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

R3 & Distributed Ledger Technology

Tim Grant, Managing Director R3

Washington, DC May 2016

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?

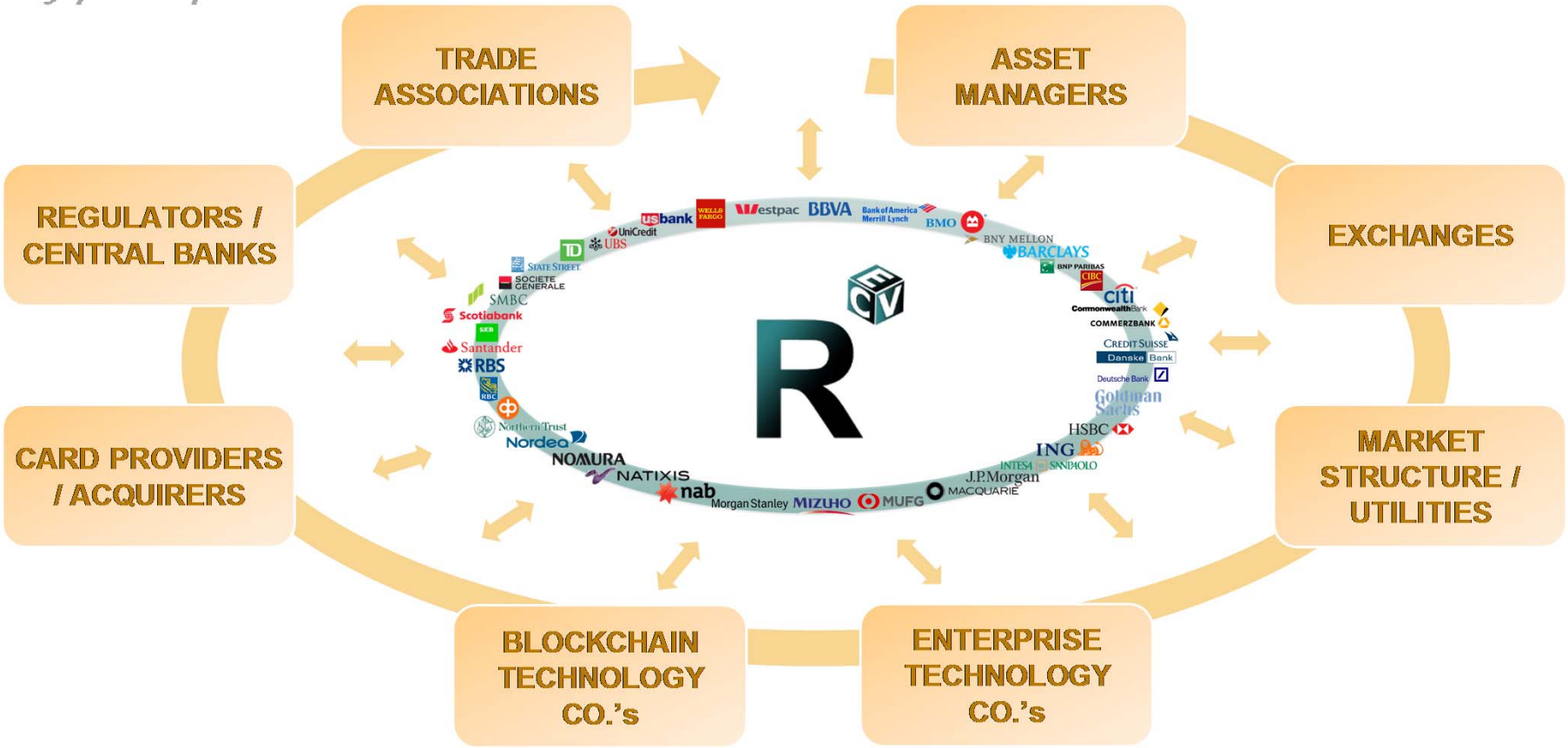
About R3

Introduction to the world's largest distributed ledger consortium

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

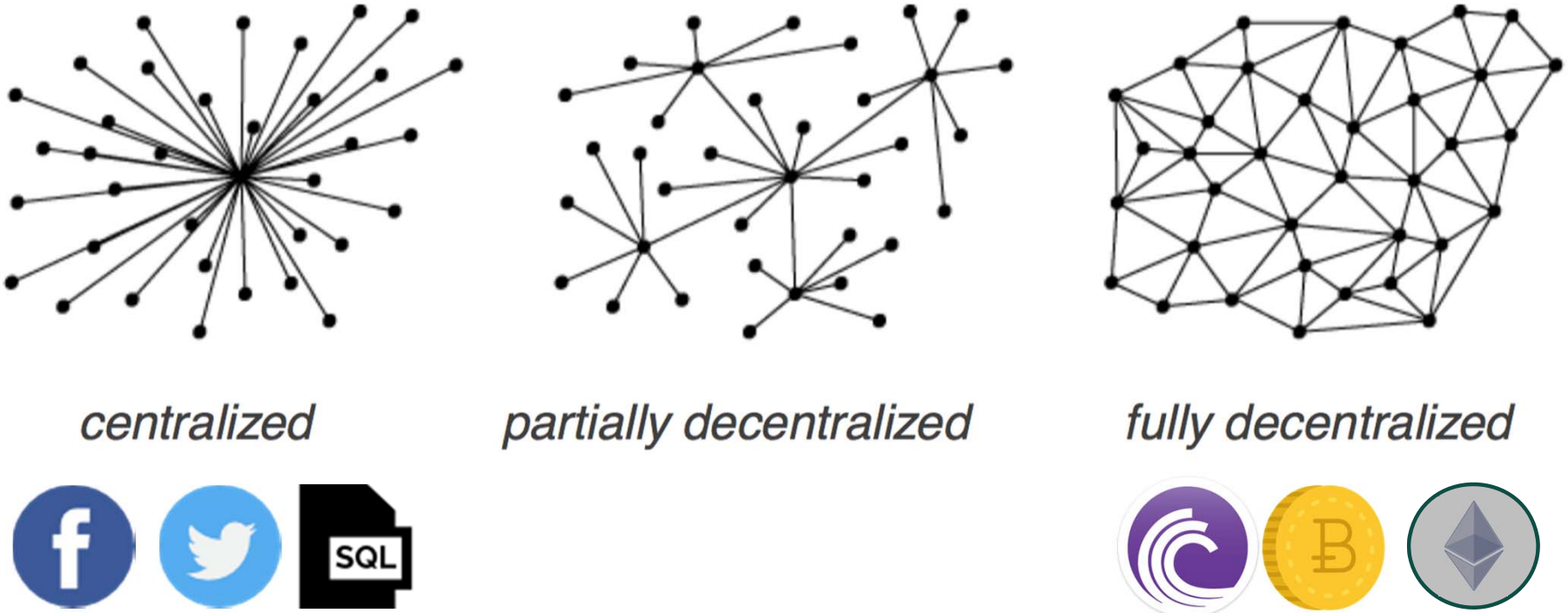
The Financial Distributed Ledger Ecosystem

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



Key DLT Concepts at a Glance

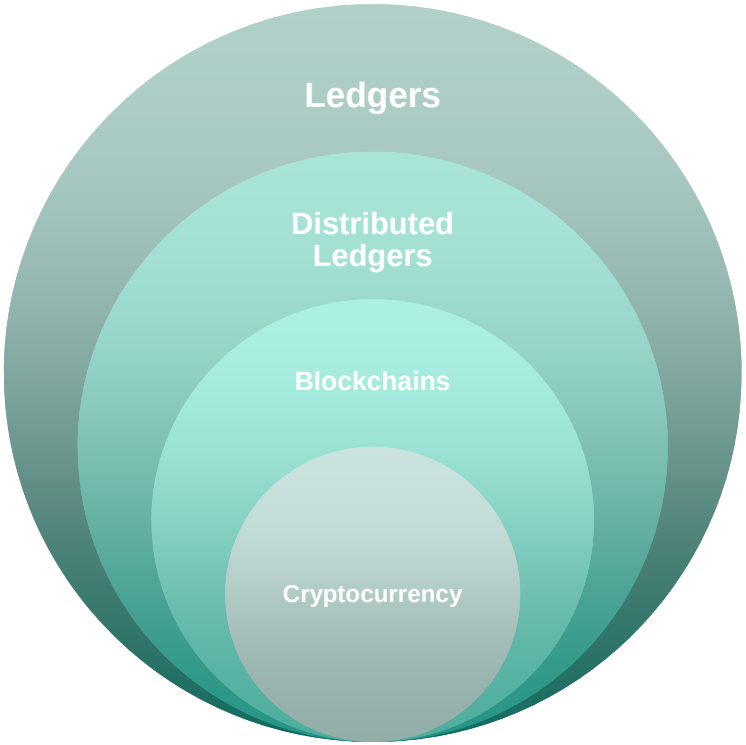
Cryptography to ensure identity authentication for each transaction

Non-repudiation to preserve integrity of data and create an audit trail.

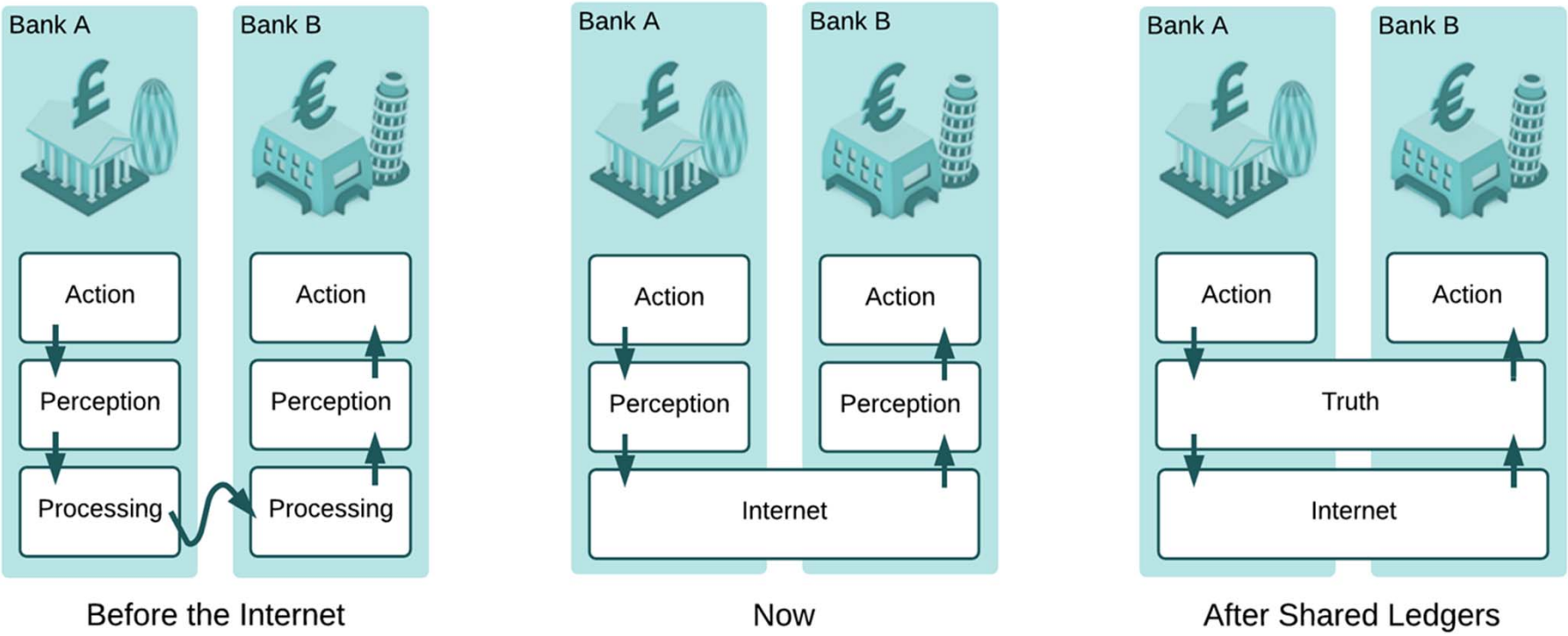
Smart contracts for the automatic execution of business logic when certain criteria are met.

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…

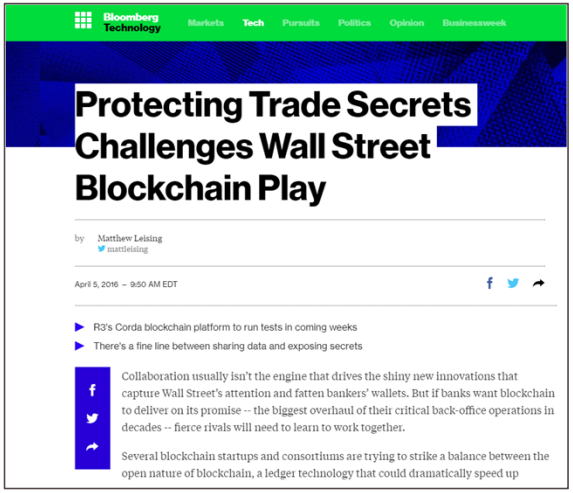


R3 Corda: A Unique Approach to Shared Ledgers

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

Manages and Executes Financial Agreements

Legal Interlock	Interoperable	Private	Shared Business Logic



Bloomberg Technology — Markets | Tech | Pursuits | Politics | Opinion | Businessweek

Protecting Trade Secrets Challenges Wall Street Blockchain Play

by Matthew Leising
@mattleising

April 5, 2016 – 9:50 AM EDT

- R3's Corda blockchain platform to run tests in coming weeks
- There's a fine line between sharing data and exposing secrets

Collaboration usually isn't the engine that drives the shiny new innovations that capture Wall Street's attention and fatten bankers' wallets. But if banks want blockchain to deliver on its promise -- the biggest overhaul of their critical back-office operations in decades -- fierce rivals will need to learn to work together.

Several blockchain startups and consortiums are trying to strike a balance between the open nature of blockchain, a ledger technology that could dramatically speed up

- 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?

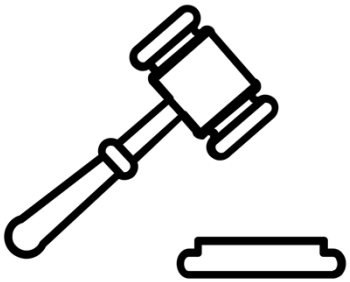
Illustrative Use Cases Leveraging DL Technology

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

Financial Institutions

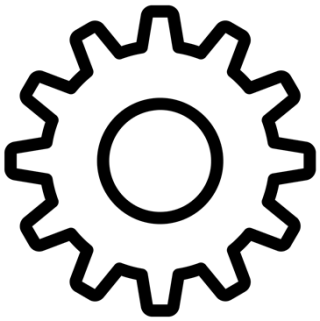
- FX Settlement
- Trade reconciliations
- Transparent Valuations
- Cross Border Payments
- Credit Efficiency
- Loan Settlement
- Derivatives Clearing
- Collateral Management

Regulators



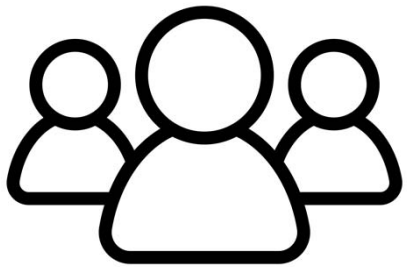
- Compliance Reporting
- Risk Visualization
- Basel III Compliance
- Client Fund Transparency
- Know Your Customer / Anti-Money Laundering
- Trade reporting

Operations



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

Individuals

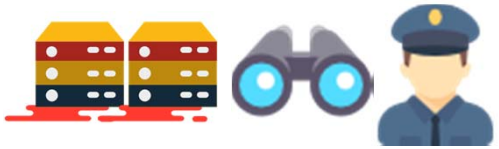


- Crowdfunding
- Virtual Identity
- Credit Scoring
- Cross Border Remittance
- Vault/Escrow Services
- Customer Deposit Cost
- Peer-to-Peer Lending

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

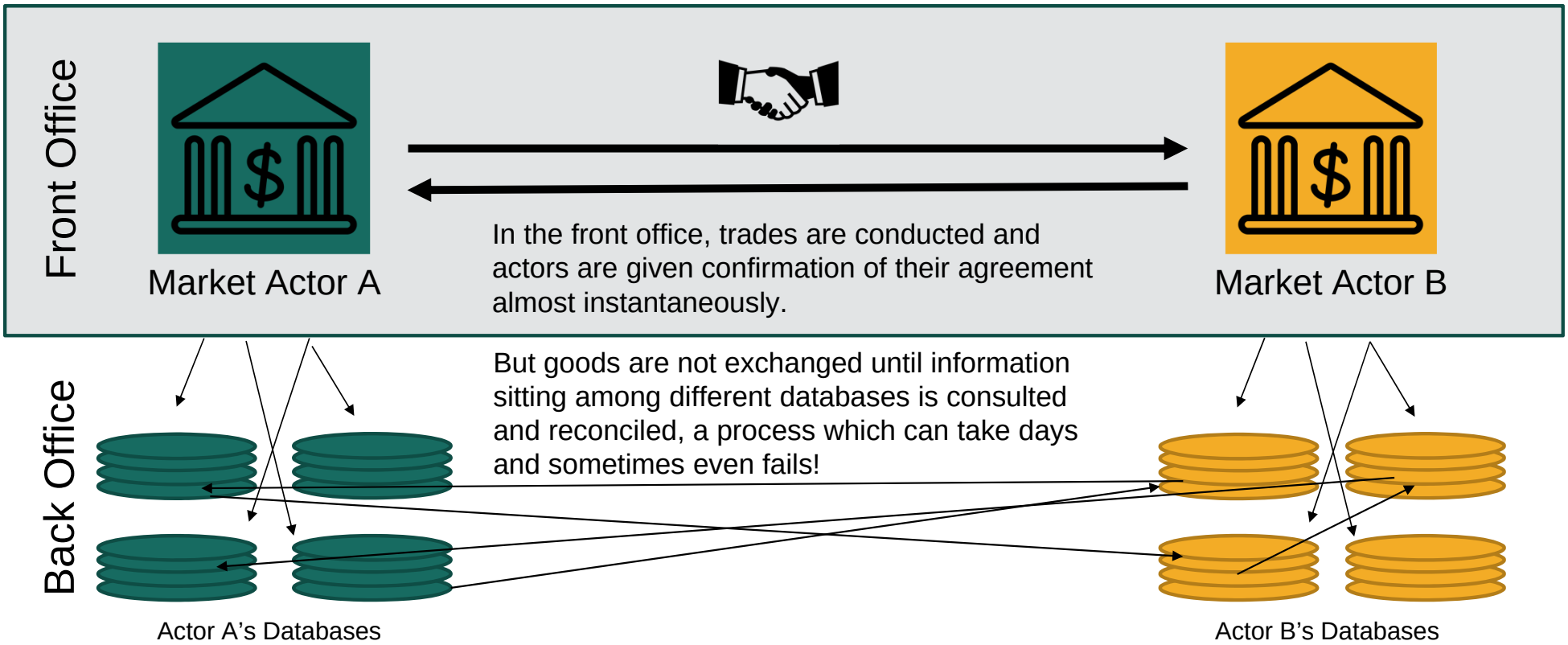


Simultaneous, real-time legal entity, auditor, and regulator access to data of multiple institutions

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.



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.

Front Office

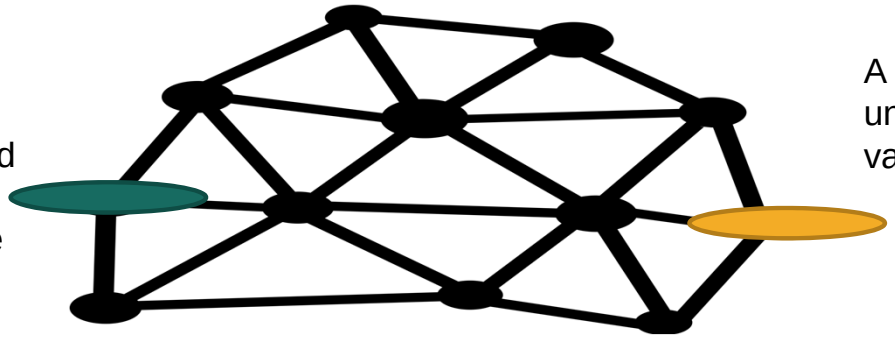
Market Actor A

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

Market Actor B

Back Office

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

FORTUNE

Here's Why the Blockchain Would Have Saved Lehman Brothers

by Jeff Bukhari @jeffbukhari MARCH 30, 2016, 6:14 PM EDT

siliconANGLE

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