Blockchain Panel

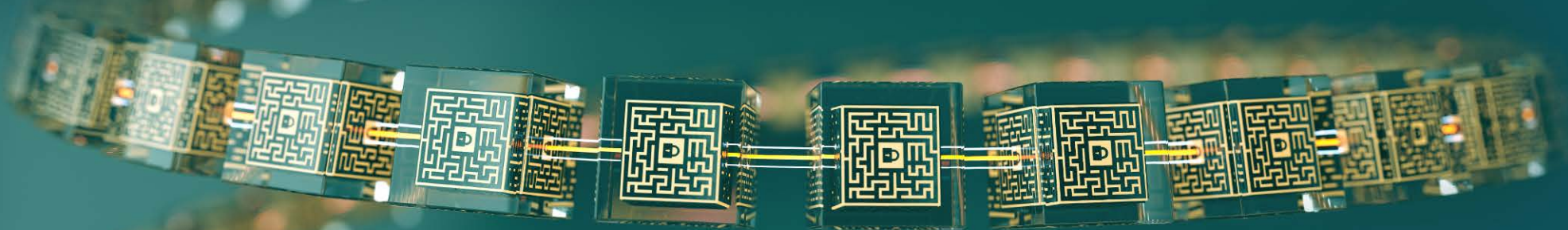**Keith Dierkx, IBM Corporation**

Sebastian de Meel, PwC

Srinivasan Sriram, SkuChain

Moran Cerf, Northwestern

"Over the past two decades, the Internet has revolutionized many aspects of business and society–making individuals and organizations more productive.

Yet the basic mechanics of how people and organizations execute transactions with one another have not been updated for the 21st century.

Blockchain could bring to those processes the openness and efficiency we have come to expect in the Internet Era."

Blockchain Multiple Choice Question

A: It's the latest rage

B: Blockchain doesn't solve technical problems

C: Blockchain solves social problems

D: Blockchain decentralizes and distributes trust

E: Amazon will be a big user of Blockchain

In less than 10 years, blockchain has emerged from a small presence (Bitcoin) to one of the most talked about technological innovations!

Bloomberg, November 2016

"In October, Walmart started tracking two products using blockchain – packaged produced item in US and pork in China – test involved thousands of packages shipped to multiple stores"

"Bringing Bling to the blockchain – we want to assist in reduction of blood diamonds"

- *Leanne Kemp, Founder and CEO of Everledger*

LEANNE KEMP

"77% of global financial companies will include blockchain in production process by 2020"

- *PwC Research 2017*

DeNovo Quarterly FinTech Report

WORLD ECONOMIC FORUM

"58% of surveyed executives and experts from the information and communication technology sector believe 10% of global GDP will be stored on the blockchain by the mid 2020's"

- *World Economic Forum, September 2015*

"You should be taking this technology as seriously as you should have been taking the development of the Internet in the early 1990s"
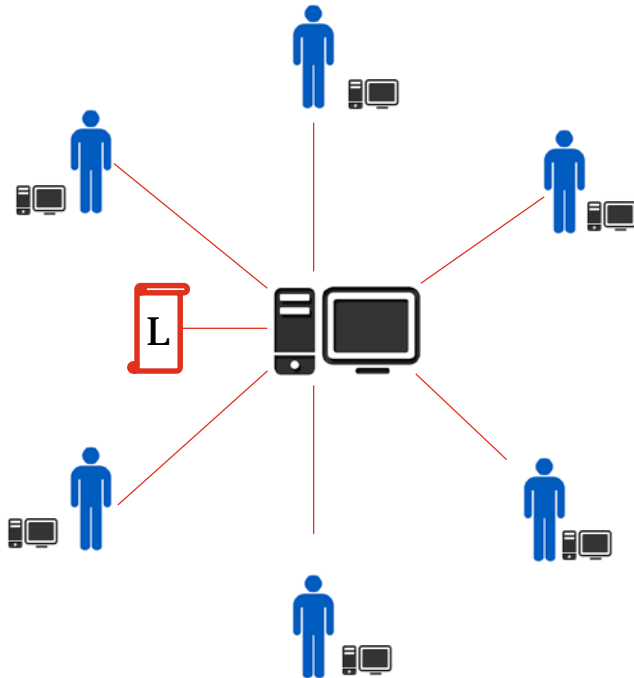
- *Blythe Masters to BloombergBusiness, 2015*

BBC Video https://youtu.be/2ky3mDUoh74

Source: BBC, PwC Analysis

Understanding blockchain

To understand blockchain we must first understand concept of the centralized versus distributed ledger
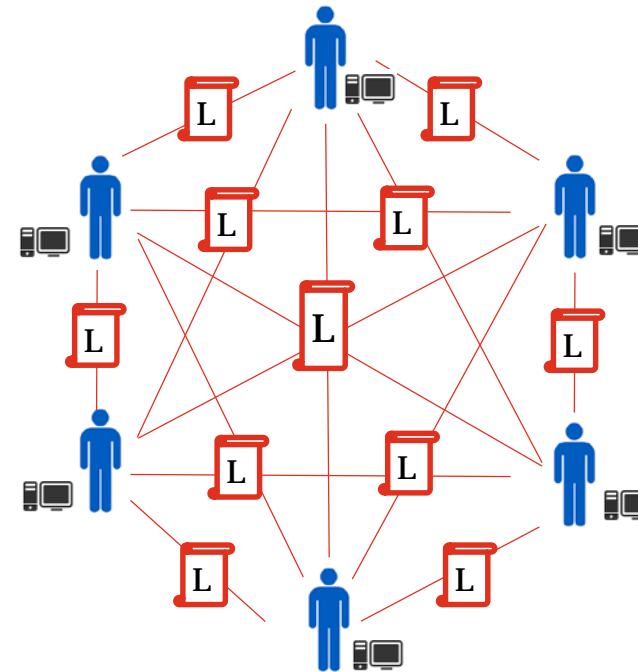
Centralized Ledger
e.g. Banks/ Paypal

Distributed Ledger
e.g. Public Blockchain Technology

Own ledger, have to "trust" central authority to maintain and update

Trust without central authority, blockchain algorithm process updates every 10 minutes, first computer solves new transaction algorithm and remainder agree – ledger updates with new block of transactions for all

Source: PwC Analysis

Moving on from bitcoin, today's blockchain can enable business and operations transformation, via smart contracts and privacy

What is blockchain?

A **blockchain is a decentralized ledger** of all transactions in a network. Using blockchain technology, participants in the network can confirm transactions **without the need for a trusted third party** intermediary.
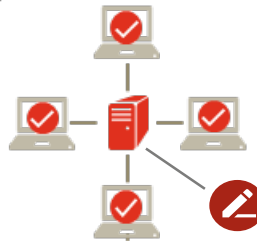
Someone in a network **requests a transaction**

The transaction is **broadcast to other computers** (nodes) in the network

The network of nodes **validates the transaction** using agreed algorithms

Private key

Smart contract (additional business logic) could be applied if needed and creates shared workflow

The **transaction** is complete

The new block is **added to the network's blockchain**, in a way which is permanent and unalterable

The verified transaction is combined with other transactions to **create a new block of data for the ledger**

Source: PwC Analysis

6 key operating concepts together enable the blockchain to drive benefits both within and between organizations

Transparency
Servers, or nodes, maintain the entries (known as blocks) and every node sees the transaction data stored in the blocks as created

Decentralized
There is no central authority or intermediary required to approve transactions and set rules

Secure
Integrity and security of the information on the blockchain are ensured with cryptographic functions

Trusted
Verification is achieved by participants confirming changes with one another, peers in the network validate updated information ensuring validity and integrity of the data on the chain

Immutable
The software is written so that conflicting or double transactions do not become written in the data set supporting a highly secure immutable transaction history

Smart Contracts
The ability to run additional business logic facilitates the ability to design and implement shared workflow and enhance automation
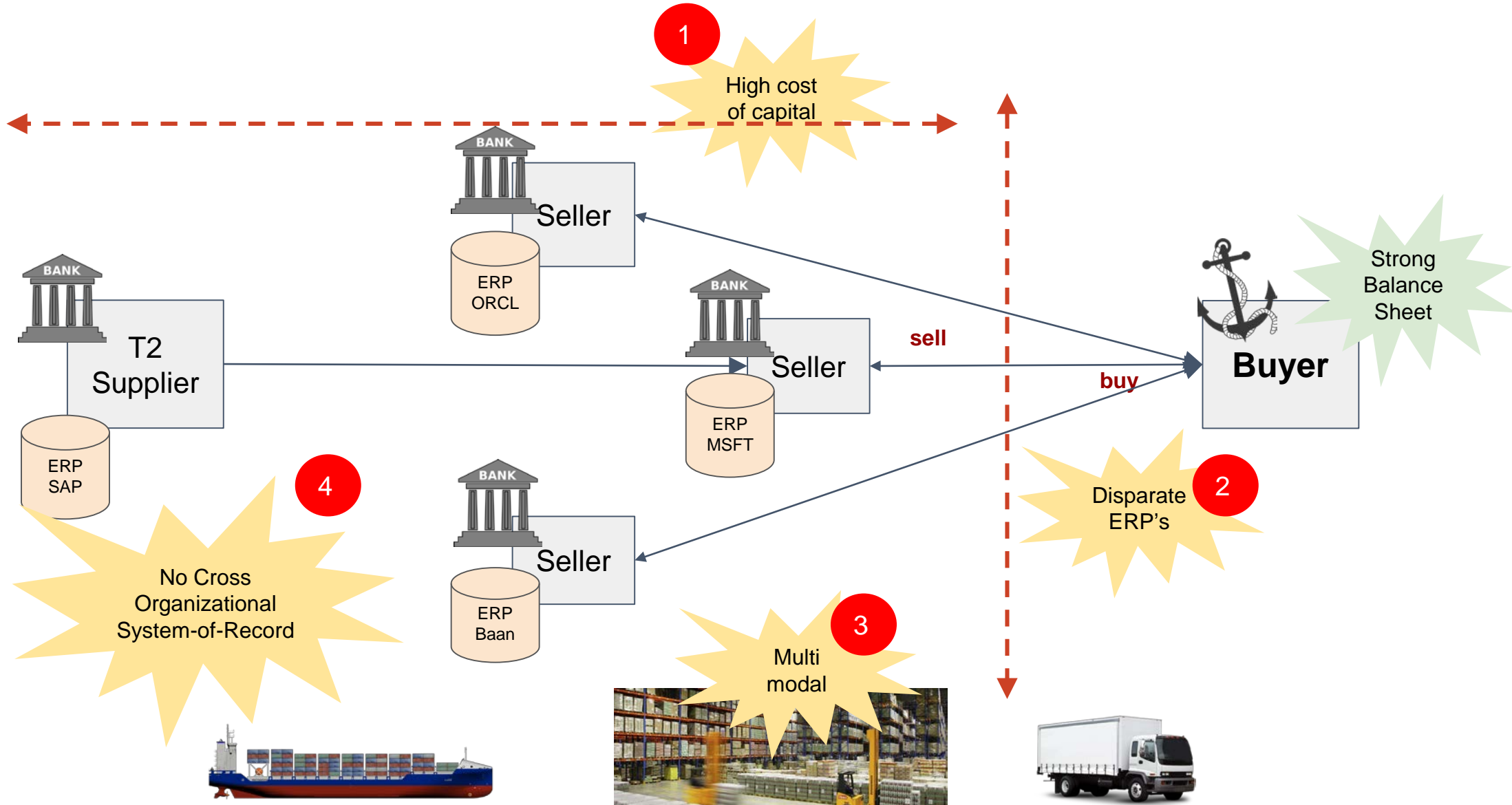
✓ Operational and cost efficiencies
  ✓ Reduce Errors
  ✓ Improve Cycle
  ✓ Automation

✓ Proven security and resilience

✓ Improves auditability

✓ Foundation for growth

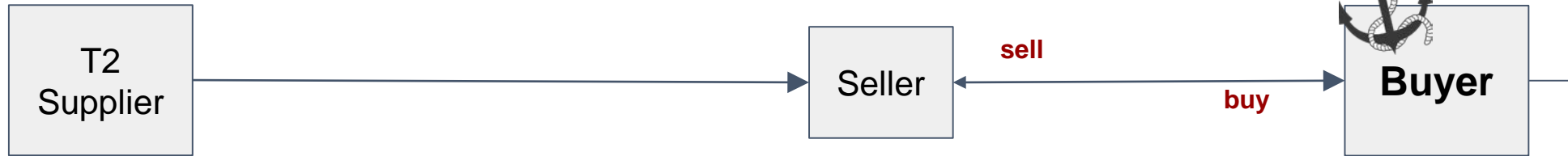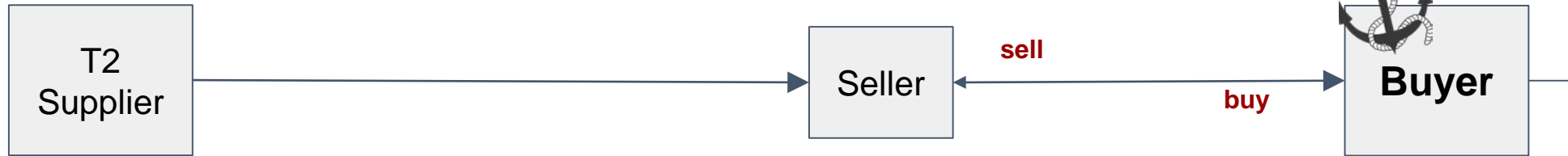Turn Information into Capital

We could use the Buyer's strong credit

T2 Supplier

Seller

Buyer

sell

buy

1 We could use the Buyer's strong credit

T2 Supplier → Seller ← **sell** **buy** → **Buyer**

2 To get capital from a financier ← BANK

1 We could use the Buyer's strong credit

T2 Supplier — ship → vmi → Seller ← ship — **Buyer**

buy

sell

IMT
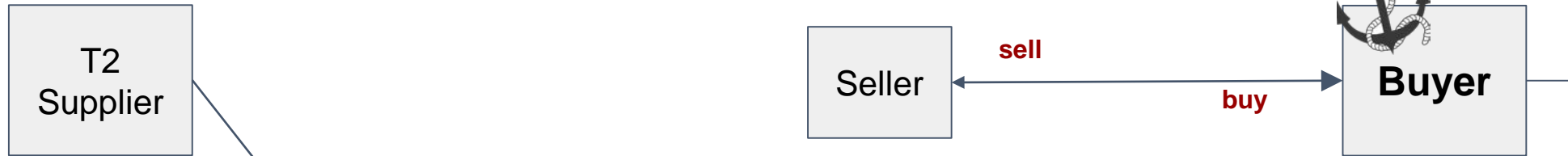
2 To get capital from a financier

3 Buy the raw material & sell to the Buyer

BANK

skuchain

✔ The Seller gets Working
Capital Relief

T2
Supplier

ship

vmi

Seller

ship

Buyer

buy

sell

IMT
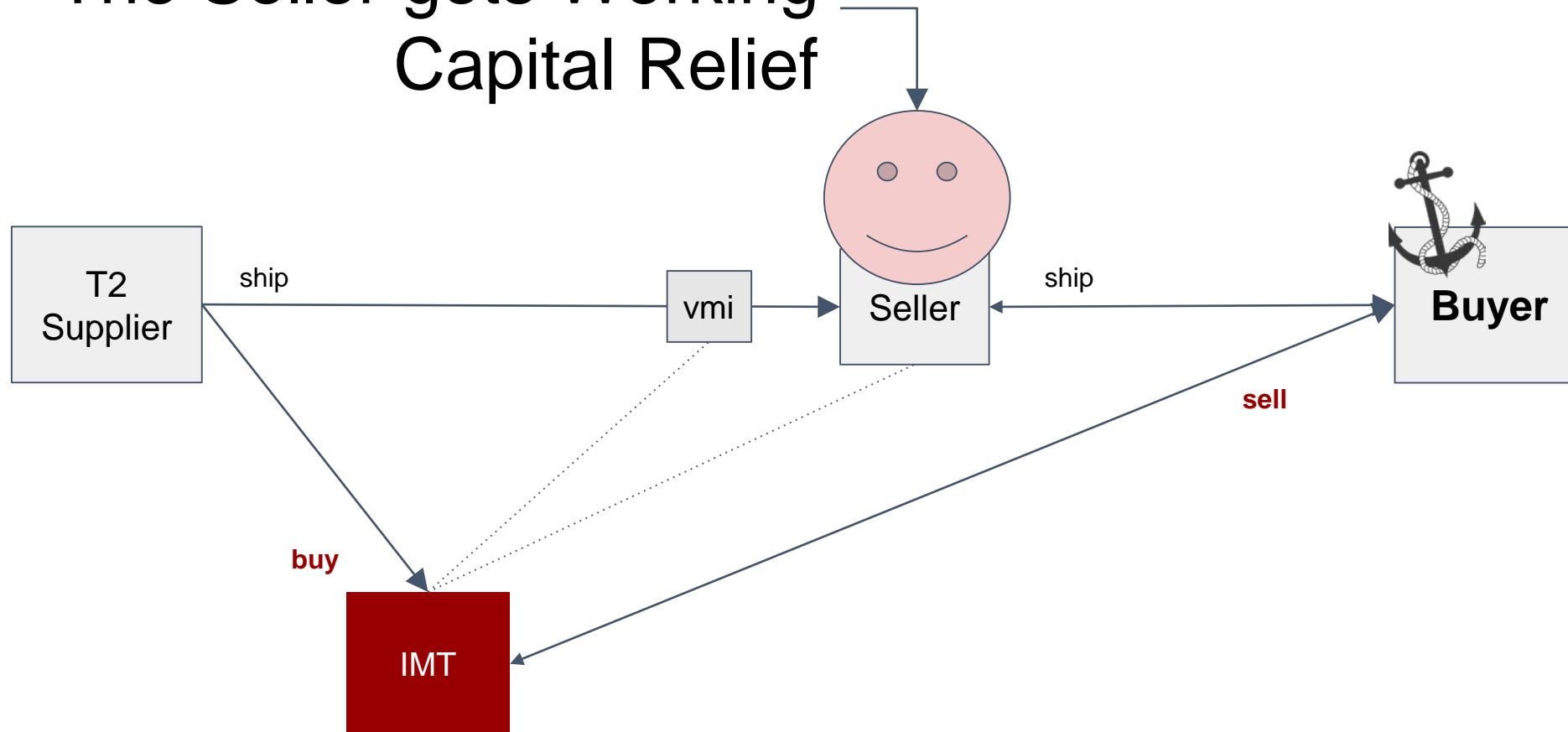
Blockchain Value		
	Title Transfer	✔
	Value Transfer	✔
	Multi Sig capability	✔
	Transaction encryption	✔
	Immutability	✔
	Provenance	✔
	Deterministic addresses	✔
	2^{160} number space	✔

✔ Let's us do just that!

What if...
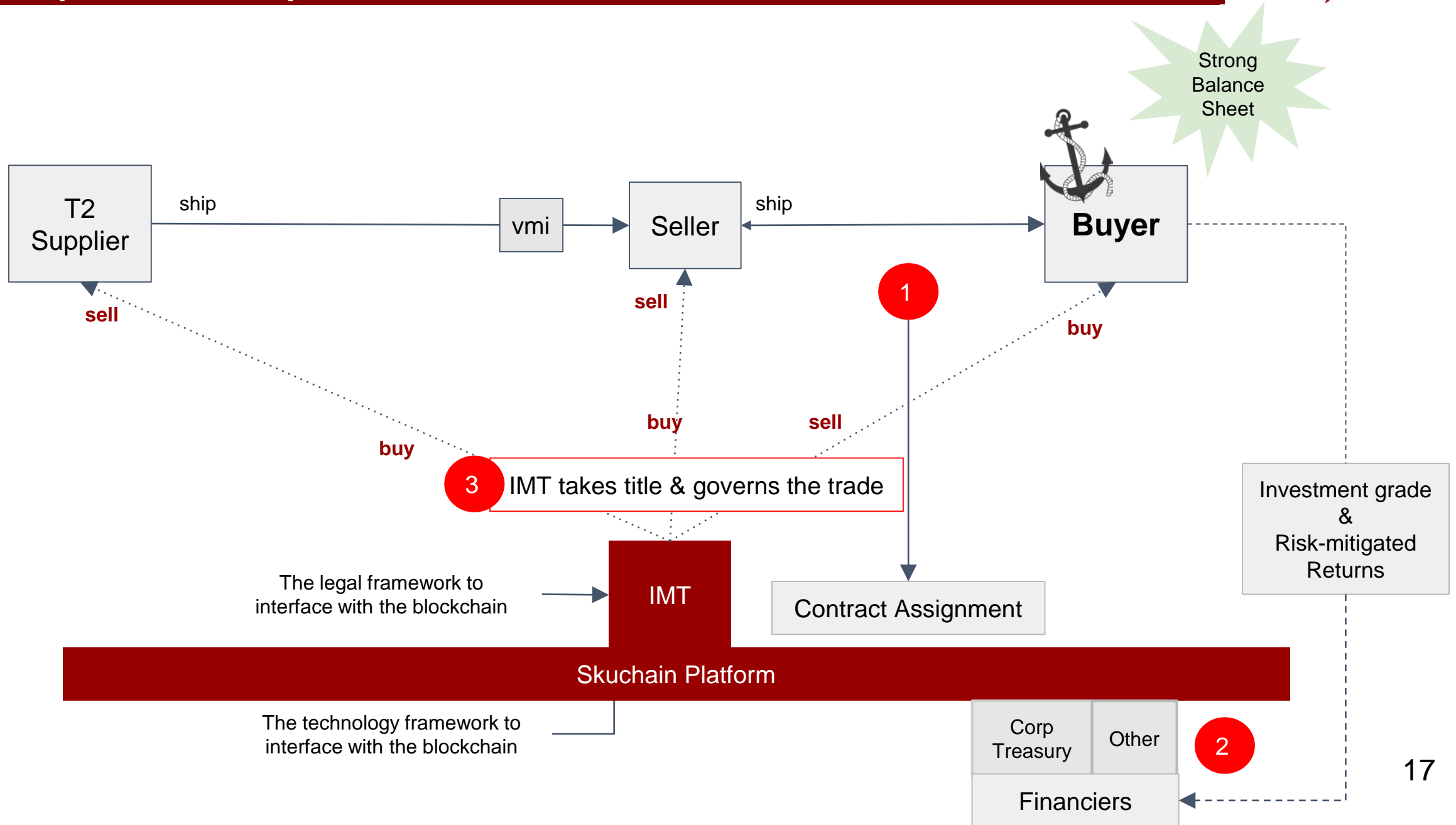
? We wanted to track a product from farm to fork

Farmer

Truck

Silo

Plant

DC

Retailer
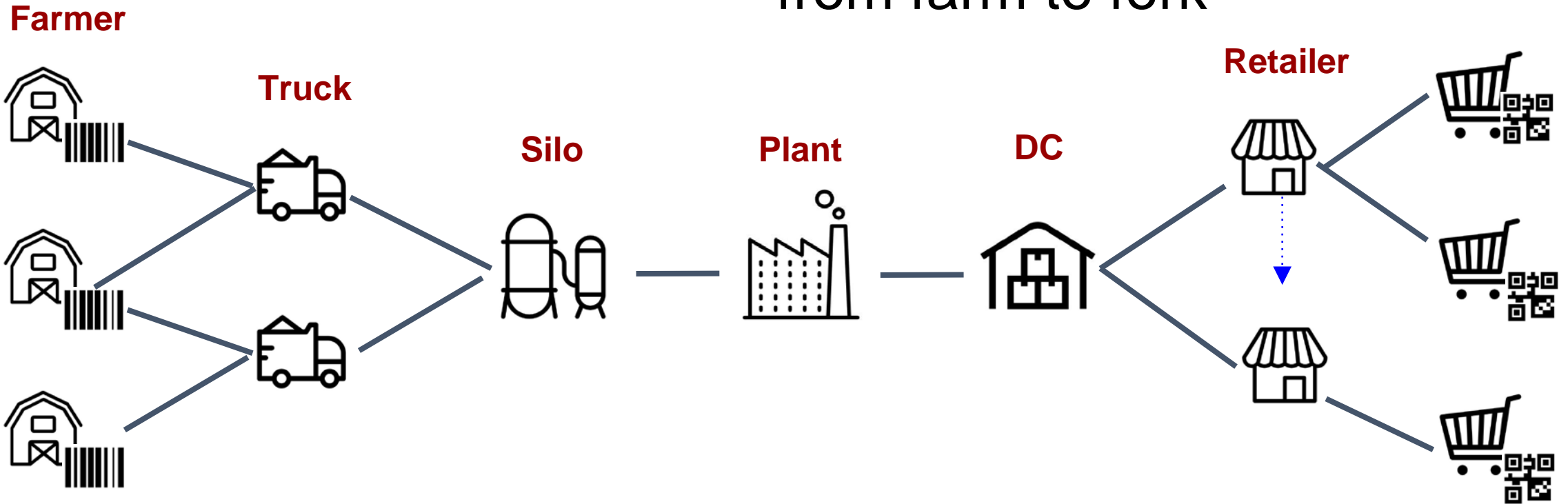
Entity	Action
Mint at Source	To 'count' the original quantity
Aggregate	To 'add up' all the sources that got combined at the factory
Process	To 'convert' the liquid/raw material to powder/finished goods
Distribute	To 'unitize' the quantity to each recipient
Retail	To 'transfer' the ownership of the product

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✅ Let's us do just that! w/ Skuchain's Popcodes

Unique Cryptographic Codes

genesis-65-000069

genesis-65-000070

**Sequential** Numbers - makes labelling scale
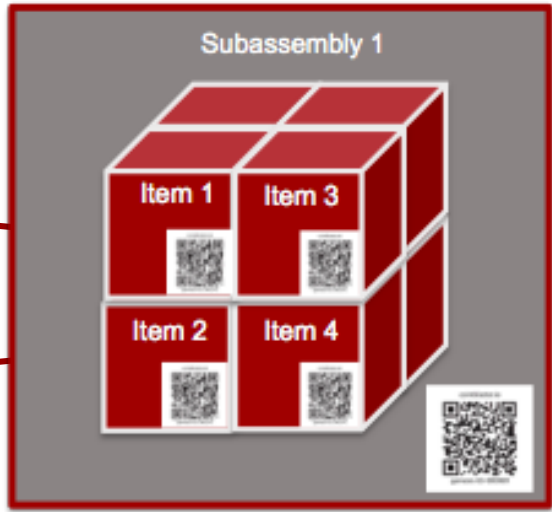
Value assigned to each item and assembly

MetaData

Subassembly 1
- Manufactured in Italy
- Date: 05/04/2016
- Line: 23298
- **Value $92.02**
  - **Item 1**
    - Manufactured in Ireland
    - Date: 04/04/2016
    - Line: 23298
    - **Value $23.97**
  - **Item 2**
    - Manufactured in USA
    - Date: 03/17/2016
    - Line: 00978
  - **Item 3 Value $22.98**
    - Manufactured in Croatia
    - Date: 12/06/2015
    - Line: 34342
    - **Value $22.09**
  - **Item 4**
    - Manufactured in USA
    - Date: 03/18/2015
    - Line: 00978
    - **Value $22.98**

20

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? We wanted real time visibility across the supply chain

Farmer

Truck

Silo

Plant

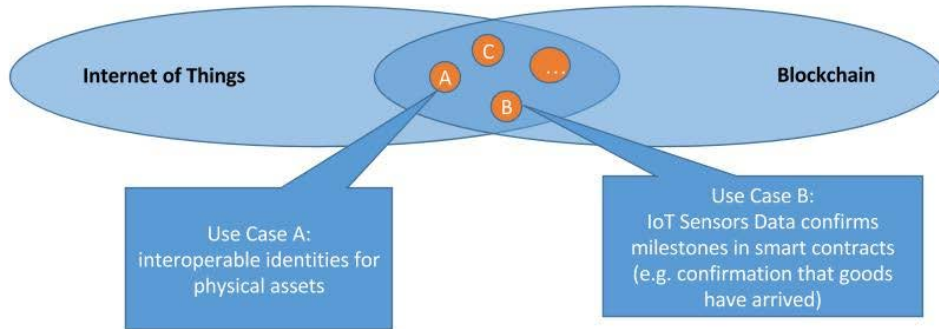**DC**

Retailer
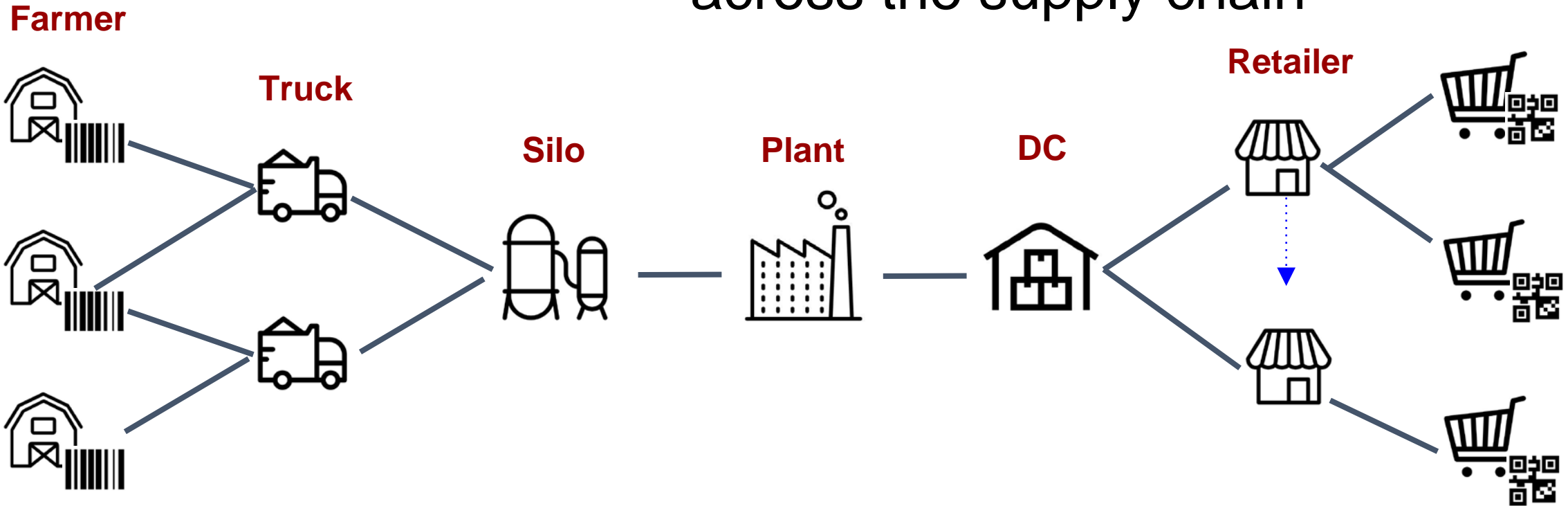
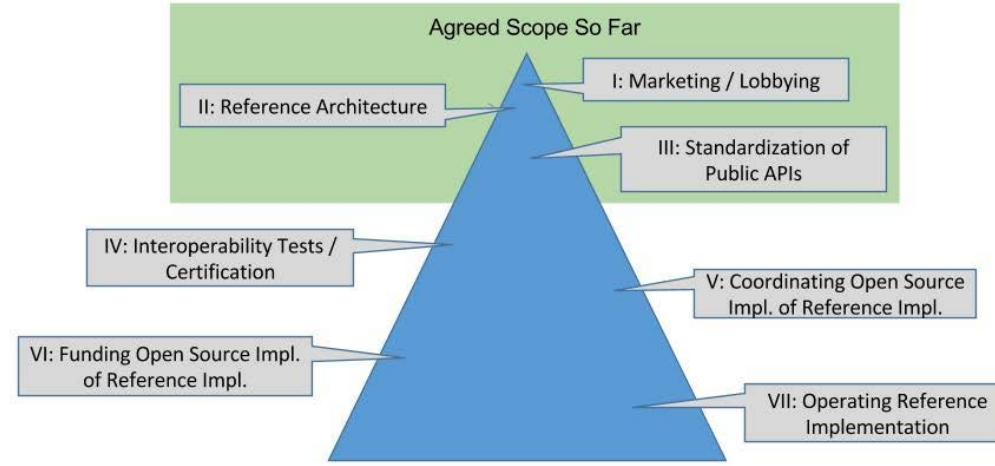| Entity	Action
Sensors	Track the movement and assembly of goods with sensors
Transport	Track the underlying goods as they are being transported

Horizontal Scope — Combined Blockchain/IoT Use Cases

Use Case A: interoperable identities for physical assets

Use Case B: IoT Sensors Data confirms milestones in smart contracts (e.g. confirmation that goods have arrived)

Vertical Scope — Agreed Scope So Far

I: Marketing / Lobbying
II: Reference Architecture
III: Standardization of Public APIs
IV: Interoperability Tests / Certification
V: Coordinating Open Source Impl. of Reference Impl.
VI: Funding Open Source Impl. of Reference Impl.
VII: Operating Reference Implementation

Protocol Functions | Building Interoperable IoT Solutions

	Luxury Authentication	Trade Finance	Sharing Economy	Industrial IoT	Autonomous Vehicles	Local Energy Trading
Registration	✓	✓	✓	✓	✓	✓
Verification	✓	✓	✓	✓	✓	✓
Transfer	✓	✓	✓		✓	
Ledger		✓		✓	✓	✓
Wallet			✓		✓	✓

Founding Members

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Skuchain Platform

	Logistics Handoff messages using **LIMBR** Protocol Logistics Inter-modal Blockchain Registry

	Manufacturing, Assembly & Transport signals

**With
Integrated Workflow**

| Products <-> Blockchain |
| Sensors <-> Blockchain |
| Products <-> |

Skuchain Platform

Gets us… Real time Visibility

	Farm		Truck		Nestlé Factory		Distribution Center		Retail Store
Name:	Happy Cow Dairy	**Name:**	Reliable Logistics	**Name:**	Nestlé Factory	**Name:**	Pacific Logistics	**Name:**	Safeway
Date:	Mar. 20, 2017	**Date:**	Mar. 20, 2017	**Date:**	Mar. 20, 2017	**Date:**	Mar. 22, 2017	**Date:**	Mar. 23, 2017
Time:	10:48 a.m.	**Time:**	11:02 a.m.	**Time:**	12:45 p.m.	**Time:**	10:30 a.m.	**Time:**	3:30 p.m.
Location:	San Jose, CA	**Location:**	Fremont, CA	**Location:**	Modesto, CA	**Location:**	Sacramento, CA	**Location:**	Mountain View, CA
Employee:		**Employee:**		**Employee:**		**Employee:**		**Employee:**	
		Temperature:		**Fat %:**		**Quality Check:**		**Quality Check:**	
		Antibiotic:		**Protein %:**				**Load Test:**	
				Antibiotic:					
				Alcohol:					

Dairy-Farm-2 — Truck-11 — e-Factory-7

Retail-Store-4

Retail-Store-1

Distribution-Center-3

Retail-Store-5
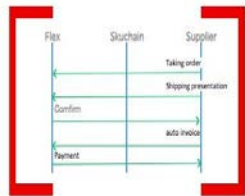
Retail-Store-2

Retail-Store-3

| Overview | Distributor View | Store View | Public View | Consumer View |

Skuchain: Turn information into capital

Shared Inventory Ledger on the Blockchain

Real-time, secure visibility

JIT data   JIT data   JIT data   JIT data

BRACKETS®
Smart Contract

Stronger Balance Sheets

Raw Material   **T2 Supplier**   **Seller**   Customer

Get paid faster   Purchase VMI as needed   Get paid faster   Purchase VMI as needed   Get paid faster   Purchase VMI as needed
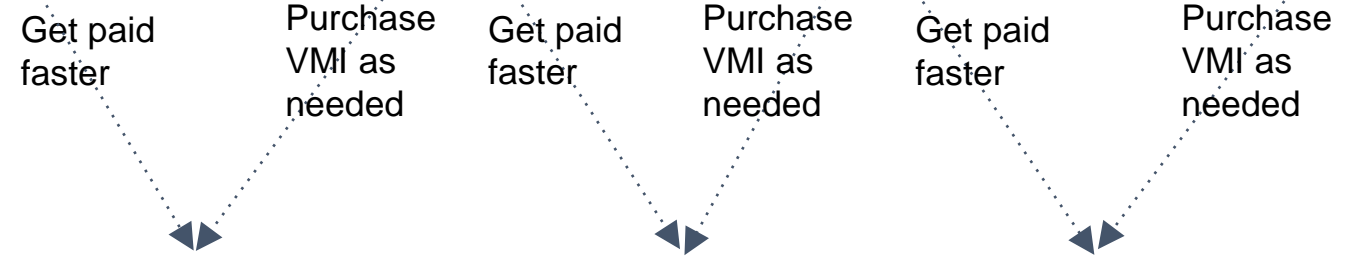
IMT (Inventory Financing Vehicle)

Financiers
Treasury
Skuchain
Banks
Traders

Supply Chains

Electronics

Aerospace

Food

Agriculture

Auto

Partners

Logistics

Banks

ERP

Ginni Rometty IBM – Chairman, CEO & President
&
Zaki Manian   Skuchain – Co-founder & CSO

IBM & Skuchain
discuss Blockchain, Hyperledger & Global Trade
New York – Aug 2016

Issued Patent # 9,436,923

+5 Patent Applications

28

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Ask us about

Skuchain University
Outreach Program

TRUSTED IoT ALLIANCE

Blockchain Initiative
For Commerce

Additive Manufacturing
Blockchain Registry

BAFT

Meetup
Hyperledger Silicon Valley

Innovation Council
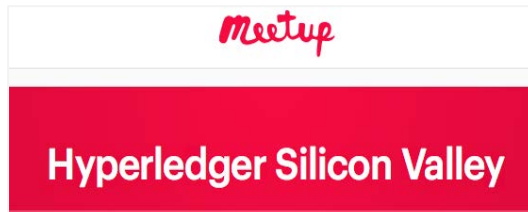
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Mountain View CA 94040
USA

http://www.skuchain.com
info@skuchain.com

The Global Trade Digitization Solution

The Infrastructure connecting all actors in global supply chains

A solution to provide end to end supply chain visibility and optimal document workflow
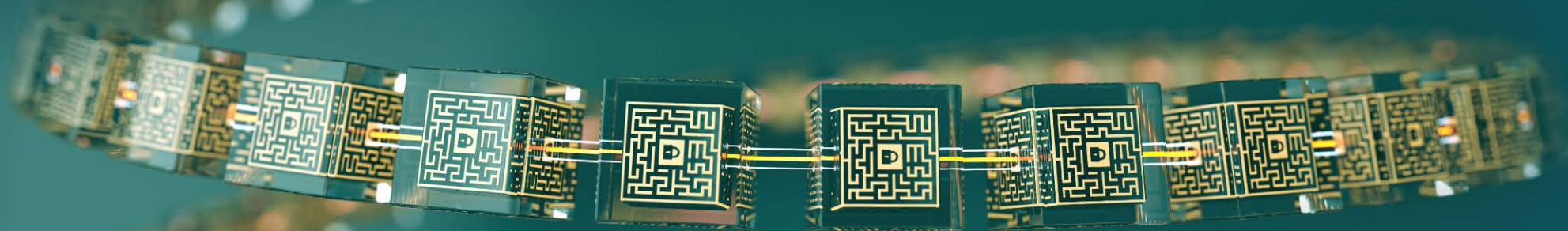
Important principles

- Detailed information remains under the control of the owner

- As neutral as the Internet

- Fault tolerant

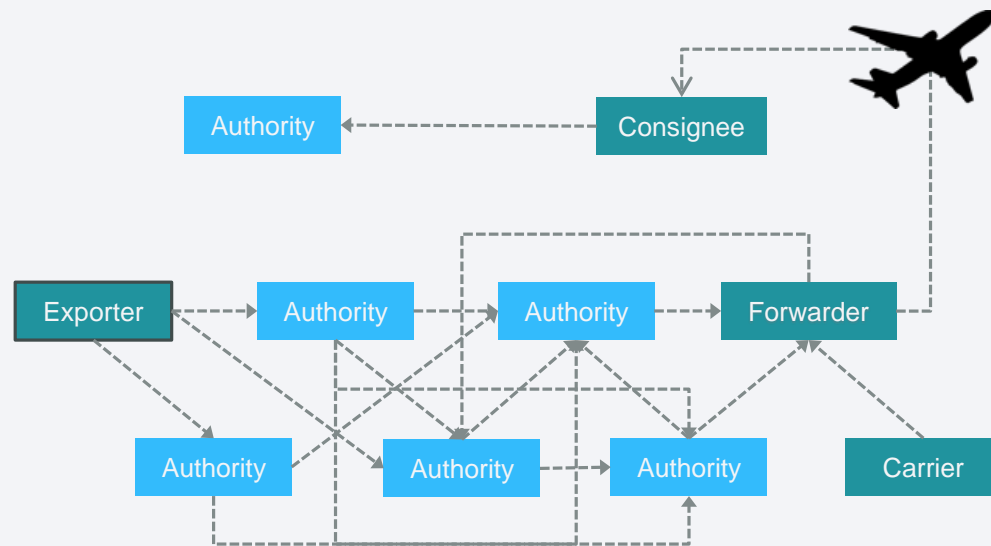- Everyone can work in their own systems
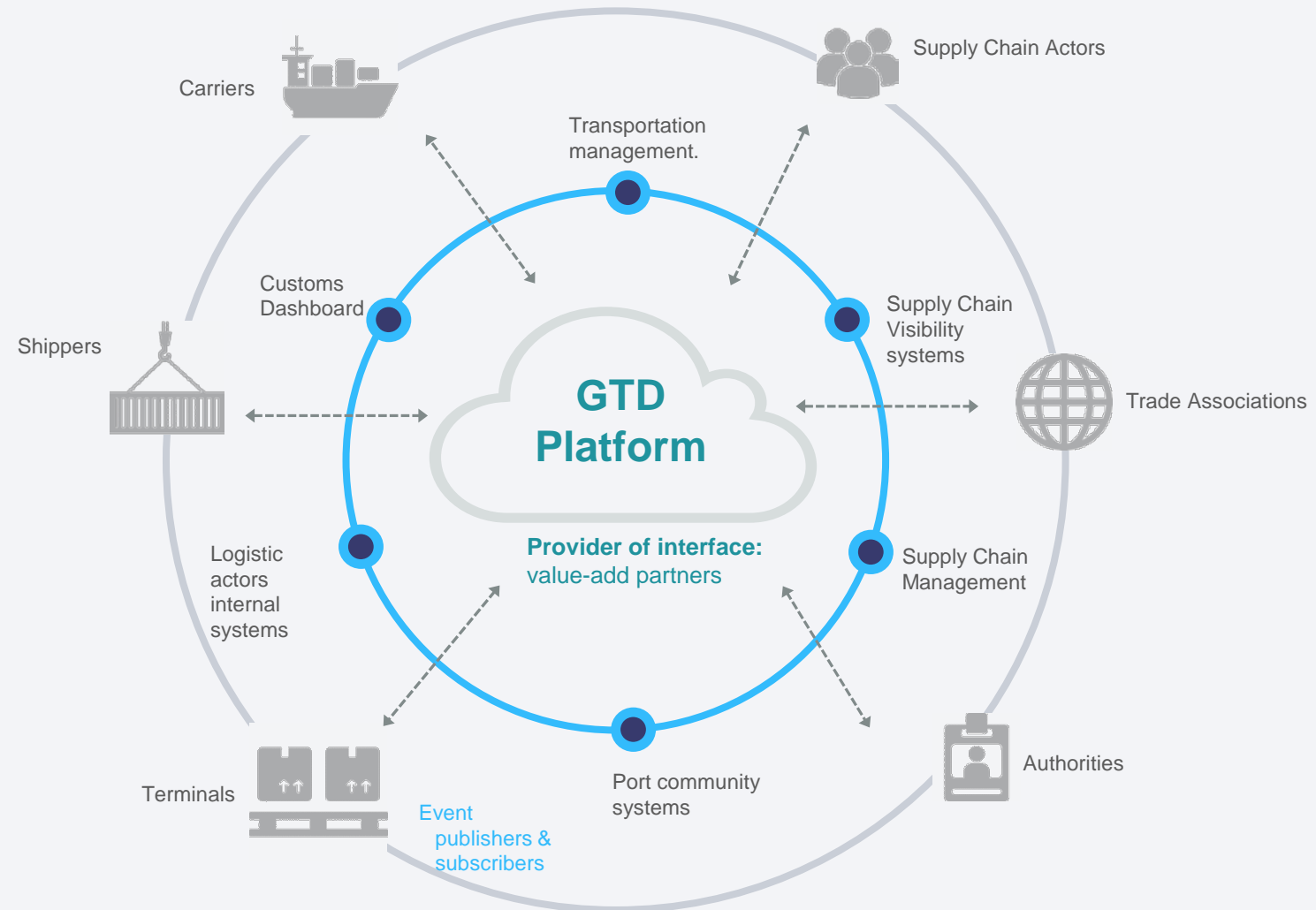
Workflow Capability

Providing Trusted, Tamper-Proof, Cross-Border
Workflows for Digitized Trade Documents

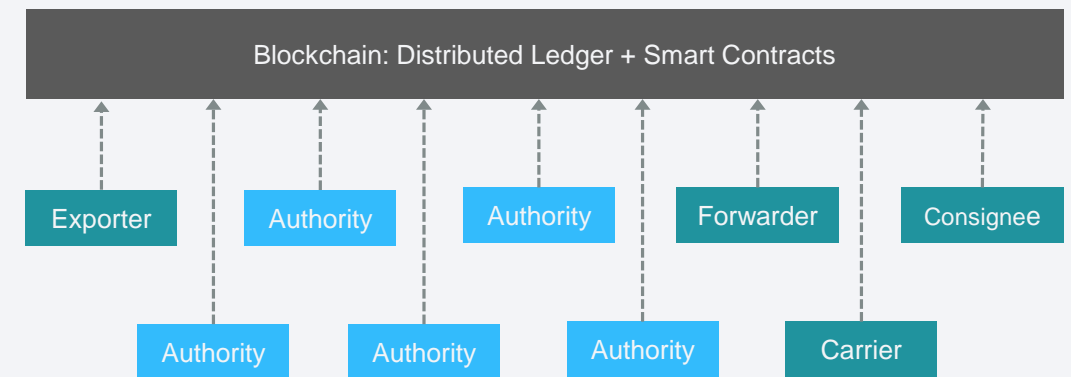# Paper Documents Used for Trade

Today

- Manual, paper-based processes
- Humans must carry documents to authorities for stamps
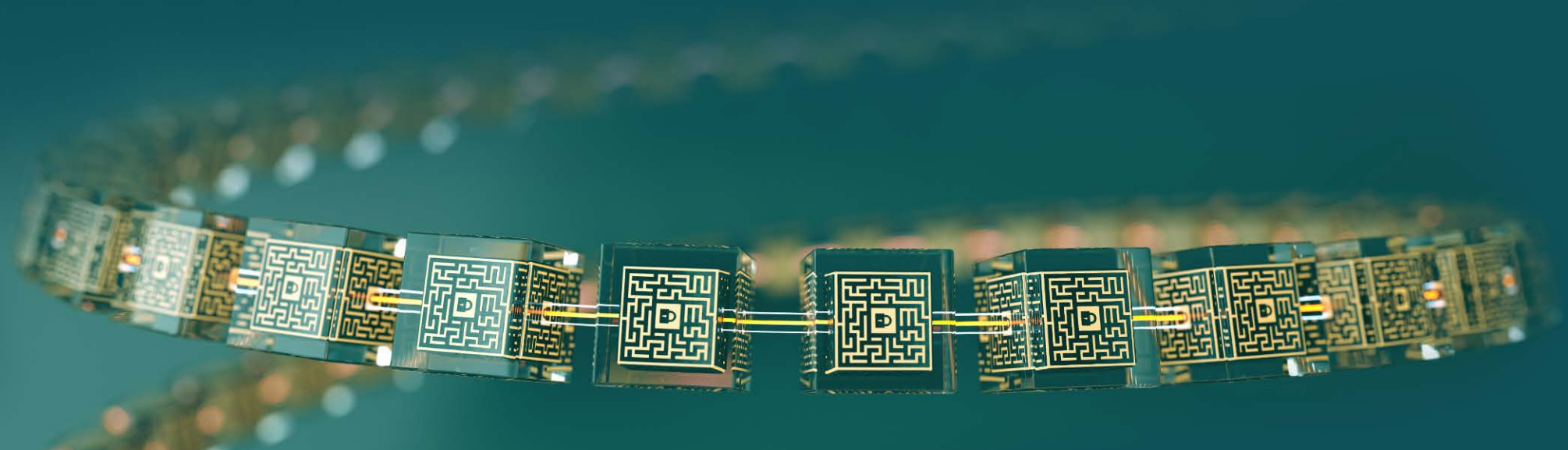- Air Courier expense and delays

Tomorrow

- Digital Documents
- Trusted Data Exchanges
- Trusted Workflows
- Instant Secure Access
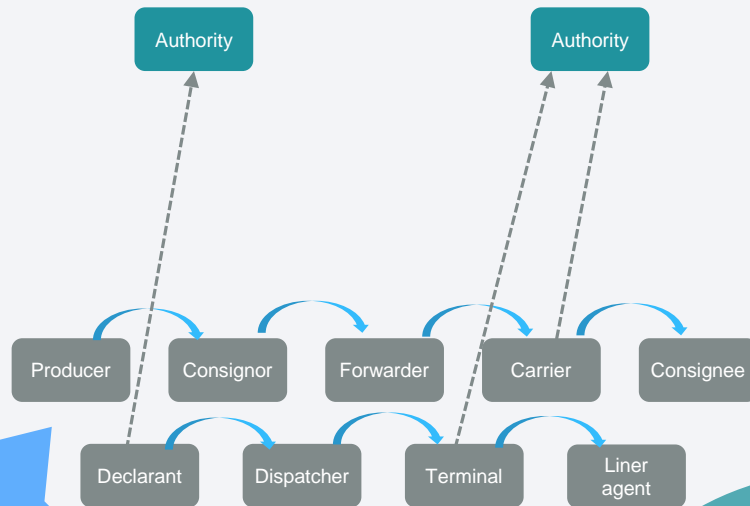
Visibility Capability

Providing Shared Visibility and Shared State for Container Shipments

Information Exchanges in the Trade Ecosystem

Today

- Peer to peer communication

Tomorrow

- Shared communication

Global Shared Infrastructure

Authority
Producer Consignor Forwarder Carrier Consignee
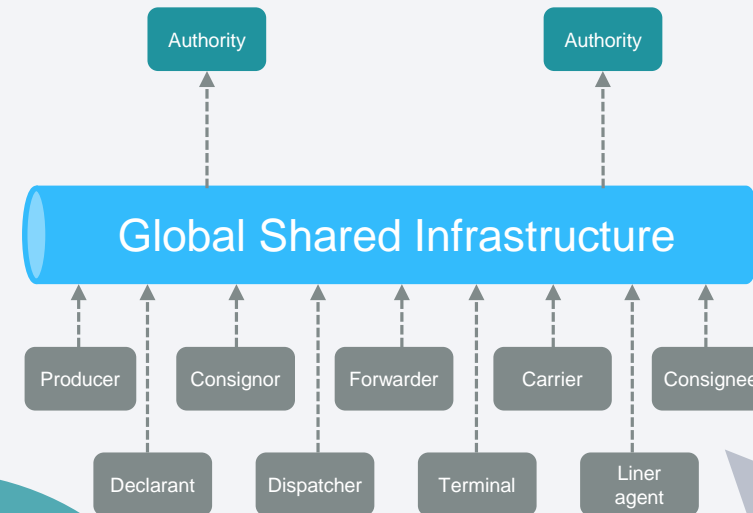Declarant Dispatcher Terminal Liner agent

The administrative cost of handling a container shipment is **comparable to the cost of the actual physical transport**

Transporting flowers from Nairobi to Rotterdam involves **30 actors** and **200 information exchanges**

Estimated Global Savings from more efficient sharing of information: USD $27b.

Other Blockchain use cases

Provenance Use Case- Food Traceability

What?

- Traceability of food from "farm to fork"

- Complex distribution and processing ecosystem involving farms, distributors, retailers, consumers makes it difficult to assure food provenance

How?

- Blockchain holds history of food items processed through entire supply chain, certificates, etc.

- Accessible by each party in supply chain to record food processing steps

Benefits

1. Increased trust – multiplied by each participant in food supply chain

2. Pinpoint source of compromised food, reducing the unnecessarily broad recall

3. Improved co-ordination in food supply chain

4. Handle changing regulations easily using smart

Walmart and IBM Are Partnering to Put Chinese Pork on a Blockchain

by Robert Hackett   @rhhackett   OCTOBER 19, 2016, 6:00 AM EDT
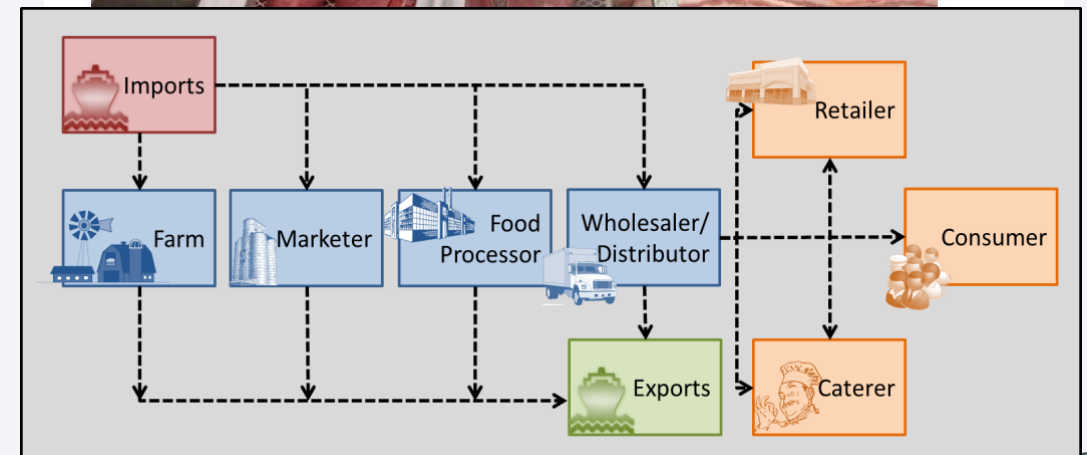
Case Study: IBM Global Financing (IGF)

Our Commercial Financing business provides working capital to IT suppliers, distributors and partners through financing of inventory and accounts receivables

What?

Improve the efficiency of our commercial financing business by sharing data in a secure and transparent manner on Blockchain
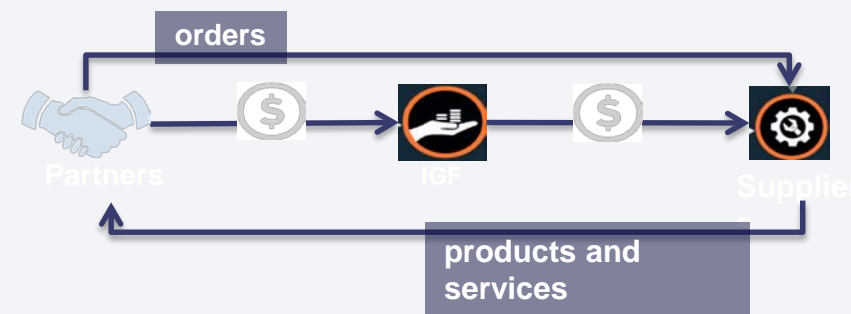
How?

Blockchain enables Comprehensive View of key operational data:

Purchase Order > Transaction Approval > Shipments > Invoices > Remittances

Benefits

- **Fewer disputes & faster settlement**
- **Reduction in dispute resolution time: 40+ days to under 10 days**
- **Improved capital efficiency; freer flow of capital**

IGF world-wide statistics			
4000+ Partners and Suppliers	**2.9M** Invoices / year		**$44B** Financed / Year
$100M Capital tied up any time!	25,000 Disputes / year	$31K Avg. disputed invoice value	44 days Avg. time to resolve a dispute