

White Paper



Exploring Blockchain: Opportunities and Implications for Financial Institutions

Blockchain, the technology behind Bitcoin, has the potential to transform business models by enabling processes that are not only faster and more efficient, but also more transparent and secure – all while enhancing information access and data integrity. It's no wonder, then, that financial institutions are exploring its potential to improve service, lower costs, increase efficiency and reduce risk.

With the technology's evolution still in the early stages, each organization must understand blockchain's potential, its challenges, and the near-term opportunities it creates.

The Promise of Blockchain

The benefits of blockchain stem from its unique design. Combining shared databases and cryptography, the technology allows multiple parties to have simultaneous, real-time access to a constantly updated digital ledger comprised of transactions or records that cannot be altered. All network participants have access to the ledger, making it a single source of truth for any transactions posted to it.

Smart contracts, which control and restrict how the data in the blockchain is accessed, are a key component of how blockchain improves both efficiency and trust. They automate the execution of transactions and the recording of data into the ledger, eliminating human intervention.

Virtually anything of value can be transparently traded, tracked and verified using blockchain technology. Security is enhanced because all parties are recorded, all transactions are cryptographically verifiable and no private data ever leaves the network. Operational costs are minimized through real-time processing and automated management.

For financial institutions, the implications of blockchain technology revolve around these key benefits:

Reduced complexity	Both manual and duplicate processes are eliminated, simplifying processes
Security	Their decentralized and distributed design makes blockchains difficult to hack, since there is no single point of failure and private data is never compromised
Transparency	Blockchains have multiple points of real-time verification and validation, creating a fully auditable and truthful ledger that cannot be modified
Efficiency	Increased automation provided by smart contracts speeds processing, improves data quality and streamlines clearing and reconciliation
Control	Increased security and immutability enable greater control of funds and simplify auditing and governance

Public vs. Private Blockchains

Public blockchains are decentralized and allow anyone to download the protocol, join the network and conduct transactions. Private blockchains require permissioned access and operate under a centralized organization, such as a financial institution, that establishes the network and defines the steps a user must take to participate in it. Private blockchains are more scalable, enable compliance with regulatory requirements and offer greater privacy than public blockchains.

A number of consortia have originated that allow participants to develop applications and services on top of a common, underlying blockchain platform. In these instances, permissions, standards and governance are predefined by the consortium. Examples of these consortia include Hyperledger and R3. This paper focuses on the use of private and consortium blockchains.

Early Opportunities for Financial Institutions

Financial institutions, technology firms, brokerages, regulators and others are currently forming task forces and alliances to test various blockchain applications. The journey has only just begun, but leading firms are focusing their initial efforts in a few key areas where distributed ledger technology can solve business problems and offer near-term benefits.

Customer Identification

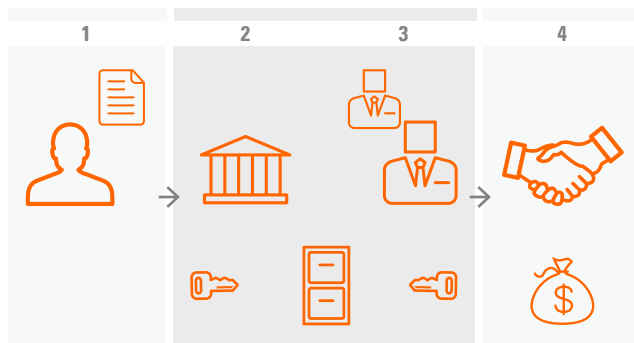
Through the use of cryptography and its ability to share a constantly updated, accurate record with multiple parties, blockchain offers compelling capabilities around identifying customers and protecting their identities across a wide range of banking services. An ideal application might be the protection of personal financial information uploaded for a loan application. A number of early solutions are being piloted for customer identification, including R3's Corda®, a blockchain-based operating system for financial institutions.

Blockchain technology also provides a significant opportunity to streamline Know Your Customer requirements. The increased transparency and security it offers promises to simplify the roles of regulators and reduce both costs and operational risk.

Loan Processing and Management

Today, lending is a labor-intensive environment fraught with potential security risks. Blockchain-based smart contracts, with business rules embedded in blockchain rather than in the application, will significantly advance lending workflows by streamlining document management and facilitating the secure transfer of information. Blockchain systems will also improve financial institutions' ability to protect customers' personal information from fraud, as well as third-party marketers and competitors.

A group of 19 financial institutions recently formed a consortium to begin putting syndicated loans on blockchain systems. A key challenge is finding a way for separate blockchains to interact so that changes to a loan's ownership can be quickly reflected across all systems.



1. Consumer applies for a loan
2. Bank cryptographically stores consumer's personal information on a private blockchain
3. Mortgage, underwriting and compliance are granted access to the blockchain's shared ledger
 - No personal data leaves the ledger
 - Data and documents can't be altered or downloaded
4. If loan is approved, a smart contract automatically releases funds to the borrower
 - Personal documentation is automatically released when loan is closed

A Fiserv Pilot Project: Using Blockchain to Solve the Loan Portfolio Problem

Problem:

Loan servicers buy and sell groups of loans. This involves manual, labor-intensive processes that take several weeks to complete.

- The initial bid and subsequent updates to a sales portfolio of loans consumes resources in duplicate multi-step efforts to transfer data and reconcile differences using reports
- This process is inefficient and introduces risk into portfolio transactions due to the potential for human error and inadvertent transfers of invalid loans

Solution:

- The secure contract and distributed ledger elements of blockchain streamline and automate standard processes while providing enhanced liquidity, security, transparency, data storage, provenance and cost reduction
- Secure contracts improve confidence in the deal terms and portfolio content by controlling characteristics of the chain composition (total principal balance of the transfer is chief among those characteristics)
- The distributed ledger can eliminate the back and forth data transfers that occur during the process as balances change and individual loans no longer qualify for the deal due to payoffs or advanced default actions

Data Recordation and Sharing

The combination of clearly-evidenced ownership and transfer tracking of data through sophisticated encryption offers numerous improvement opportunities over current approaches to data recordation and sharing. Data and transactions entered into a blockchain can eliminate manual tasks such as end-of-day reconciliation. The automatic transparency made possible by blockchain has the potential to reduce the manpower and costs related to auditing, reporting and regulatory compliance.

Blockchain technology could also help financial institutions digitize existing records and manage them within a more secure infrastructure. For example, in the onboarding of an existing retail client, a private banker might access an internal blockchain that stores the client's background information including identification, residency, marital status and income. The sharing of consumer data across siloed banking divisions could shorten the onboarding process from weeks to minutes. Further down the road, a private bank blockchain could be permissioned to allow government agencies to submit consumer identification data, ensuring accuracy and reducing paper-based inefficiencies.

Cross-Border Payments

Blockchains could improve cross-border payments by allowing the direct exchange of payment tokens that enable real-time messaging and clearing within a cryptographically secure and resilient environment. While central banks and large financial institutions are receptive to this idea, substantial challenges exist and adoption is expected to take years.

Barriers to Adoption

Harnessing the potential of blockchain will require process and infrastructure changes that may take several years to complete. They include:

Speed and Scale Requirements

Despite the success of pilot projects, it will take time to define the technology requirements and the ancillary system integrations needed to support the speed and scale required in a live blockchain environment. Financial institutions will also struggle with how to audit systems with almost-instant clearing and consensus-based verification.

Approval of Regulators

Regulators are currently working with industry leaders to explore what oversight of blockchain systems will look like. Attention has initially been directed towards cryptocurrencies and related consumer protections – but as blockchain technology matures, a new regulatory framework will be required before real-life data can be stored and transmitted within a financial institution. Regulatory oversight will become even more critical as private blockchains begin interacting and sharing data with one another.

Governance and Industry Standards

As blockchain applications evolve within the financial services industry, agreements will have to be made regarding the standards and governance that will allow for interoperability between various blockchain services. A benefit of building off of an existing consortium platform is that there are agreed-upon rules and standards that inherently allow interoperability between various applications.

Exception Handling and Errors

While the inalterability of data on a blockchain ledger protects against human error and fraud, its design can be an impediment if the original data validated into the blockchain is faulty. Exception handling processes for blockchain will be needed to address this problem.

Next Steps and Recommendations

While blockchain promises transformational advancements in banking processes, widespread adoption is not a near-term expectation. Refining and optimizing how blockchains interact with other data sources and systems is a multi-year effort that will involve trial and error from numerous industry participants. In the meantime, financial institutions that want to harness the power of blockchain can discuss realistic near-term applications with their technology providers.

A prudent approach is to identify practical use cases where blockchain can enhance and improve existing processes and products.

Distributed ledgers and smart contracts can be used to accelerate the speed of product and service delivery, drive product innovation, and increase consumer adoption of real-time and near-real-time services.

Financial institutions should not wait to begin the internal education, consensus-building and planning that will be required to leverage blockchain solutions as they evolve. Here are recommended steps to consider:

- Create a task force to identify and prioritize the business problems that blockchain may solve
- Create cross-departmental working groups to explore blockchain use cases and develop organizational readiness

- Pilot initial use cases based on internal assessment
- Conduct value chain analyses to identify inefficiencies around data management and record keeping that could be improved using blockchain technology
- Work with technology partners to identify where existing functionality can be enhanced
- Consider joining an organization focused on blockchain business issues, not only to keep up with emerging developments but also contribute to the conversation

Over the long term, an unprecedented level of collaboration between technology providers, financial institutions and even non-bank service providers will be essential to defining universally-accepted blockchain standards and governance while creating interoperable networks. Fiserv will continue to invest in blockchain technology and devote significant resources towards identifying practical, cost effective applications for our clients.

We look forward to working with our clients on blockchain-based solutions that will help drive innovation, increase efficiency and enable new revenue sources going forward.

Connect With Us

For more information, call 800-872-7882, email getsolutions@fiserv.com or www.fiserv.com.

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