



HYPERLEDGER

BLOCKCHAIN TECHNOLOGIES FOR BUSINESS

A guide to developing applications with Hyperledger and Blockchain

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The Basics

Introduction to Blockchain

October 2008, it all started with Satoshi Nakamoto and his historic paper **Bitcoin, a Peer-to-Peer Electronic Cash System** <https://bitcoin.org/bitcoin.pdf> Which addressed a key problem:

*A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. **Digital signatures provide part of the solution**, but the main benefits are lost if a trusted third party is still required to prevent double-spending. **We propose a solution to the double-spending problem using a peer-to-peer network.***

Hyperledger Fabric: A Distributed Operating System for Permissioned Blockchains

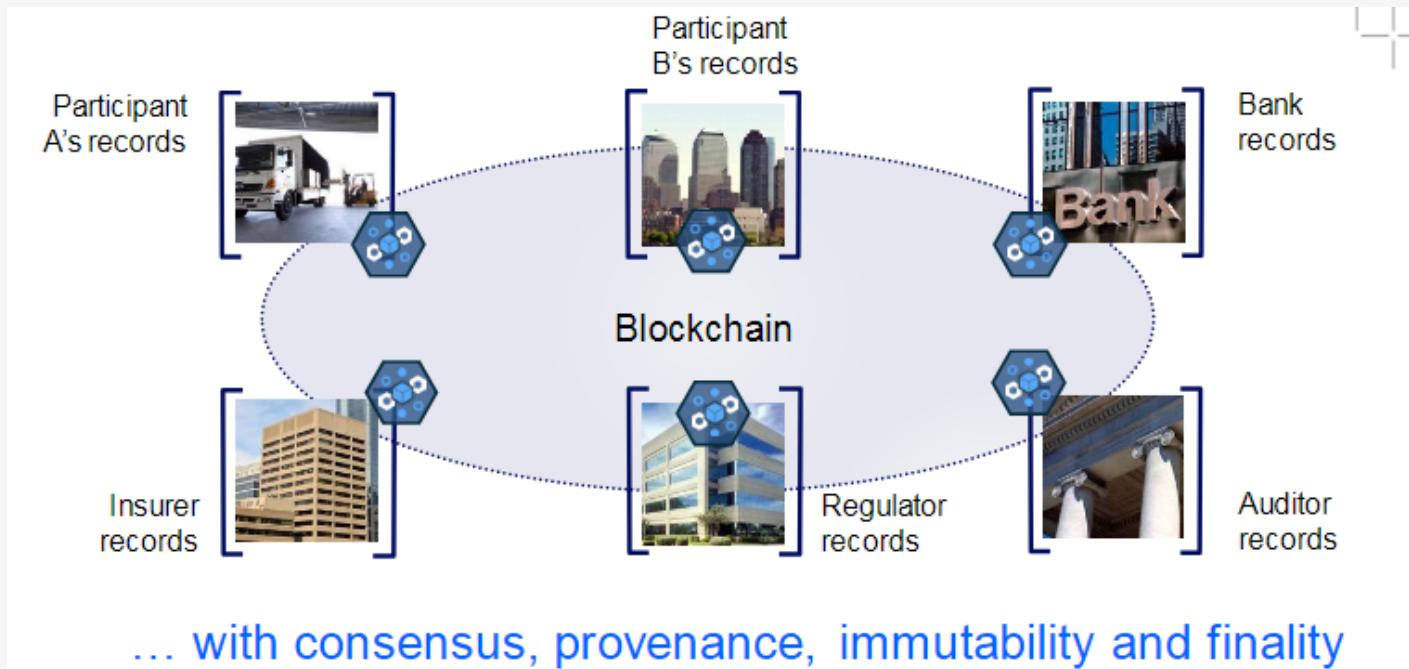
Elli Androulaki Artem Barger Vita Bortnikov Christian Cachin Konstantinos Christidis Angelo De Caro David Enyeart Christopher Ferris Gennady Laventman Yacov Manevich Srinivasan Muralidharan* Chet Murthy† Binh Nguyen * Manish Sethi Gari Singh Keith Smith Alessandro Sorniotti Chrysoula Stathakopoulou Marko Vukolić Sharon Weed Cocco Jason Yellick

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<https://arxiv.org/pdf/1801.10228v1.pdf>

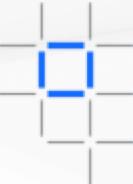
A shared, replicated, permissioned ledger

No central, third-party mediator, such as a financial institution or clearinghouse, is involved



... with consensus, provenance, immutability and finality

Blockchain



Blockchain global impact



10% of Global GDP
will be stored on
blockchains or
blockchain related
technology by 2025.¹



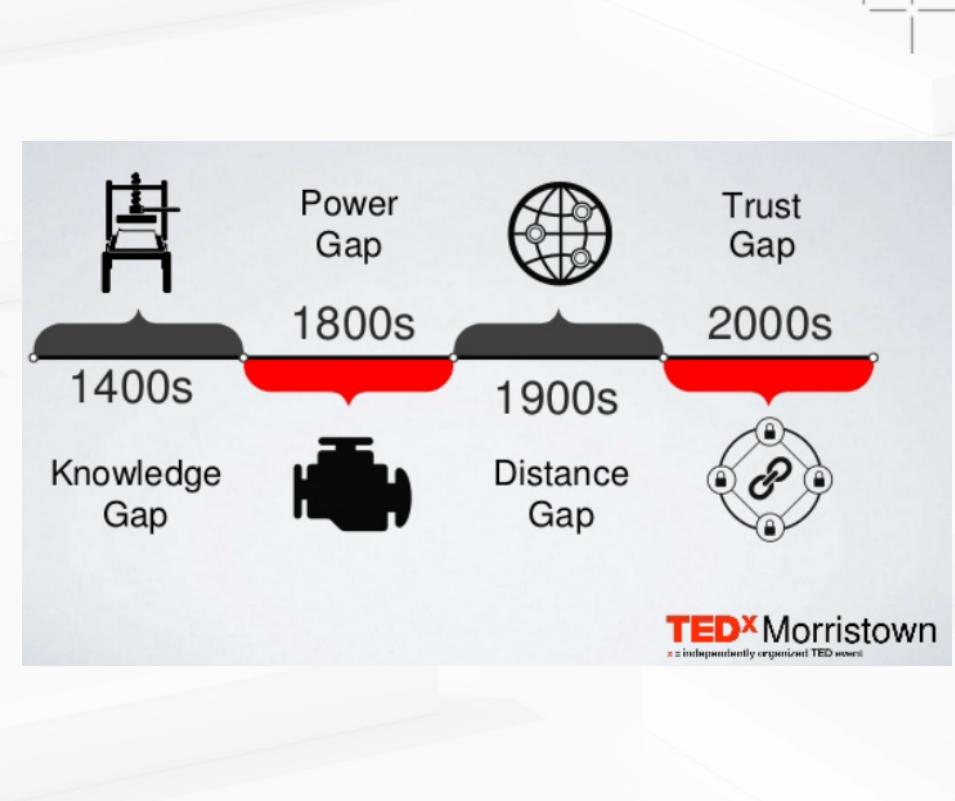
\$176 Billion
The business value
added by blockchain by
2025, then surge to
exceed \$3.1 trillion by
2030.²



17% of Banks
Released a Blockchain
application in 2017.³



\$2.3 Billion
Estimated size of the
Blockchain technology
market by 2021.⁴



TEDx Morristown
an independently organized TED event

¹ Source: World Economic Forum
³ Source: IBM

² Source: Gartner
⁴ Source: MarketandMarkets

Re-imagining digital business processes



TRADELENS



- **Connects the ecosystem:** brings together ports, terminals, ocean carriers, government authorities, etc
- **Drives true information sharing:** real-time and seamless actionable insight
- **Fosters collaboration and trust:** automate cross-org business processes
- **Shared visibility** and shared state for shipments



IBM Food Trust™



- **Manage quality risk:** enable rapid, low cost, food recalls
- **End to End transparency:** data sharing extends beyond 'one up, one down'!
- **Trust and Audit:** ensure provenance with easily trusted, auditable records.
- **Consumer confidence:** comprehensively communicate with end consumer



World Wire



- **24x7 payments:** payment support regardless of size, origination, destination or asset type
- **Higher visibility:** for streamlined transactions with reduced disputes and reconciliation needs
- **Regulatory compliance:** enhanced through improved transparency
- **Secure network:** with interaction and eligibility criteria & robust access control



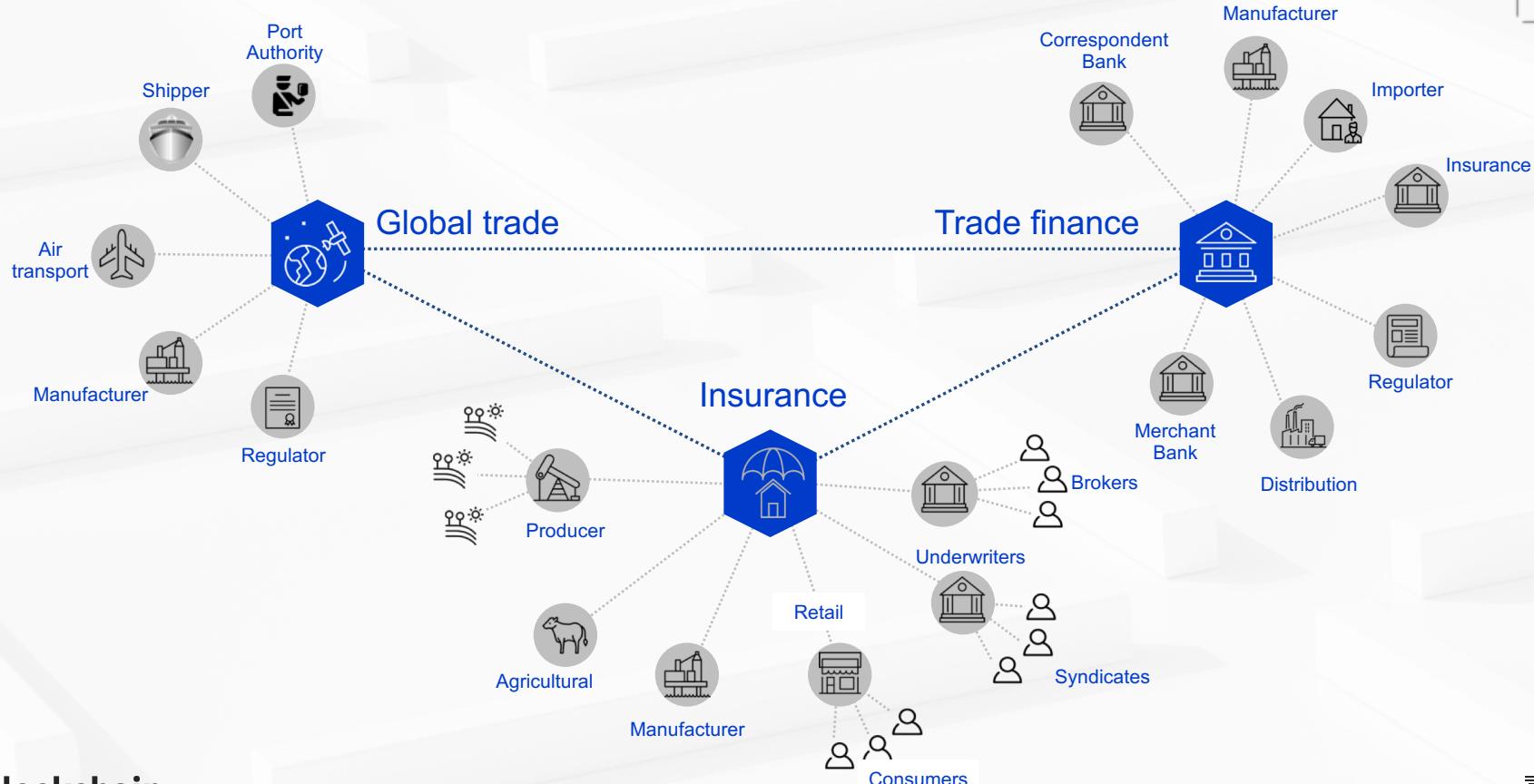
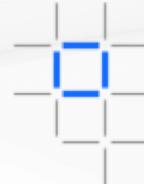
we.trade

more trust. more trade.



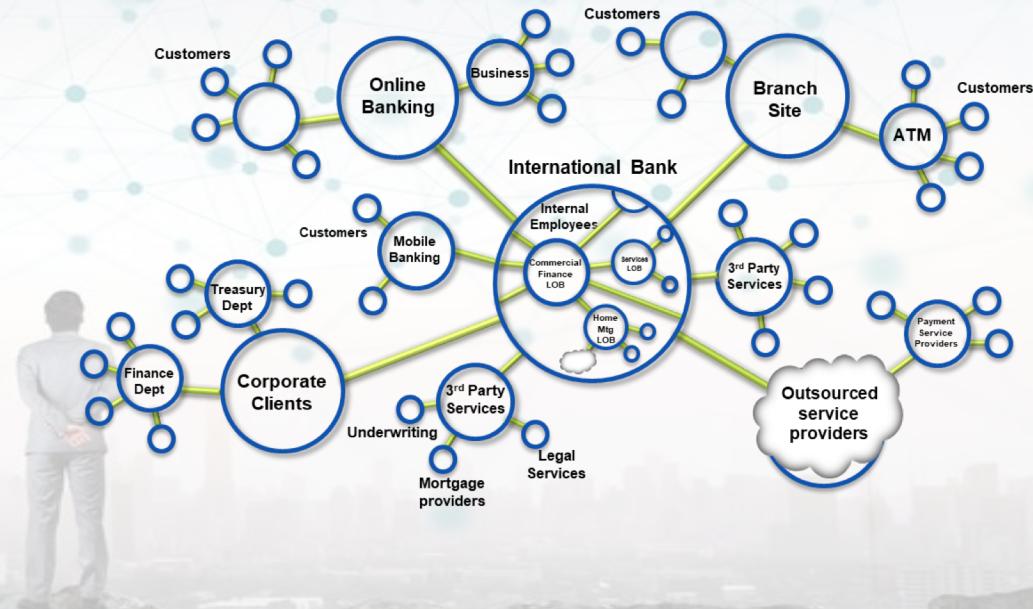
- **Trade finance platform:** backed by a consortium of major international banks
- **Full function:** enables accurate trading posture information, order to settlement control, risk coverage, track and trace options
- **Near-real time:** exchange of information
- **Discovery:** Allows buyers to discover trusted sellers and vice-versa

Towards a Network of Networks



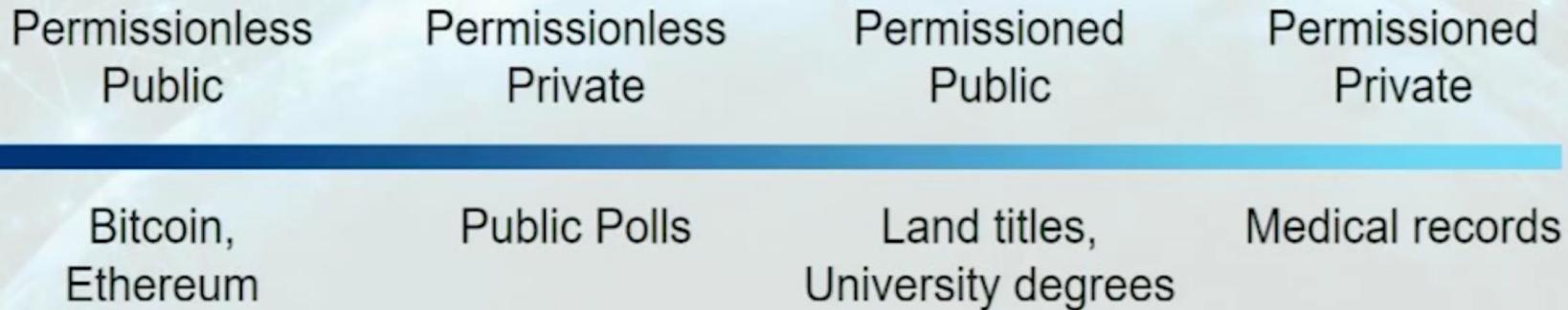
Blockchain builds on basic business concepts

- **Business Networks** connect businesses
- **Participants** with Identity
- **Assets** flow over business networks
- **Transactions** describe asset exchange
- **Contracts** underpin transactions
- **The ledger** is a log of transactions



Blockchain provides an
immutable, shared, replicated ledger

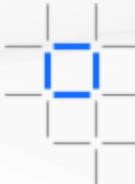
Spectrum of Blockchains



Permissioned vs. Permissionless: Who can write to a blockchain (i.e., accessibility)

Public vs. Private: Who can read from a blockchain (i.e., visibility)

Blockchain in 2018



Technologies



- Bitcoin
- Ethereum
- Hyperledger
- CORDA
- Ripple
- BigChainDB
- Quorum
- Stellar
- +++

Topics



- Shared Ledger & smart contracts
- Public, private
- Permissioned, permission-less
- Tokens and incentive mechanisms
- Identity and Zero Knowledge
- Consensus mechanisms
- On-chain, off-chain
- Systems integration
- Inter-ledgering
- Physical-digital with IOT

Communities



- Bitcoin
- Ethereum
- Linux Foundation / Hyperledger
- EEA
- ISO/TC 307 – Blockchain & DLT
- IEEE Blockchain
- W3C Blockchain Community
- Accord Project
- Sovrin
- DIF