Revolutionizing the shipping industry

Prof Soulla Louca & Dr Elias Iosif

Institute For the Future

University of Nicosia

IFF at a glance

Cross-disciplinary research institute at the University of Nicosia (UNIC), focusing on technologies shaping the 4th industrial revolution. Our emphasis for 2020 is on two areas:

- **Blockchain**, including digital currencies and tokenized assets
- **Forecasting**, through the Makridakis Open Forecasting Centre (MOFC)

Academic Education & Professional Training

World's first **MOOC** on digital currencies

World's first academic degree on blockchain (**MSc in Digital Currency**)

Professional Training Programs

Research & Technology Development

Applied research projects
(EU research grants, industry funding)

Commercial spin-off
(Block.co)

Conferences & Events

World's premier blockchain learning conference & community (**Decentralized**)

Global forecasting research competition & conference (**M-competition**)

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The Institute For the Future

Our **mission**:
- To explore and shape our future world, fueled by the technologies underpinning the 4th industrial revolution.

Our **vision**:
- To push the boundaries of knowledge in exponential technologies and to inspire our students to become technology leaders of tomorrow.

Our **goals**:
1. To bridge the supply/demand skill gap in emerging technologies through continuously evolving educational offerings to meet the changing needs of the market.
2. To build global communities of highly engaged learners and professionals.
3. To foster partnerships with academia and industry.
4. To carry out basic and applied research, commercializing its outcomes where relevant.

IFF timeline

2013
- Bitcoin accepted for tuition payment

FIRST IN THE WORLD

2014
- Launch blockchain MOOC & MSc

FIRST IN THE WORLD

2015
- Publish MOOC certificates on blockchain

FIRST IN THE WORLD

2016
- Launch IFF
- First MSc graduates

FIRST IN THE WORLD

2017
- Publish all university diplomas on blockchain
- First Decentralized conference (500 attendees)

FIRST IN THE WORLD

2018
- IFF receives "Biggest Contributor in the Rise of Blockchain" award
- Second Decentralized conference (1,000 attendees)
- M4 forecasting competition (200 teams) & conference
- Block.co launched

2019
- Professional Certification courses launched
- Third Decentralized conference (1,200 attendees)

2020
- MOFC launched
- M5 forecasting competition (March) & conference (December)

IFF numbers

- **Largest student community in the world**
  - 40,000 MOOC participants from 100+ countries.
  - 600+ MSc students and graduates from 76 countries, including USA (19%), UK (6%), Canada (5%), South Africa (4%), Brazil (3%), India (2%) and Australia (2%).

- **Accelerating research track record**:
  - €5m in competitive European Commission research grants since 2017.
  - Member of the Austrian Blockchain Center (€17m consortium, funded by the Austrian government)
  - Member of the University Blockchain Research Initiative
  - Member of Bloxberg
  - Founding Member of the DLT Education Consortium

- **Respected business & academic community organizer**:
  - Three annual Decentralized conferences
  - Growing base of local Decentralized chapters: Nicosia, New York City, Mexico City, California, Amsterdam, Nigeria, Malta, Dubai, London, Thessaloniki, Brussels, Tokyo.

- **Strong team and partners**:
  - 15 full-time and affiliate UNIC faculty members
  - 20+ resident and visiting researchers
  - 50+ university and industry partners
  - One commercial spin-off

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Leaders in blockchain education

The Global Universities Embracing Cryptocurrency

Top 5 University Bitcoin Courses

#1 University of Nicosia

#2 University of Cumbria

#3 Simon Fraser University

#4 MIT

#5 New York University

#6 Duke University

#7 McGill University

#8 Pompeu Fabra University

#9 Imperial College

Source: Coindesk, 2015

#1 University of Nicosia

#2 New York University

#3 Stanford University

#4 Princeton

#5 Duke University

Source: The Merkle, 2017

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Leaders in blockchain research

Project	Budget	Funding by	Duration	IFF role
INFINITECH	€ 21m	EC (H2020)	3.25 years	Partner
ABC	€ 17m	Austrian govt	4 years	Partner
EUNOMIA	€ 2.4m	EC (H2020)	3 years	Partner
BLOCKPOOL.EU	€ 1.5m	EC (H2020)	2 years	Partner
DLT4ALL	€ 1m	EC (Erasmus+)	3 years	Coordinator
Direct industry funding	€ 1m	Ripple, trade.io, PumaPay, etc.	1-5 years	Main/sole partner

BLOCK.CO

Digital Self-Verifiable Certificates You Can Trust

Block.co, a pioneer in Blockchain Credentialing applications, transforms the way organizations leverage blockchain technology in the issuance, self-verification and revocation of digital records.

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Leaders in blockchain/AI community engagement

Decentralized 2019
30 Oct - 1 Nov 2019 | Athens, Greece

- Europe's premier annual blockchain conference since 2017
- Bringing industry & academia together
- Pre- and post-conference events (**Decentralized Training Series**)
- Bottom-up community engagement (**Decentralized Chapters**)

M4 Conference
10-11 December 2018
Tribeca Rooftop, New York City

- Based on the results of the annual **M-Competition** on forecasting
- 200+ research teams; 100,000 real-life time series analyzed
- In collaboration with NYU & Nassim Taleb
- Sponsored by Google, Amazon and Uber

Our people: IFF Governing Board

Antonis Polemitis
UNIC CEO

Dimitris Drikakis
UNIC VP of
Global Partnerships

George Giaglis
IFF Executive Director

Soulla Louca
IFF Director of
Partnerships

Spyros Makridakis
IFF Director of
Research

Marinos Themistocleous
IFF Director of
Education & Training

Our people: IFF Researchers & Staff

Dr Klitos Christodoulou

Dr Elias Iosif

Dr Charis Savvides

Dr Ifigenia Georgiou

Dr Ioannis Katakis

Dr Konstantinos Karasavvas

Dr Ariana Polyviou

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Jeff Bandman

Kypros Stefanou

Valentinos Theofilou

Irene Patrikios

Nick Assimenos

Sokratis Mina

Elena Kontemeniotis

Maria Charalambous

Eleni Alexi

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Our people: Visiting Scholars & Faculty

Andreas Antonopoulos

Prof Nassim Nicholas Taleb

Stefan Loesch

Adam Hayes

Dr Theodosis Mourouzis

Athanasios Leontaris

Dr Apostolos Kourtis

Yiannis Menelaou

Mark Toohey

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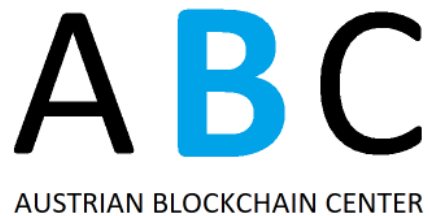
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MAX-PLANCK-GESELLSCHAFT — Sandra Vengadasalam

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Blockchain -An Introduction

The Origin

Blockchain was introduced, in 2008, as the technology underlying Bitcoin, the platform and cryptocurrency that has gained immense popularity due to the upward trend in the value of bitcoins.

The Potential

Despite it being invented to support Bitcoin, important stakeholders from various industries recognized its potential and started exploring applications of the technology to either improve current practices, or create news one that were not possible until now.

Blockchain –An Introduction

❑ A distributed ledger of any type of transactions;

    ❑ Transactions – exchange of data that represent medical data, consumer details, product data….

    ❑ A decentralized network for peer-to-peer transactions, **without the need for a central/trusted/third party;**

    ❑ Once added to the rest of the chain, the records cannot be modified;

Source: Financial Times
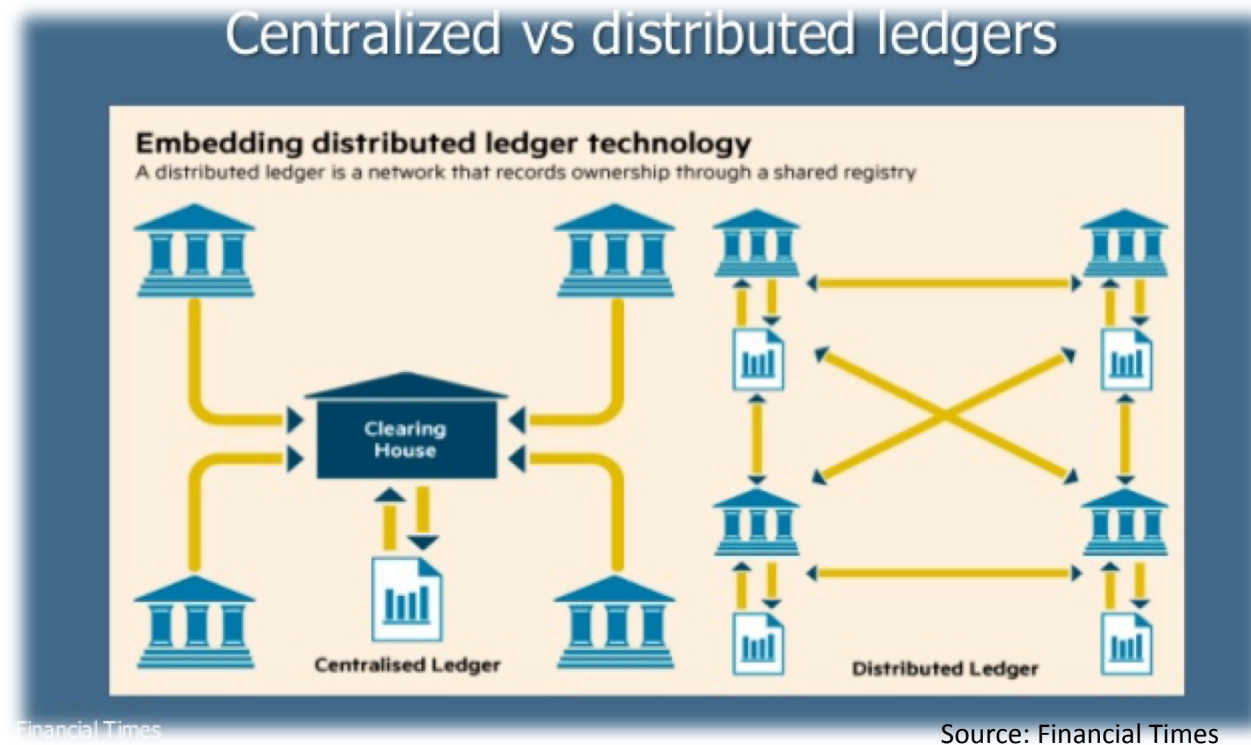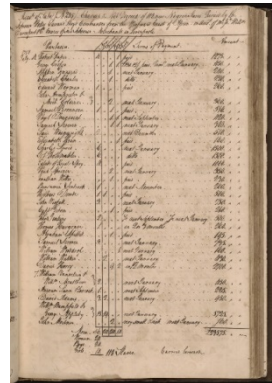
Blockchain –An Introduction

- **Blockchains** eliminate the need of the central ledger;

- Consist of blocks that hold batches of valid transactions;

- Can be open, verifying anonymous actors in the network;

or
- they can be closed and require actors in the network to be identified;
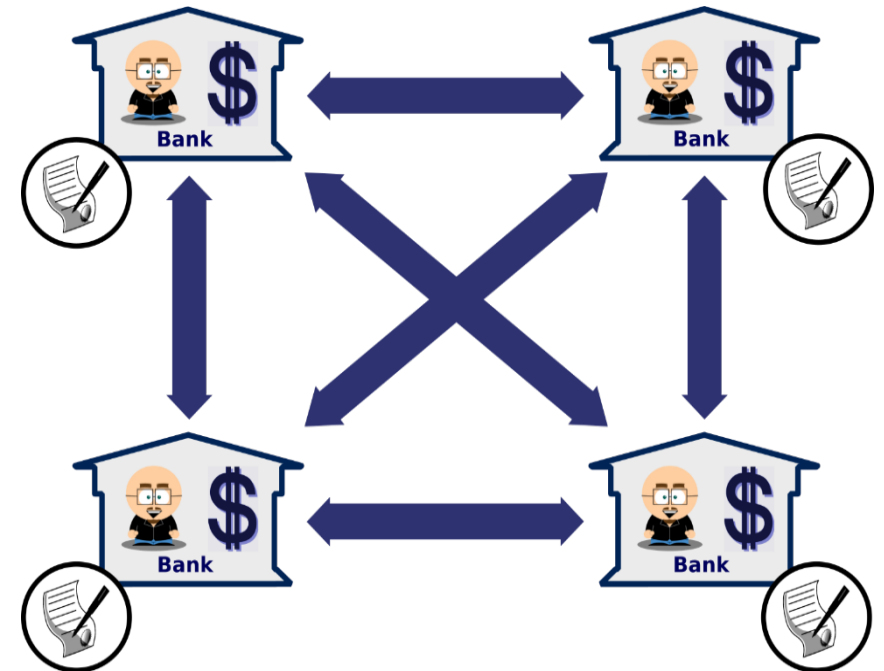
Blockchain – An Introduction

Blockchain and Smart Contracts

❏ Blockchain can also be programmed; (such as if-else and if-then statements to ensure that certain conditions are met);

❏ e.g., transfer penalty fees when the agreed terms are not met.

Source : http://blog.cryptoig.ca/?p=380

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A growing list of use cases
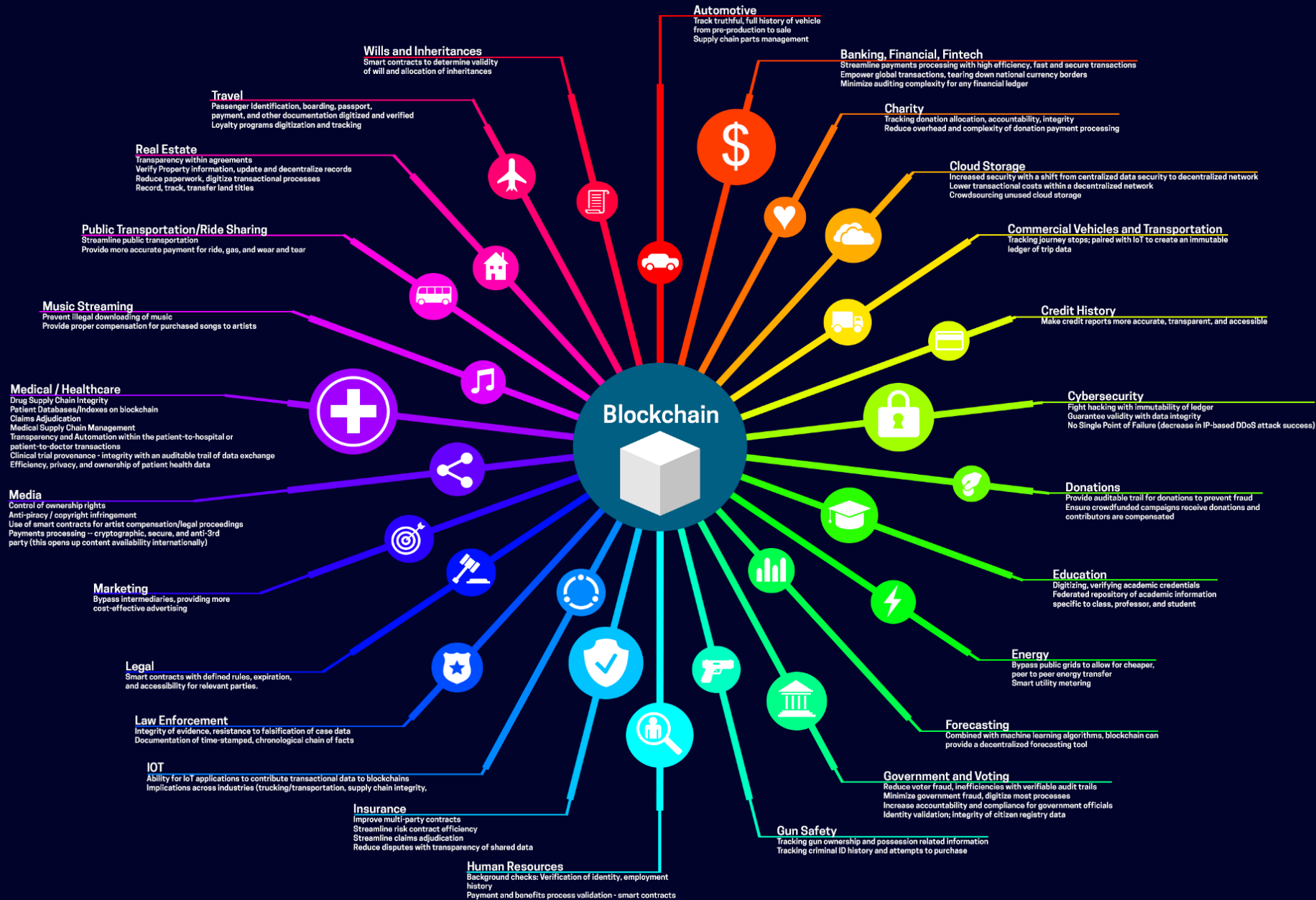
Taking Advantage of Blockchain Technology

◤ Shipping – a complex ecosystem exchanging data. Relies on transactions which involve a big number of documents (many times paper based), such as:

- sales contracts,
- charter party agreements,
- bills of lading,
- port documents,
- letters of credit,
- …
  - related with the vessel and the cargo.
  - A slow bureaucratically process

Taking Advantage of Blockchain Technology

- Can speed up document flows and cut down bureaucracy
  - Companies and custom officials have to fill lots of documents for the moving of goods

  - So what? Any **centralized** system could solve this???
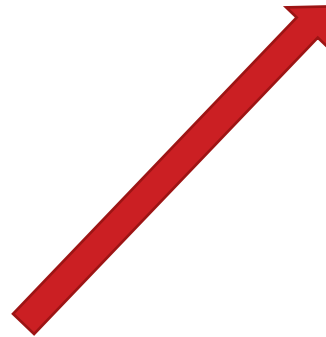
- Blockchain based-systems can provide real time visibility, transparency and data quality and avoid problems in financial settlements
- Can save millions of euros annually

Taking Advantage of Blockchain Technology

◤ Can avoid cyberattacks
 ◤ The data structure they provide is both safe and transparent

◤ Why?
 ◤ Records are transmitted using **encryption algorithms** providing high level security and making hacking practically impossible and **immune to modification and deletion => Safe**

 ◤ Before a transaction is executed and subsequently recorded on the blockchain, 51% of relevant parties have to consent to it , maintaining **a chronological chain of activity**

 => traceability to determine origin and authenticity

 ◤ This means that transactions are verified by network participants and, therefore, trusted, forming a public record visible to all and therefore all parties in **supply chain** can have access to trusted data.

 ◤ **=> transparency**

Taking Advantage of Blockchain Technology

Use of smart contracts

- Charter-party agreements and bill of lading terms and conditions could be implemented via smart contracts;

Source: https://www.linkedin.com/pulse/case-blockchain-e-commerce-supply-chain-christophe-deslandes
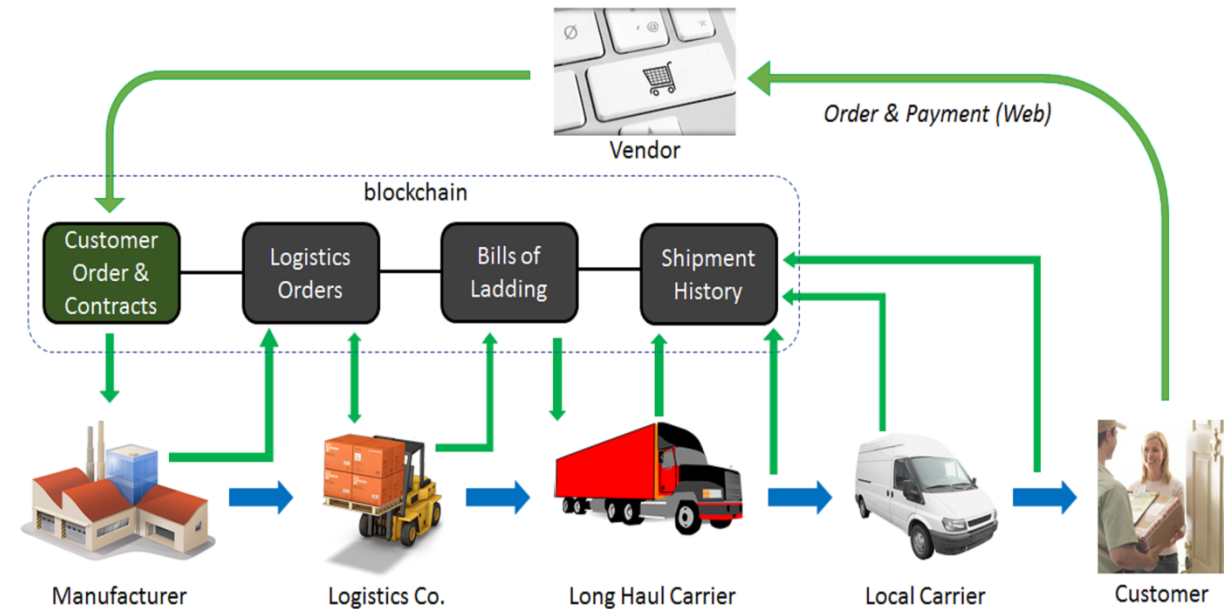
Can solve several challenges in Supply Chain

❏ Slaves to Paper (blue)

- ❏ Very Slow
- ❏ Easy to falsify
- ❏ Expensive because of massive amounts of paper and man-hours go into making, signing, transporting and validating papers

❏ Slaves to slow finance (red/orange)

- ❏ Trade financing ubiquitously hard to receive
- ❏ Costs involved are very high
- ❏ Speed of execution is very slow
- ❏ High fees because of high risk
- ❏ Long and costly arbitration processes in case of international disputes

The international trade "ecosystem"

Source: Boston Consulting Group

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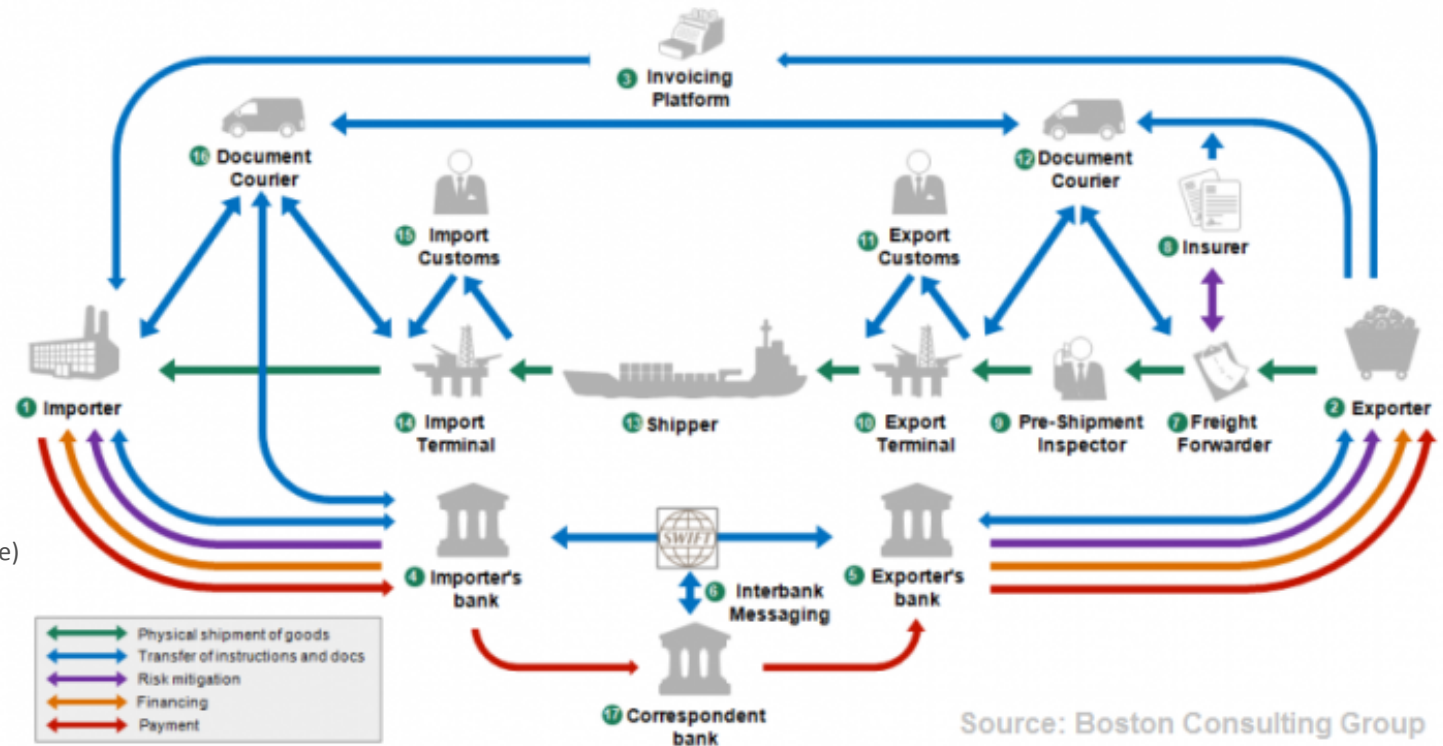
Blockchain in SCM
(Supply Chain Management)
Digitizing Global Trade

1 **Digitizing processes**

Immutable records

Ease of validation

2 **Automating checks and balances**

Smart Contracts as deterministic agreements

Trade financing via digital assets as a trade facilitator

Foul Proof provenance or origin, delivery and conditions in between

3 **Decreasing costs**

Decreased Paperwork

Increased protection against fraud

Digital signatures as a replacement of bureaucracy

Blockchain—a shared, distributed ledger—can trace the container's path through the supply chain with exceptional transparency and security.

The flower grower readies the product for international shipment. Shipment information is added to the blockchain.
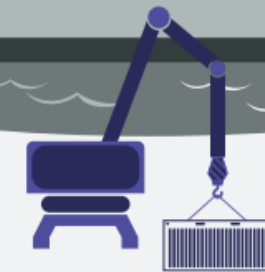
As the container awaits transfer to port, officials submit approvals electronically. Blockchain confirms the transaction and executes a smart contract, releasing the shipment.
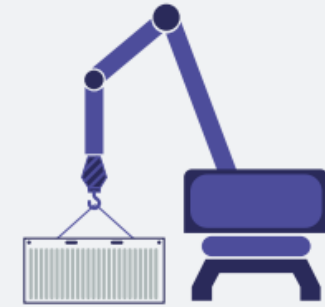
The container is loaded onto the ship.

All parties have end-to-end visibility of the container's progress through the supply chain.

The container arrives at the destination port and clears customs.

Retailer receives the flowers on time and signs electronically. Information is relayed back to the blockchain.

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Case Studies

IBM and Maersk

- Tested a pilot case – (avocados shipped from Mombasa to Rotterdam);

- Estimated that shipping carriers could save upto 38 billion every year;
  - Maersk aims to get 10 M out of its 70 M containers to be using blockchain by the end of the year.

EY – to transform marine insurance

- An enterprise-scale platform to integrate and secure the stream of different data sources involved in insuring shipments. (Maersk, ACORD, Microsoft, MS Amlin, Willis Towers Watson, XL Catlin)

  Source: http://www.ey.com/gl/en/industries/financial-services/insurance/ey-blockchain-marine

Samsung SDS

- Launched a blockchain consortium for shipping and logistics designed to verify trade information by distributing encoded data to each participant through the network (the Korea Customs Service, Ministry of Maritime Affairs and Fisheries, the Korea Maritime Institute, Busan Port Authority, Hyundai Merchant Marine,Korea Marine Transpor, IBM Korea)

  Source: http://www.koreatimes.co.kr/www/tech/2017/06/133_230428.html

Case Studies

IBM Watson & IoT

- Demo describing the tracking and sharing of a shipment of an IoT-enabled package among all parties in a blockchain;

- Use of smart contracts to specify conditions to be met during the shipment from the Factory to the Grocery Store;

Source: https://www.youtube.com/watch?v=PIuemoDf--s
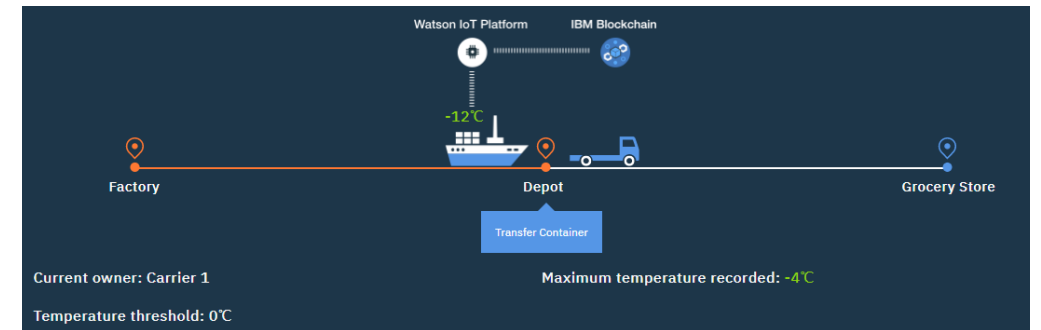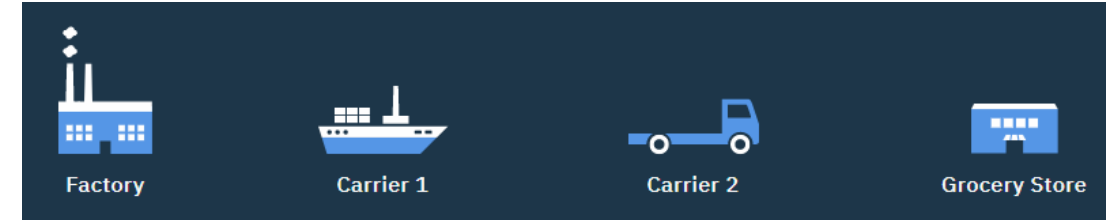
Case Studies

In Food Industry – IBM, Dole, Driscoll's, Kroger, McCormick and Company, Nestle, Tyson Foods, Unilever and Walmart.

- Use the technology to trace contaminated food (400,000 deaths every year)

- Usually it takes weeks to identify the precise point of contamination, causing:
  - Further illness,
  - Lost revenue,
  - Wasted product

Blockchain benefits in supply chain

Benefits of blockchain

- Saves time – from days to instants =>financial transactions are performed faster than in the traditional financial systems
- Streamlines administrative processes and reduces costs (from overheads and intermediaries)
- Increases trust – through shared processes and record keeping
- Reduces risk – tampering, fraud and cybercrime
- Enables traceability of environmental and other incidents
- Empower the consumer and the retailer

Blockchain benefits in shipping

Coupled with:

- artificial intelligence,
- internet of things, and
- quantum computing

online contractual transactions may become completely self-executing and enforcing.