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Role of Blockchain in Supporting Business Resilience & Sustainability

Prepared for IEMA

Sept 2020

Agenda
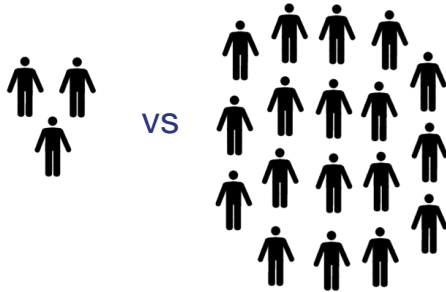
Blockchain Basics

Case Studies

Opportunities, Challenges & Looking Ahead

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Blockchain Basics

We Live in an Imperfect World

Wealth and power is aggregated among the few instead of spread to the many

Parties today are required to trust each other with sensitive data, transactions, and records
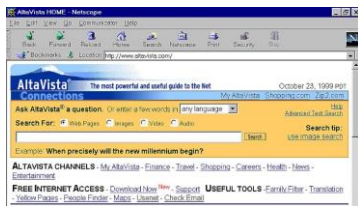
Paper and digital records can be tampered with and altered at many points of interaction

From Web 1.0 to Web 3.0

The Internet began as a decentralized architecture, but efficiencies and drive for wealth led to siloed, walled gardens. This was due to the lack of a mechanism for **shared ownership** of open platforms.
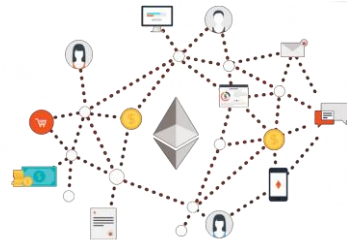
| Web 1.0	Web 2.0	Web 3.0
• Static rendered content • Images, text, hyperlinks	• Interactive, ecommerce, mobile, social • Efficiencies and competitive commerce – Siloed, walled gardens	• **Ethereum**: trusted transactions, automated agreements, smart objects on a world computer • Decentralized storage, bandwidth and heavy compute

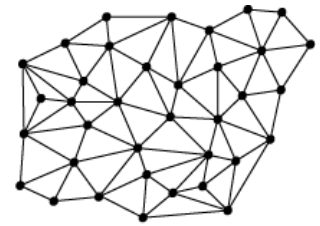# The Digital Economy is Headed Towards Decentralization

Digital business models transformation driven by **reduction in intermediaries**
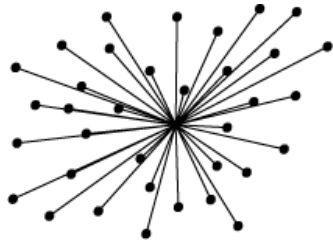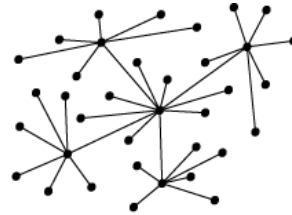
2010 **2015**

Platform Economy

Sharing Economy

P2P Economy

Today: Centralized Architecture → Single Point of Failure

Most Internet interactions run on centralized web servers

———

Designed to be controlled by a "trusted admin," who can read, delete, alter, block data

EQUIFAX

YAHOO!

TARGET

Massive amounts of user data in a single database = *honeypot

———

Vulnerable to targeted attacks by hackers & internal bad actors

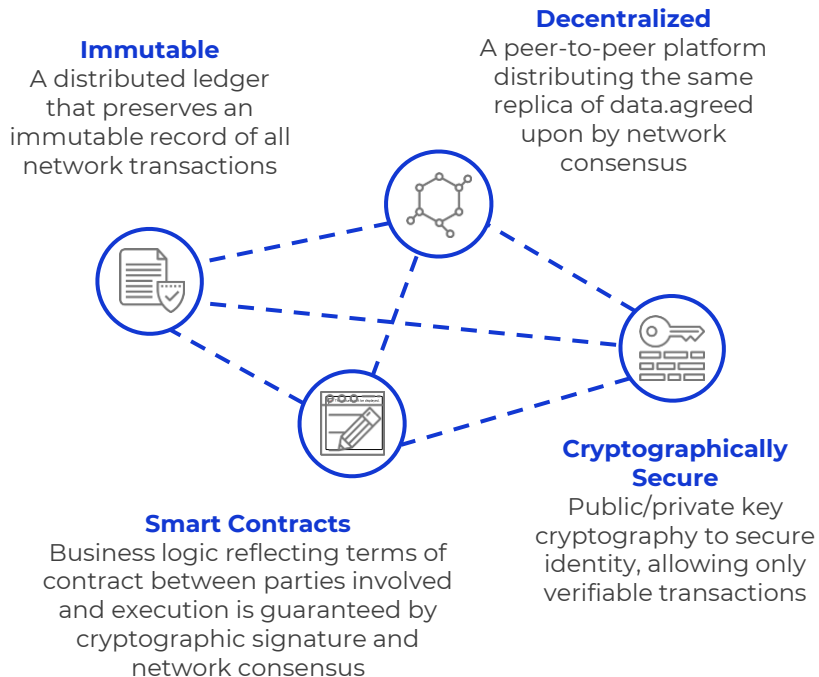*honeypot = identity, credit card numbers, etc.

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Future: Blockchains Create Open, Distributed Ledgers Shared Across Many Nodes

- Data is stored and replicated across nodes (no single point of failure)

- "Smart contracts" automate business logic without requiring trust

- Transactions are added to an immutable ledger that is tamper-proof

- Transfers are more secure, faster, and easier
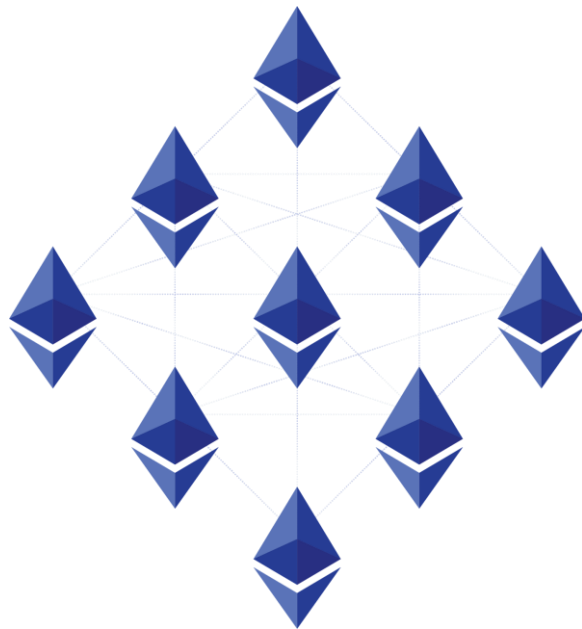
Blockchain is a distributed and immutable ledger, inherently resistant to attacks and malicious behaviours

Key Components

Immutable
A distributed ledger that preserves an immutable record of all network transactions

Decentralized
A peer-to-peer platform distributing the same replica of data.agreed upon by network consensus

Smart Contracts
Business logic reflecting terms of contract between parties involved and execution is guaranteed by cryptographic signature and network consensus

Cryptographically Secure
Public/private key cryptography to secure identity, allowing only verifiable transactions

Value Proposition

Reduces cost
- Removes the costs of intermediaries
- Reduces processing, re-work, and manual errors

Increases opportunities
- Creates new decentralised business
- Open the possibility of new products/services
- Captures potential value lost in delays

Reduces risk
- Immutable and resistant to collusion
- Shared data with privacy by design
- Reduces double entries/human errors
- Execution of contractual terms via self-executed code

Increases speed, trust and transparency
- Real time propagation of data and events
- Preserves complete audit trail
- Allows T+0 delivery vs payment

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Blockchain technology evolves with the creation of natively digital smart assets

Programmable

- Programmable digital assets smart-contracts allow for automating the creation and management of digital assets such as distribution, valuation, clearing and settlement.

Compliant

- Enable the implementation of on-chain and off-chain compliance checks to automate compliance with several legal requirements, especially KYC and AML.

Immutable & Transparent

- Immutable ledgers with trusted real time transactions audit trail providing direct and cryptographically secure ownership of investors

Efficient and liquid

- Markets can be designed as natively global, allowing trading of smaller units with international payments and delivery of assets cleared and settled in seconds, with transparency and finality.

"Tokenization on Ethereum allows physical and digital assets to be represented by almost-infinitely divisible, traceable, secure units of ownership.

With real-time settlement, reconciliation will be eliminated or at least require less time, energy, and capital to execute, ensuring that companies can operate at their maximum optimization and profitability.

Joe Lubin

**ConsenSys founder
Ethereum co-founder**

3 Main Enterprise Technologies which are not Interoperable (yet)

Enterprise Ethereum	Hyperledger Fabric	R3's Corda
Ethereum was established in 2014, and Quorum Enterprise Client for Privacy was launched in 2016. Enterprise Ethereum Alliance (EEA) was formed in 2017. Hyperledger Besu was created in 2019 and follows the EEA Technical Specifications, it is currently on v1.4	Hyperledger Fabric was contributed by IBM (prev Open Blockchain) in 2016 to start the Hyperledger Foundation.. Fabric was originally founded by IBM and is currently on v2.1	The R3 Consortium was launched in Dec 2015. Corda open source launched in Nov 2016. Corda Enterprise was launched in 2018 and the current on v4.3
Ethereum Mainnet: 54,000 total and 7,000 active mainnet nodes across 90 countries (2,000 in USA) Public testnets available - ropsten, kovan, rinkeby, goerli, beacon (eth 2.0)	No hyperledger fabric public blockchain Bespoke permissioned networks created by IBM on their cloud infrastructure	No corda public blockchain Permissioned network services available to join via Corda Foundation (250k yearly membership)
300,000 developers globally, the largest global blockchain ecosystem Estimated 30,000 new developers monthly	Approx 20k+ developers	Approx 15k+ developers

Case Studies

Covantis

ConsenSys partnered with Covantis backed by 5 industry leaders. The founding members, ADM (NYSE: ADM), Bunge (NYSE: BG), Cargill, Louis Dreyfus Company and Glencore Agriculture, are jointly developing a platform to make global trade simple, secure and efficient. The initiative aims to bring efficiencies and cost savings to companies throughout the international supply chain.

In the Past

An estimated
275 million emails
annually...

to process
11,000 shipments
each year.

Documents involved

Complex processes

A complex process

- Repetitive
- Manual
- Costly
- Time-consuming

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Today

Increased Efficiency Using Blockchain

International Trade Operations

Contract Management | Letter of credit process

1 Notices, (nomination, tender...)
2 Documentary instructions
3 Appointment of 3rd party providers
4 Drafts generations
5 Original documents Issuance
6 Documents Presentation

Invoicing payment | Custom clearance | Load and discharge logistics | Laytime | LOI process

Efficiency Gains

80% ↓ decrease in error rates.

An estimated 60% of execution tasks can be automated.

70% ↑ increase in transaction speed.

90% ↓ decrease in re-keying entries.

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Covantis Features: Nomination

Add Buyer / Seller after creating the Vessel

Adding Sellers

Covantis Features: Documentary Instruction

Filling in Documentary instructions / importing DI received by buyers

Covantis Features: Digital Documents & Auto-Matching
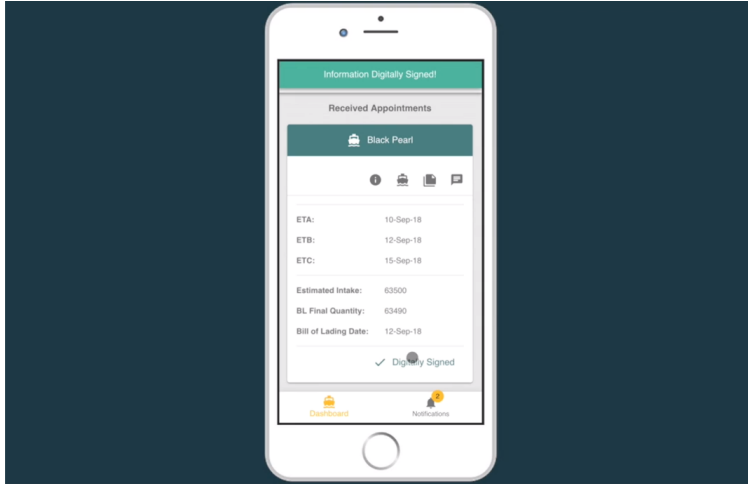
Agent can login check new appointment, provide updates, issue digital bill of lading
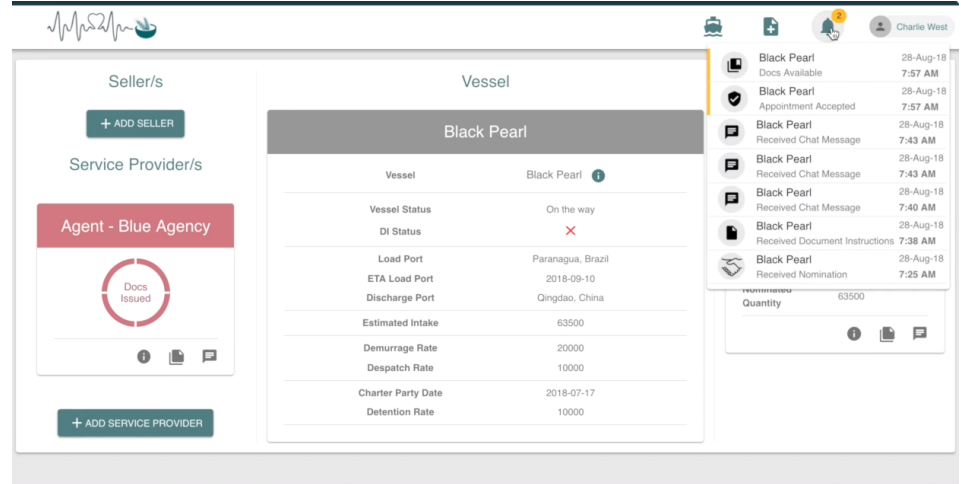
Shipper can check if the documents are compliant with instruction.
No need to manually check on each doc

Covantis Features: Draft Generation
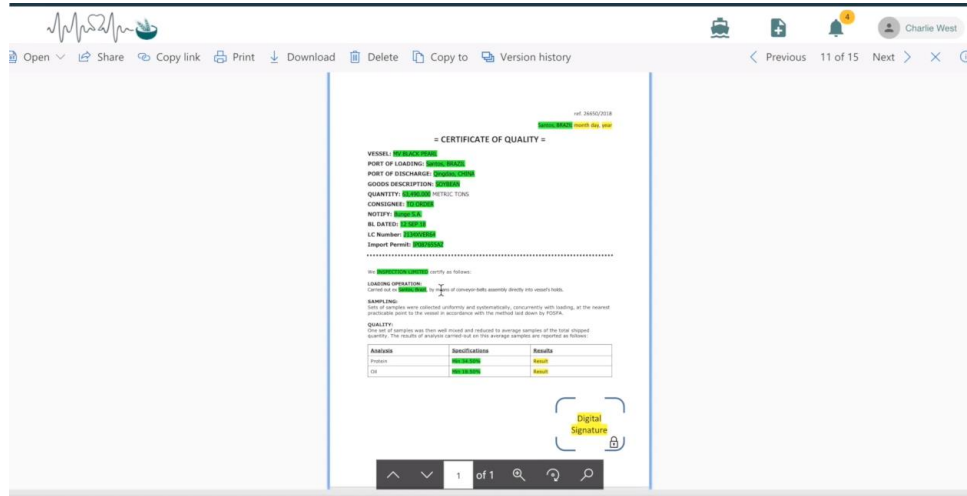
Auto-generate draft for buyers with all the information available pre-filled from previous processes
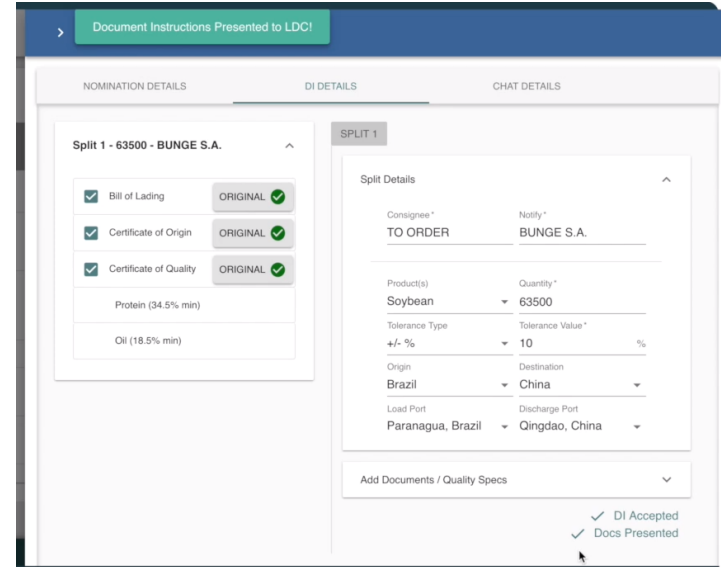
Saving up to 10 days for generating documents in every shipment

International Trade Market is a $16T market...

International trade is the exchange of capital, goods, and services across international borders or territories.

It is a $16tn market:

- 75% of various goods typically shipped by shipping containers or ground transportation

- 25% of commodities

… of which, around ⅓ benefit from Trade Finance

Depending on estimates, around $5tn of International Trade benefit from Trade Finance mostly from banks, financial institutions and more recently from institutional investors or funds.

The Asian Development Bank highlighted the potential for growth of the global Trade Finance market by identifying a **$1.6tn gap** between supply and demand for trade finance, particularly for SME and midcap firms (74%) and trade flows from/to emerging markets (40% of the gap originates in Asia and the Pacific) .

This gap stems primarily from:
- KYC concerns (29%)
- Lack of information and transparency (21%),
- High operational cost/poor profitability (15%)
- And a lack of alternative investors to banks despite the favorable risk profile of trade finance as an asset class (good return w/ low default rates)

Rapid globalization has outpaced the industry's ability to standardize and digitize its system of record-tracking

As a result trade and financing require a tremendous amount of trust between transacting parties to hedge against all of the vulnerabilities the industry's complexity allows.

Industry Challenges	Operational Challenges	Pain Points
Complexity	Paper Based	Delays
Regulation & Compliance	KYC	Fraud
	High Operational Cost Could be reduced by 35%	Loss of Income & Opportunity

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Komgo

ConsenSys has partnered with komgo, backed by 15 industry leaders, including banks, trading companies, an inspection company and an energy major to digitize the trade and commodities finance sector through a blockchain-based open platform.

Komgo

Komgo Case Study: Blockchain for Commodity Trade Finance

A blockchain-based open platform that is **bringing commodity trade finance into the 21st century** by optimizing financing processes and accelerating operations with digitized transactions and a trusted source of documents to reduce fraud.

komgo

Problem Statement

Rapid globalization has outpaced the trade finance industry's ability to standardize and digitize its system of record-tracking. The exchange of commodities—each with its own unique regulations, shipping specifications, and certification requirements—is currently managed across different borders and jurisdictions using an ineffective, antiquated paper-based system of record tracking that is often prone to significant issues.

Among these issues are fraud, security vulnerabilities, and inefficient payment methods that leave stakeholders waiting for payment for an inordinate amount of time.

 It has been difficult to make significant technological improvements to trade finance operations for various reasons, including the number of diverse stakeholders located across the globe and the complexity and volume of business transactions. Fractured processes cause billions of dollars worth of annual losses in income and missed opportunities.

Solution & Partnership

The komgo platform, backed by 15 of the world's largest institutions spanning global banks, trading companies, and oil giants, facilitates significantly increased transparency, while its "privacy by design" architecture permits private peer-to-peer transactions. This design model radically enhances trust and accelerates access to trade finance by reducing operational procedures and lowering the risks of failures and fraud across the industry.

A private, shared blockchain network based on Enterprise Ethereum that serves as a secure, streamlined, and digital platform on which only authorized parties can store data, exchange transactions, and send messages more efficiently and securely based on permissions. This network enables the secure peer-to-peer exchange of documentary evidence to support Know-Your-Customer (KYC) due diligence and the execution of trade finance transactions.

By working with ConsenSys Solutions and leveraging Kaleido's enterprise blockchain solution, komgo was able to quickly implement its vision and successfully deploy its live production network in December 2018.

Goals Achieved

After 2 years of proofs-of-concept and pilots, komgo incorporated in August 2018 and launched its platform four months later on 20 December 2018. komgo is connected to another live Ethereum platform, VAKT, a blockchain based post-trade processing platform for commodities. The first letter of credit was issued on the komgo platform on 21 December 2018—a first for the commodity trade finance industry.

komgo catalyzes the world's commodity trade network by facilitating a global ecosystem that optimizes physical commodities financing and the acceleration of industry operations. While streamlined operations are estimated to create potential cash-flow gains of 30-40% across the entire production chain, industry-wide adoption of komgo is expected to reduce the cost base between 20-50% with the possibility of further improvement as the project matures. komgo seeks to further expand its product offering in 2019 and will continue to grow its network to hundreds of participants.

MUFG | GROUPE CRÉDIT AGRICOLE | ING | Rabobank | NATIXIS BEYOND BANKING | MACQUARIE | GUNVOR | KOCH SUPPLY & TRADING | SGS | ABN·AMRO | BNP PARIBAS | MERCURIA | SOCIÉTÉ GÉNÉRALE | citi | Shell

WFP Building Blocks

Building Blocks (BB) is a blockchain-based system developed by World Food Programme (WFP) to deliver humanitarian assistance. BB create blockchain accounts for beneficiaries where their entitlements are loaded, and subsequent redemption authorized and recorded. BB has demonstrated several internal efficiencies for WFP, including **reductions in costs, reduction in risks, improved transparency, increased control, and improved operational flexibility**. Serving 650,000 Refugees, as of 9/2020.

Design Principles

Fair and Equitable

- The platform is owned and operated equally by all participants. Every member will follow and contribute to rules and standards, and have a fair representation in its governance with the alignment of stake, value-add and voting power.

Collaborative

- Code base will be provided for free. Partners can enhance the platform features by creating modules for health, education, shelter, microfinance, etc.

Privacy Enhancing and Secure

- Product security will be rigorously vetted by a dedicated product team with ongoing support. Comprehensive identity and role-based access management via smart contracts.

Accountable and Transparent

- Delegation of authority is clear following a model of an empowered executive team responsible to shareholders.

Opportunities, Challenges & Looking Ahead

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Current Blockchain Opportunities in Trade Finance

Sharing verifiable data with privacy by design

- Shared immutable ledger

- On-chain privacy or off-chain privacy with cryptographic proof on-chain

- Public cryptographic proof of executed transactions and states

- Certify issuer and date of issuance of documents or data on-chain

Real time events and business logic

- Emit smart contract events

- Near real time propagation to/processing by relevant parties

- Execute contractual clauses or conditions in smart contract

- Verifiable proof of contract execution of-chain

Cryptographic signatures of documents, legally binding messages, and interactions

Execution of business processes and shared data across networks via traditional interoperable layers

Transaction finality, use of Enterprise consensus (IBFT, PoA, etc.)

Current Challenges of Blockchain Platforms

Technical Challenges

- Early stage technology with limited toolkit in 2018

- Greatly improved in 2019 - new projects rely on low-level blockchain toolkits and focus efforts on development of business layers, product design and UX/UI

- Interoperability: many consortia on the same topics, and users may not want to use several platforms

Adoption

- Adoption of decentralised network and applications depends on product value that depends on adoption

- Need to consider functional flows in and out and on/off platform, engage with non-onboarded user, demonstrate value and incentivise users to join

- Interoperability between platforms/networks, with internal systems and with industry standard systems and protocols

Use Case Specific Challenges

- Legal value of:
  - Cryptographic proofs on-chain
  - Digital documents and data

- Paper still rules for now: the first step is to handle parallel flows of paper and digital documents, gradually moving towards pure digital documents

- Recognition of digital documents by P&I clubs (eB/L), legal systems and industry bodies

- Standardisation vs customisation

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Next Generation of Use Cases

Tokenization of IOUs, invoices, purchase orders, documents, collateral physical or digital assets and **payment via stablecoins/digitised FIAT currencies**

Creating primary and secondary marketplaces for such digital assets, increase liquidity and transparency

Metric and analytics by collecting aggregated and anonymised data via blockchain or Trusted Execution Environments that can be used to assess asset valuations
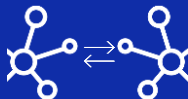
Interoperability across networks and functional layers (instant delivery vs payment, transfers of claims and digital assets across networks)

Leveraging other technologies: IoT, OCR, AI, to achieve end to end automation

Increase adoption of permissioned networks with business based on utility token economics and network economic incentives

Supply chain/trade finance funds could raise funds from alternative investors via regulated token issuance of funds shares on public or permissioned networks

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