President's Council of Advisors on Science and Technology (PCAST)

R3 & Distributed Ledger Technology

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Agenda

- What is R3?
- What is distributed ledger technology (DLT)?
- What is the promise of DLT for Financial Services?
- How do we get there?
What is R3?
Founded and led by R3, the 50 Member initiative is the first and only consortium of the world’s largest global financial institutions focused exclusively on developing a next generation financial transaction network and commercial applications based on distributed ledger technology.
The Financial Distributed Ledger Ecosystem

R3 has fielded a surge in interest worldwide from a diverse range of financial services industry participants.
What is distributed ledger technology (DLT)?
Key DLT Concept: Shift from Centralised to Decentralised

centralized

partially decentralized

fully decentralized
Key DLT Concepts at a Glance

- **Cryptography** to ensure identity authentication for each transaction.
- **Non-repudiation** to preserve integrity of data and create an audit trail.
- **Smart contracts** for the automatic execution of business logic when certain criteria are met.
- **Shared ledger** so each participant sees the same view of the same data, updated in real time.
- **Distributed consensus** to ensure the state of the ledger represents the agreed-upon truth of all stakeholders.
Key DLT Concept: I know that what I see is what you see…
R3 Corda: A Unique Approach to Shared Ledgers

A blockchain-inspired distributed ledger platform designed and built specifically for financial markets

- No unnecessary global sharing of data
- Designed with regulators in mind
- Consensus agnostic
- Legal prose closely tied to smart contract code
- Uses industry-standard tools
- No native cryptocurrency

Consensus
Validity
Uniqueness
Immutability
Authentication
What is the promise of DLT for Financial Services?
Illustrative Use Cases Leveraging DL Technology

Distributed ledger technology has a myriad of potential use cases for financial institutions, regulators, operations & individuals

Financial Institutions
- FX Settlement
- Trade reconciliations
- Transparent Valuations
- Cross Border Payments
- Credit Efficiency
- Loan Settlement
- Derivatives Clearing
- Collateral Management

Regulators
- Compliance Reporting
- Risk Visualization
- Basel III Compliance
- Client Fund Transparency
- Know Your Customer / Anti-Money Laundering
- Trade reporting

Operations
- Client Onboarding
- Intracompany Settlement
- Normalize reference data
- Timestamping
- Account Portability
- Broker Fraud Identification
- Securities Agreements as Smart contracts

Individuals
- Crowdfunding
- Virtual Identity
- Credit Scoring
- Cross Border Remittance
- Vault/Escrow Services
- Customer Deposit Cost
- Peer-to-Peer Lending
Benefits of Distributed Ledgers in Capital Markets

- Reduction of manual, error-prone processes for the tracking of assets
- Ease of validation of financial transactions through smart contracts
- Simultaneous, real-time legal entity, auditor, and regulator access to data of multiple institutions
- Easier "KYC" identity verification through cryptographic signing of transactions by known participants.
Current Financial Record Keeping System

Though there is a tremendous amount of sophistication in front office processes, back office functions are based on reconciling records among fractured databases.

In the front office, trades are conducted and actors are given confirmation of their agreement almost instantaneously.

But goods are not exchanged until information sitting among different databases is consulted and reconciled, a process which can take days and sometimes even fails!
Future State

By introducing distributed ledgers to the global financial process, the critical data necessary to conduct a trade can be referenced more easily on a ledger.

In the front office, trades are conducted and actors are given confirmation of their agreement almost instantaneously.

The positions and assets of each firm will be represented in a shared ledger, maintained and validated by all the institutions participating in the financial system. A shared ledger will create unicity and make transaction validation instantaneous.
Capital Markets: Could have mitigated Lehman collapse

Here's Why the Blockchain Would Have Saved Lehman Brothers

by Jeff Buihari | MARCH 30, 2016, 8:14 PM EDT

Could the Blockchain prevent the next global financial crisis? First Global’s Gavin Smith says yes

by Duncan Riley | Feb 29, 2016 | 0 comments
How do we get there?
Significant design challenges have yet to be resolved

- Interoperability
- Scalability
- Security
- Privacy
- Identity
- Systems integration
The Solution: Industry-wide Collaboration

R3 LRC is the collaborative nexus for blockchain innovation across the financial services ecosystem

NEW MEMBER STAKEHOLDERS:

- Asset Managers
- Insurance/Re-Insurance
- Exchanges
- Market Structure / Utilities
- Credit Card Companies
- Enterprise Tech CO.’s
- Blockchain Tech CO.’s
- Regulators / Central Banks
- Trade Associations