

# Transforming Transaction Processing in Capital Markets with Blockchain Technology

## Abstract

Significant transformation can be achieved when blockchain technology's unique ability to create secured distributed ledgers among multiple entities combined with features such as confidentiality, data privacy, reliability, and scalability is applied to meet the needs of regulated financial institutions.

## The Pros and Cons of Blockchain Technology

Bitcoin and virtual currencies offer an open source, real-time payment infrastructure, which stores transactions in a shared public ledger in the form of sequentially chained blocks. The bitcoin's integrity is protected by processing or 'mining' nodes that validate and confirm transactions and create the blocks using complex mathematical formula called 'proof-of-work'.

Not surprisingly, most investments in bitcoin and virtual currencies today come from technology enthusiasts, venture capitalists, and speculators. Banks and capital market firms have stayed away from bitcoin and other virtual currencies due to regulatory uncertainty, as well as fundamental conflicts in the business model and philosophy. However, they are interested in the underlying blockchain technology that can offer the financial industry cost optimization, automation, and simplification.

## Applying Blockchain Technology to the Financial Industry

Blockchain technology tailored to suit the needs of the banking industry can:

- Help reduce the transaction costs, shorten processing times, and reduce or eliminate reconciliation across multiple parties.
- Transform not only value transfers but can also assist in orchestrating information flows that are paper based with significant manual intervention such as trade finance.

## Replacing Traditional Technology

There are number of industry initiatives to promote blockchain as an open source technology such as Linux foundation and R3. Such open source initiatives enable faster global adaptation and easy customization.

Blockchain can help banks transform from isolated, hierarchical ledgers with point to point communication models (that exist today) to shared flat ledgers with an ability to process peer-to-peer transactions. Digital signatures and encryption ensure necessary data protection and privacy needed for financial data. Immutability and 'append-only' data structures enable improved auditability and replication among financial institutions.

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The financial services industry can apply blockchain technology to efficiently process transactions in mainstream financial assets like regulated currencies, securities, and gold.

A cross-border settlement will now simply become a movement of assets in the T2S ledger.

This is unlike most markets where ledgers are maintained in a hierarchical structure, with CSDs holding institutional accounts and institutions in turn holding the accounts of customers (including retail customers).

## Exploring Real Time Scenarios as Benchmarks

Let us look at two real-world examples built on traditional technology (not blockchain) but that use the concept of a flat ledger to enable and simplify processing and settlement transactions to capital markets.

### **TARGET2-Securities (T2S) in Europe**

There are 24 CSDs holding financial assets on behalf of brokers and custodians in various European markets. These CSDs maintain ledgers with accounts and balances of financial assets of brokers and custodians in their respective markets.

To enable cross-border transfers, these CSDs need to have a relationship with other CSDs in the target market, and should be able to exchange financial messages with them to modify balances in the ledgers of their respective accounts, enabling a seamless and smooth settlement. In some cases, these links will flow through additional intermediaries like custodians, further increasing costs.

The European Central Bank introduced the T2S harmonization initiative to simplify cross-border settlement in Europe. Launched in June 2015, T2S is a technical platform that:

- Enables CSDs to outsource their ledgers and consequently, the settlement processes. Stores the ledgers of all CSDs, without interfering with the relationships and contractual arrangements these CSDs have with their customers.
- Allows customers of a CSD to directly trigger settlement of the trade by issuing suitable instructions.

### **Retail investor accounts in the Indian capital market**

The National Securities Depository Limited (NSDL) and the Central Depository Services Limited (CDSL) are CSDs for the Indian capital market. These organizations maintain the accounts of retail investors apart from the accounts of institutions like brokers and custodians.

The flat ledger structure for demat accounts in India helps institutions:

- Outsource retail account settlements to the depository.
- Simplify asset servicing by centralizing corporate actions processing for the entire market.

A blockchain-based solution, with its immutable ledger, ease of integration, and considerably lower operational and infrastructure costs, is undeniably a better option as compared to existing registries.

## Ecosystem Required for Blockchain to Function Effectively

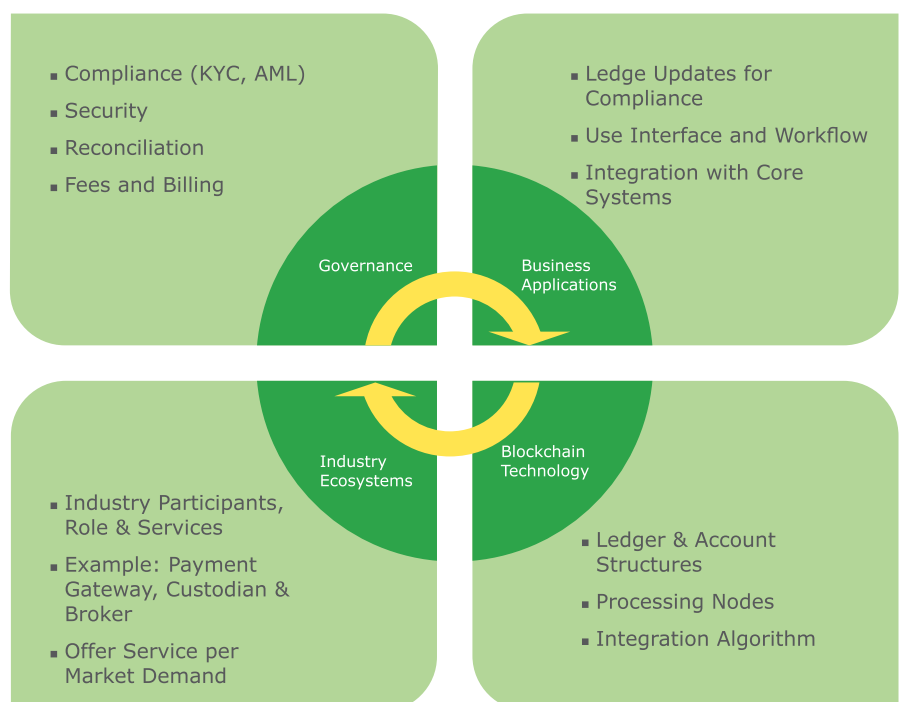
Blockchain-based industry solutions need some key building blocks and ecosystem to realize the technology’s true transformation potential. Together, these layers form a robust solution that can drive operational efficacy and efficiency of the industry.

**Blockchain technology:** This layer covers the underlying software program that defines the account and transaction information structure in the ledger, processing nodes, and the algorithm to maintain the integrity of the blockchain.

**Smart Contracts:** This layer sits on top of blockchain and provided the functional richness to the blockchain transactions. Business rules and conditions can be coded inside smart contracts which process complex financial transaction and enable necessary movements in the blockchain ledger.

**Industry ecosystem:** This layer specifies the roles and services of various industry players in the reimaged industry solution paradigm. Roles could be payment gateway, custodian, and broker. Services offered must be relevant as per market demand and based on blockchain protocol.

**Governance:** A critical layer for an industry solution, this must cover important aspects like compliance (to regulations like AML and KYC), security, reconciliation, standards, and billing.



## Conclusion: Next Steps for Blockchain in the Financial Space

Investment and research in blockchain has gathered momentum in recent months. There is significant ecosystem of consortiums, open source initiatives, fintech innovation, and industry forums.

While potential business benefits and use cases are envisioned clearly, the financial industry is working with regulators, government agencies, and standard bodies to realize the potential of blockchain technology.

Based on open source software and cryptography, blockchain technology is inherently useful for managing a shared flat ledger, enabling instant transactions. Most banks and financial institutions are working with fintech companies to incubate such solutions and test them in controlled environments.

### About The Author

Raghavasuresh Samudrala

Raghavasuresh Samudrala is an Industry Solution Advisor with the Banking and Financial Services unit at Tata Consultancy Services (TCS), and has 20 years of experience in IT solutions and consulting, with interests in enterprise architecture and innovation.

### Contact

Visit [TCS' Banking and Financial Services unit](#) page for more information

Email: [bfs.marketing@tcs.com](mailto:bfs.marketing@tcs.com)

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