. Should one node fail or be corrupted, other nodes still have access to a valid and viable ledger.



Getting started

Integrating distributed ledger and blockchain solutions into legacy bank infrastructure will not be simple. Multiple points of integration and further developments would be required to reach a production-ready state.

Selecting and focusing on the right priorities and sequence is important, and having a strategy and roadmap for both rapid development and maintenance is critical in what will continue to be a fast-changing technical space. However, given the opportunity to reduce costs, lower counterparty risk, improve liquidity, optimize capital and streamline regulatory reporting, one thing is clear: investment banks will look to distributed ledger and blockchain technology as a way to alter the economics of their businesses and bring cost-income (C/I) and return on equity (ROE) ratios closer to pre-financial crisis levels.

An internal proof of concept (PoC) can be a good way to get started with blockchain technology. As with any PoC, it is important to set realistic expectations. Remember that distributed ledger and blockchain solutions are:

- Still in the early phases of the software maturity lifecycle.
- Built on a technology base that has not yet been tested at-scale for financial institutions.
- Ambitious, solving for core operational activities of high-value transactions among heavily regulated entities.
- Subject to the network effect, their value highly dependent on shared adoption.

Fortunately, capital market firms are uniquely suited to distributed ledger and blockchain technology—and not just because the industry has a history of early adoption. Capital market firms are well equipped to field a PoC team that has experience with the trading lifecycle, batch processing, delivery versus payment (DvP), ledger reconciliation, distributed transactions, fail over and information security. They have the ability to define appropriate use cases and judge the value of distributed ledgers and blockchains in shortening batch cycles, replicating transactions, validating audit trails and implementing them.

The PoC team will need a place to work. Distributed ledger and blockchain development operations (DevOps) are similar to that of traditional industry messaging and transactional platforms, such as FIX, FPML, SWIFT, CLS, Omgeo OASYS/CTM, MQ and DTCC Swapswire. The team will want to run and re-run test scenarios with transaction data on distributed test systems that can be cleanly reset to initial conditions. This is critical for validating functionality related to audit, reconstruction, exception handling, transactions, public key infrastructure (PKI) and encryption.

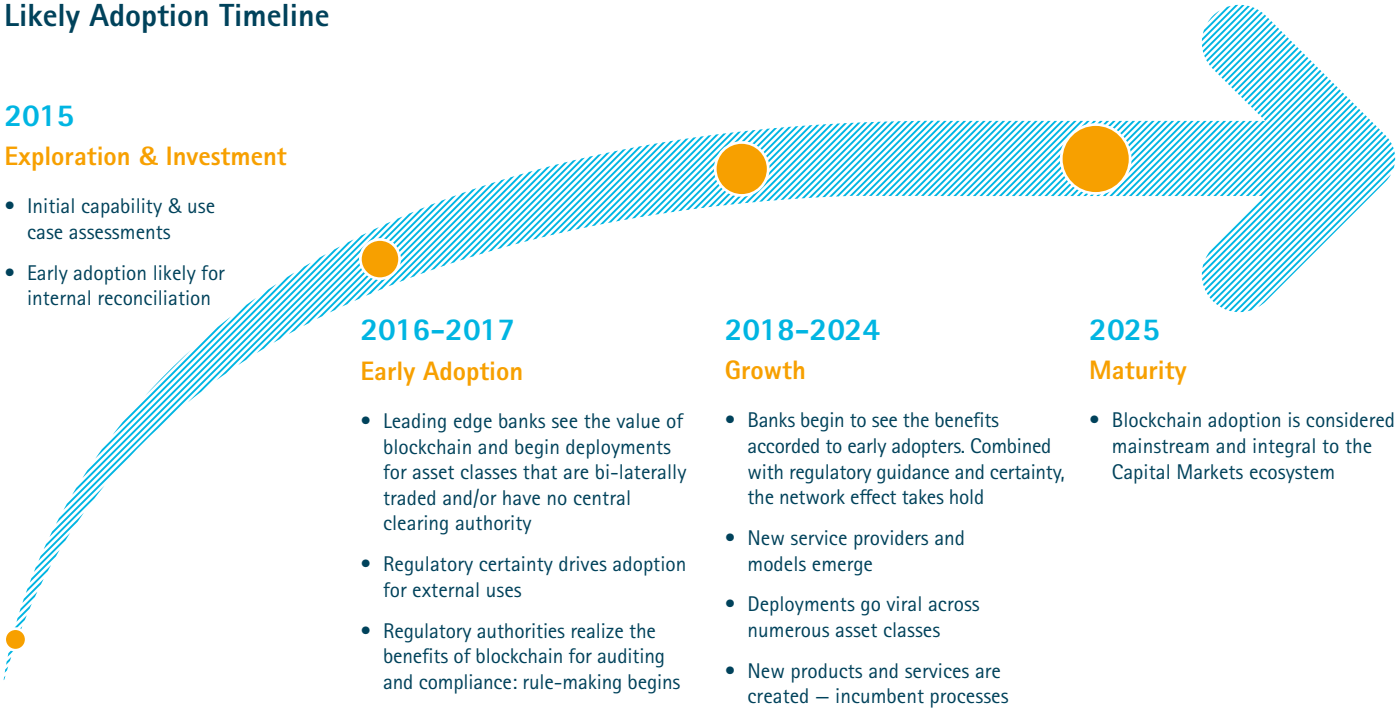
How Accenture can help

Accenture can help investment banks develop strategies to take advantage of distributed ledger and blockchain technology, and can help provide a full suite of consulting and technical support in partnership with leading emerging players to shorten time to market.

Through our open innovation approach, we actively search for FinTech solution providers in the space to provide built-for-purpose solutions to meaningful business challenges instead of retrofitting solutions for business cases. In our Accenture Technology Labs, we work with a number of blockchain technology companies, including MultiChain, Eris, Ripple, IBM and Digital Asset Holdings (DAH), to develop innovative solutions for leveraging distributed ledgers in capital markets. Accenture is also a partner of the FinTech Innovation Lab in New York, London and Hong Kong, and is collaborating with a range of innovators whose knowledge and expertise we can tap into during the course of our projects.[7] We are constantly developing new prototypes, use cases and solution components that are available for client use.

Accenture can offer clients a full spectrum of support in this area leveraging our capital markets technology experience in the settlement and clearing of various financial asset classes, the use case-applied distributed ledger and blockchain technology innovation driven out of our Technology Labs and our network of alliances and FinTech providers.

Likely Adoption Timeline



2015
Exploration & Investment

- Initial capability & use case assessments
- Early adoption likely for internal reconciliation

2016–2017
Early Adoption

- Leading edge banks see the value of blockchain and begin deployments for asset classes that are bi-laterally traded and/or have no central clearing authority
- Regulatory certainty drives adoption for external uses
- Regulatory authorities realize the benefits of blockchain for auditing and compliance: rule-making begins

2018–2024
Growth

- Banks begin to see the benefits accorded to early adopters. Combined with regulatory guidance and certainty, the network effect takes hold
- New service providers and models emerge
- Deployments go viral across numerous asset classes
- New products and services are created — incumbent processes and services are discarded

2025
Maturity

- Blockchain adoption is considered mainstream and integral to the Capital Markets ecosystem

Source: Accenture Research

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About Accenture

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