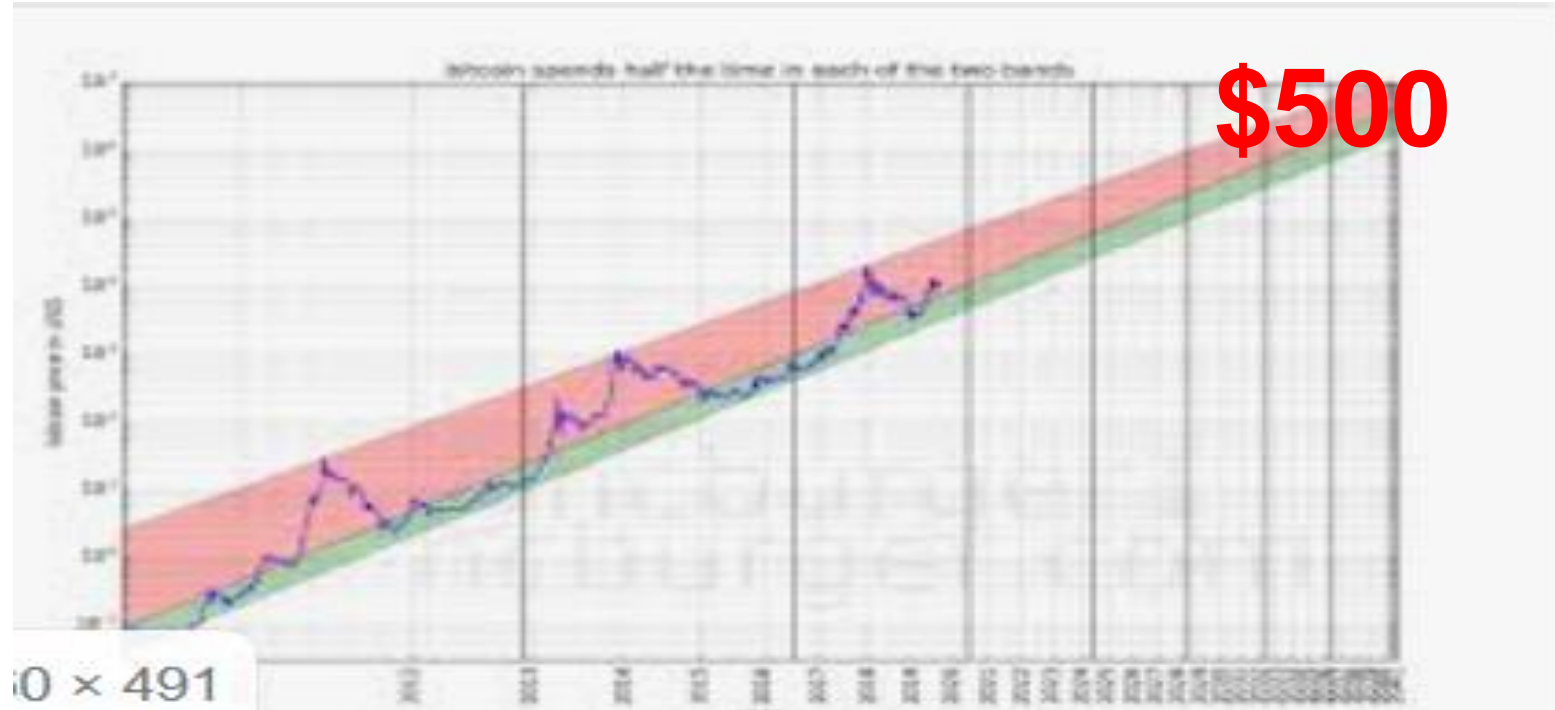


How Blockchain will revolutionize various industries including Supply Chain, Finance, Provenance?

Presented BY: Dr Abdurashid Turgunov

Course name: Blockchain Technology

Financial Industry & Blockchain



Early adaptors : Financial Industry

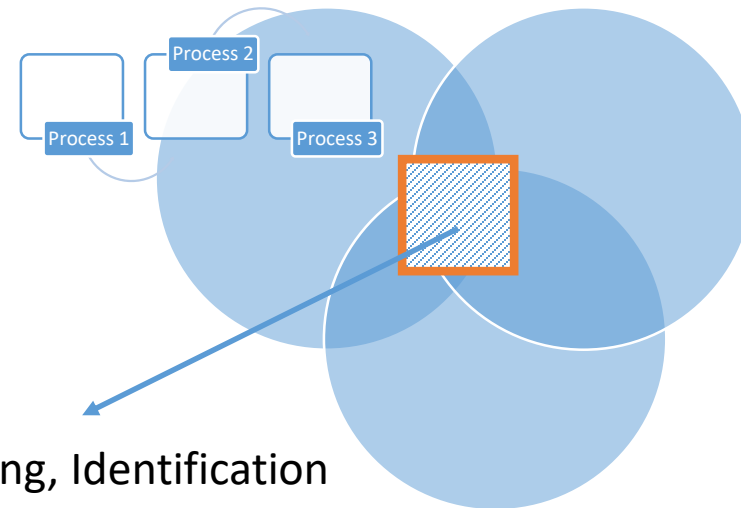


- Financial services , Capital management, Retail, Trade....
- Technology a competitive advantage vs Technology is NOT our product

Blockchain in Finance

More in POC's

- ❖ Increased POC's, but less into production
- ❖ Slow adaptation due to **changing process at Industry level** and less std. process
- ❖ Governance: Solution providers are the key drivers



Process collaboration

- Digital asset servicing, Identification
- Cash mgmt.
- Payment tokens

Pharma Industry & Blockchain

Is the technology

a **Vitamin** or a **pain killer**

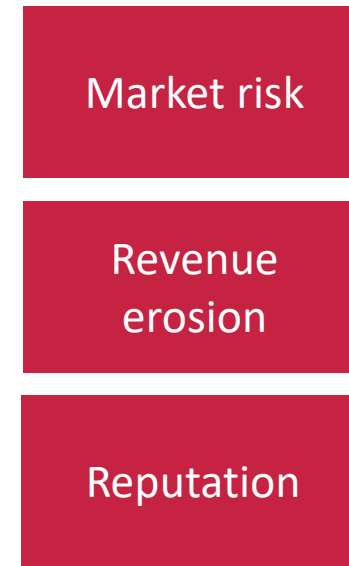


722 x 406

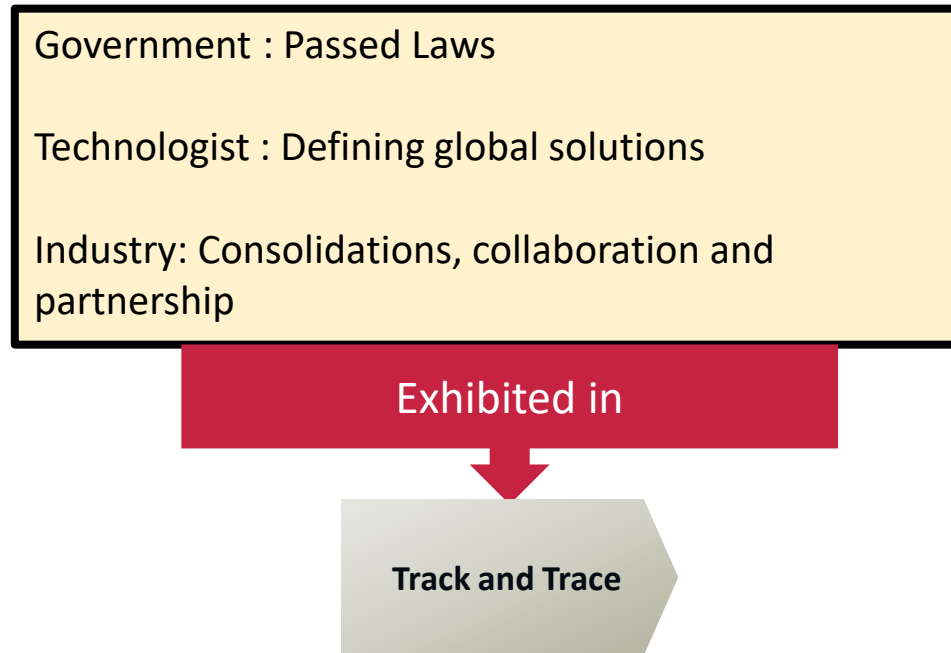
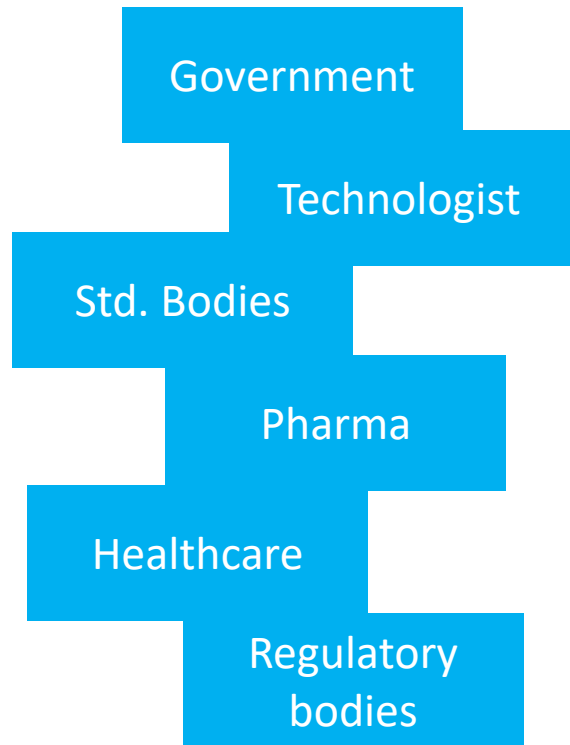
World is flat: Challenges due to global foot print

Pharma multinationals with global footprint has created

- Product and Market risks
 - ❑ Counterfeit
 - ❑ API contamination
 - ❑ Intellectual property breach
- Operational inefficiency
 - ❑ Slower product to market
 - ❑ Increase in competition (generics)
 - ❑ Increase in cost
-



Parties solving the challenges



WHO : Policy brief on Traceability

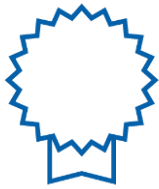
20 What is the issue

21 Given the growth and globalization of trade, health products² are manufactured and distributed in complex supply chains. As
22 illustrated in Figure 1, products pass through many entities in their journey to the patient, often being manufactured in one country
23 and distributed across borders to be marketed or sold in other countries. As distribution spreads geographically and the supply
24 chain becomes more fragmented oversight capacity of national regulatory authorities become stretched.¹ Effective oversight of the
25 supply chain is thus weakened, raising the risk of substandard and falsified (SF) medical products and leading to inefficiencies such
26 as stockouts or expired products (ref). These can lead to loss of public confidence, which eventually leads to hesitancy, reduced
27 adherence and reduced utilization of health programmes (ref). There is a need to addresses these vulnerabilities and strengthen
28 supply chain integrity and efficiency, with patient safety at the forefront.

“There is global recognition that traceability systems could be leveraged as a useful tool to ensure the integrity and improve the efficiency of supply chains”

Solving by standards and
technology

Global pharma **EXTEND** Key approaches



Standards



Industry
collaboration



Harmonized
Processes



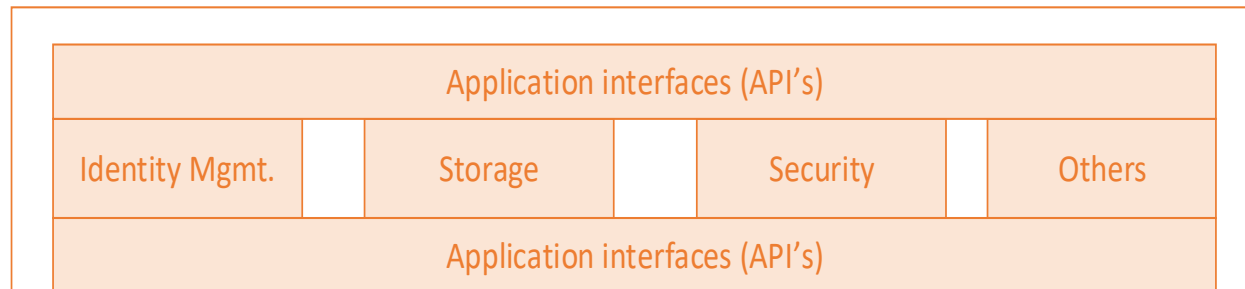
Trusted Network
Solutions

These learnings leveraged to build a roadmap for a Hyper-Connected world

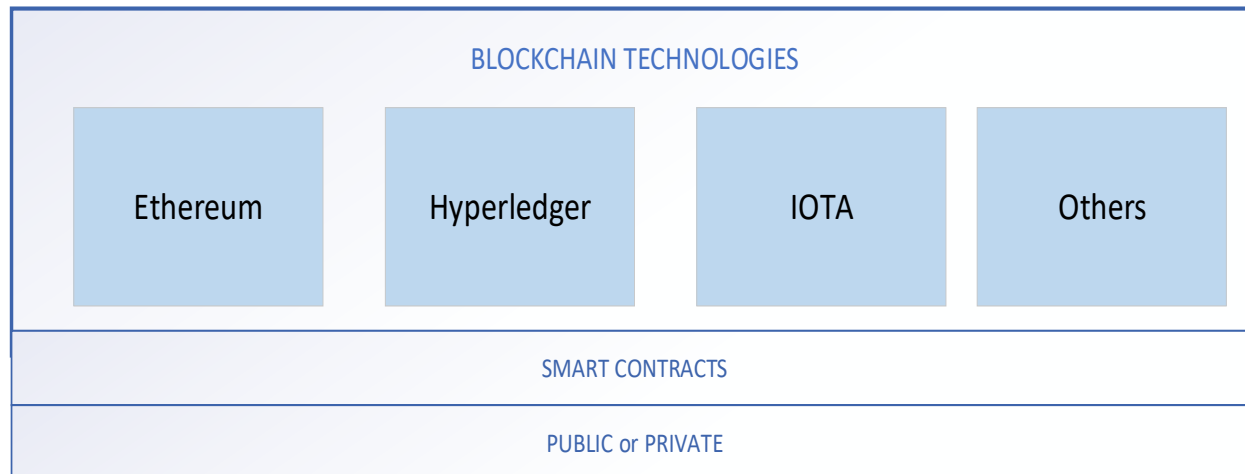
Pharma: Blockchain a foundational technology



APPLICATION



TECH.
COMPONENTS



DISTRIBUTED
LEDGER /
Smart contracts

* Key Representation only

Functions, systems and processes to enable Blockchain

GOVERNANCE : Policies, Stds, Privacy, Partners etc.

- Business logic
- Business processes
- Other application
- Interfaces
- Data management
- Interoperability

- What / How / When data goes into Blockchain
- Process that enables data
- ERP, Serialization systems etc.
- Interfaces between the systems
- Data management
- Interoperability between partners

BLOCK CHAIN PLATFORMS (20+)



ethereum



MultiChain

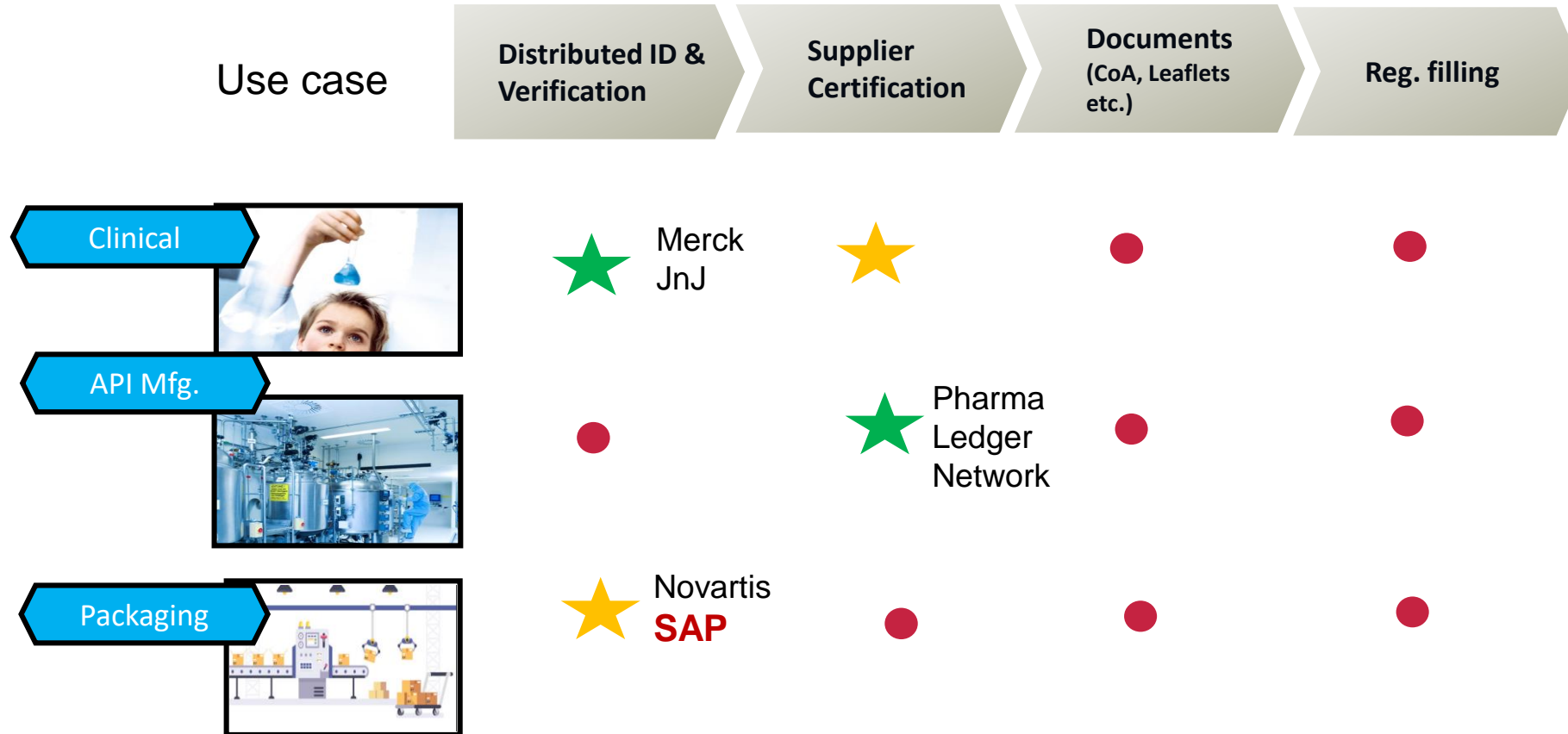
* Key Representation only

Pharma Industry consortiums and pilots

Digitalization : End to End Traceability (1of 2)

Representative key pilots only

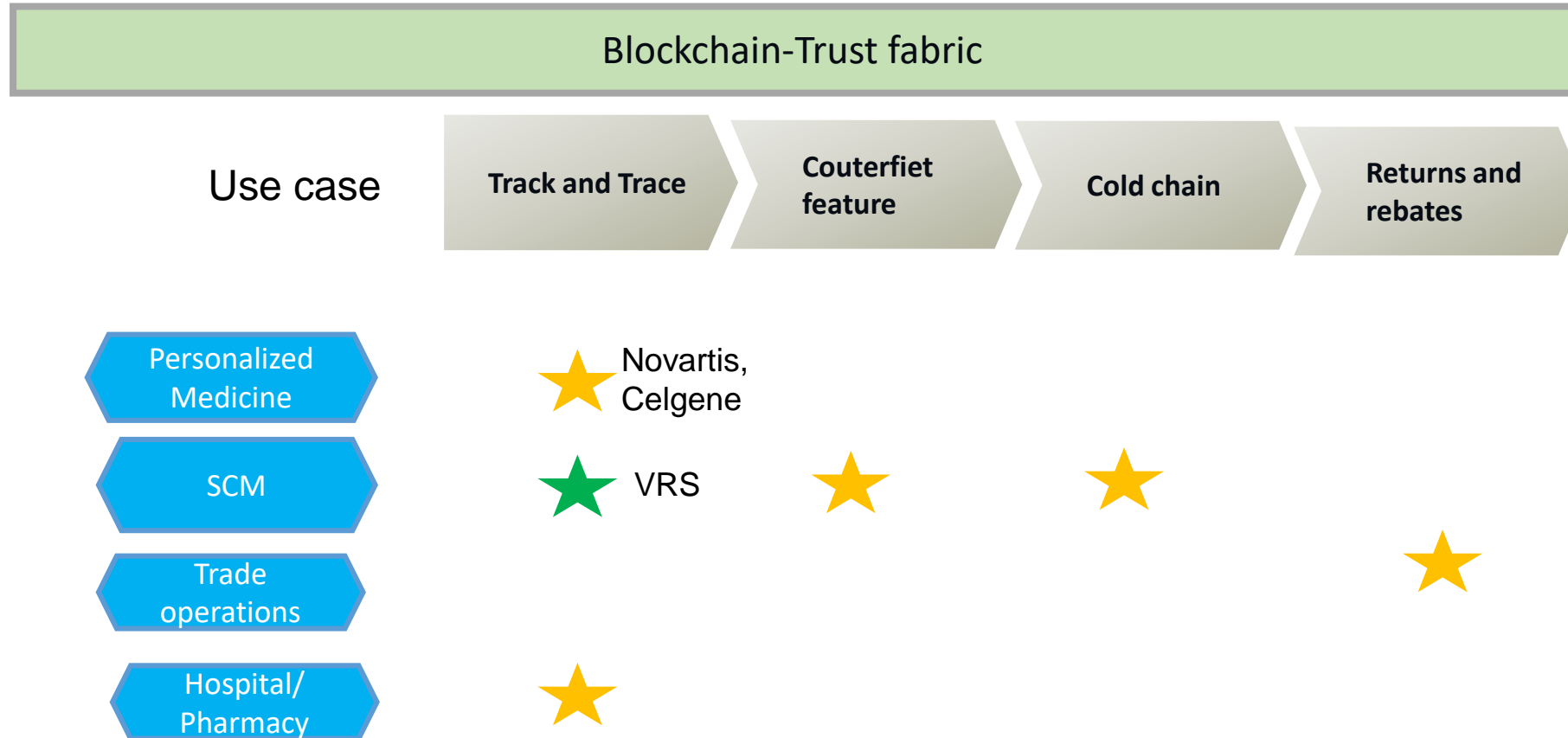
Blockchain-Trust fabric



 *Use case
 * Production pilot
 *Pilot *

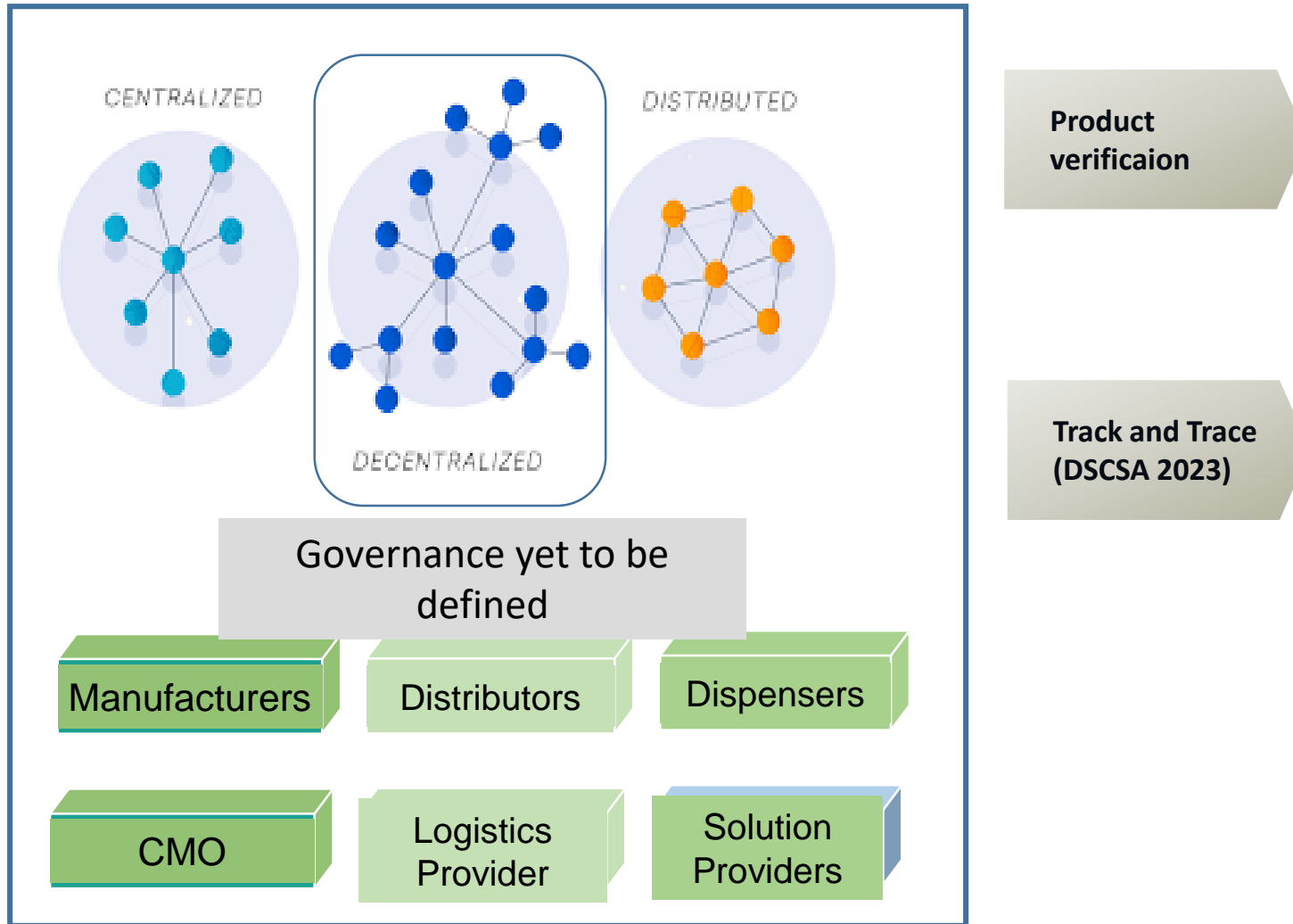
Digitalization : End to End Traceability (2 of 2)

Shown key pilots only



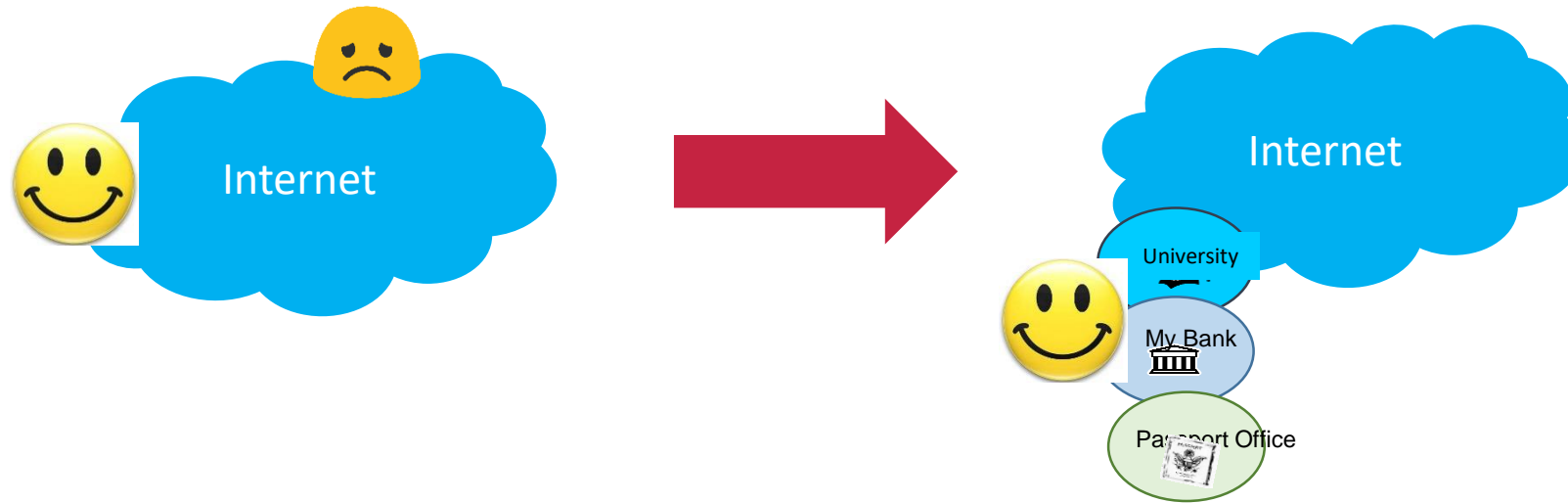
● *Use case
★ * Production pilot
★ *Pilot

1. Product verification, Track and Trace pilots



Industry has come together for first time to be on the same network

2. Identity is new age



Source: Evernym, «Identity fit for the digital age»

2. TPRM- Third party risk management

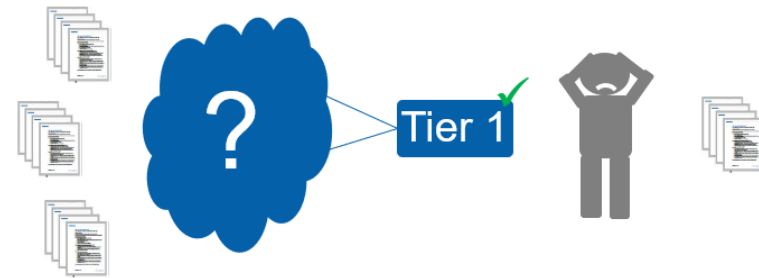
Production Pilot

Problem statement :

Multi Tier supplier

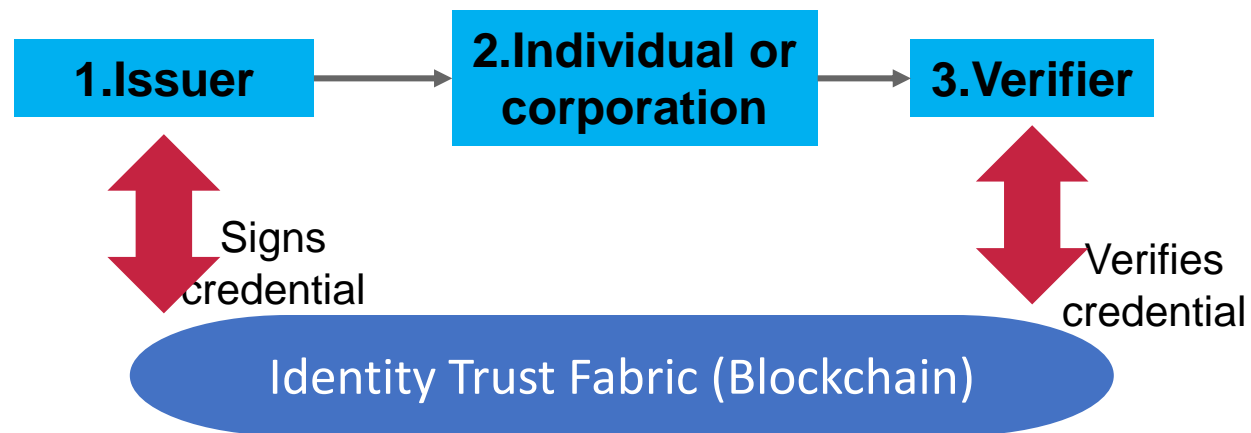
(Ex: Recent blood pressure drug shortage due to contamination in sourcing)

- Managing certificates and licenses with hundreds of suppliers
- Data privacy and confidentiality is hard to guarantee
- Buyers struggle to manage time-bound data like CAPA's (Corrective and Preventive Actions)



DI and Verification using blockchain

- Each entity has a Decentralized Identifier (DID)
- Digital management of certificates



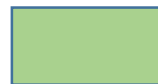
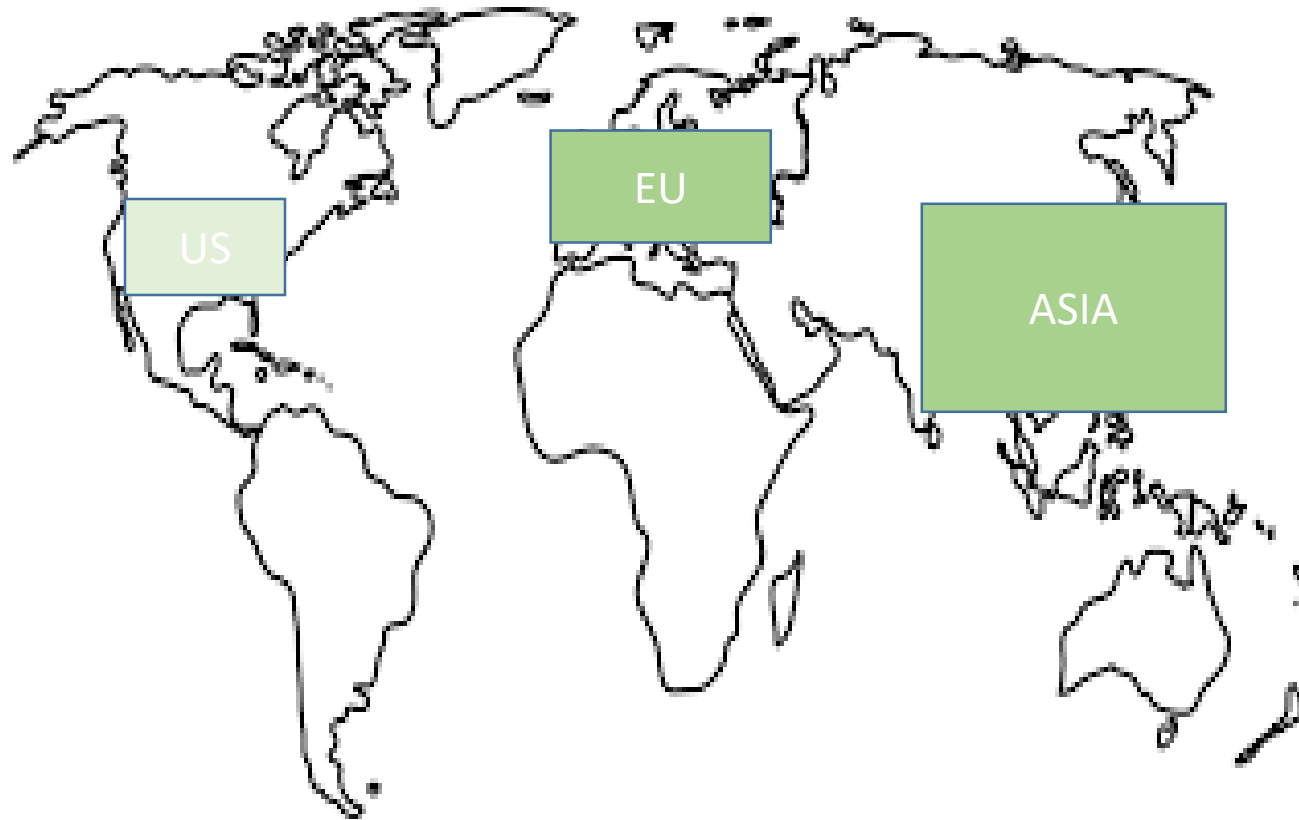
Production Pilots

- ✓ TPRM (Third party risk management)
- ✓ Clinical Hospital

Pilots

- ✓ ATP (Authorized trading partner check)

US vs ROW



Increased funding and Projects

PharmaLedger : Blockchain consortium

- *3 Years, 28 partners (11 pharma companies), 21 mEUR*
- The project implements a **scalable blockchain platform** of solutions and standards along the healthcare value chain (**supply chain, clinical, health data**) to increase **trust and transparency** while reducing waste and complexity.
- We achieve this by creating a collaborative consortium/ecosystem, establishing effective **governance**, furthering **education and awareness** to accelerate **adoption** and **culture change**.
- **Kick-off in January, 2020. We need your engagement!**

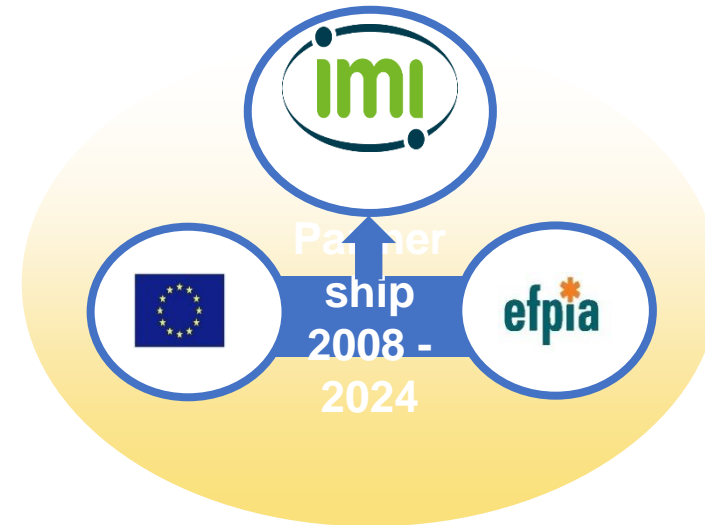
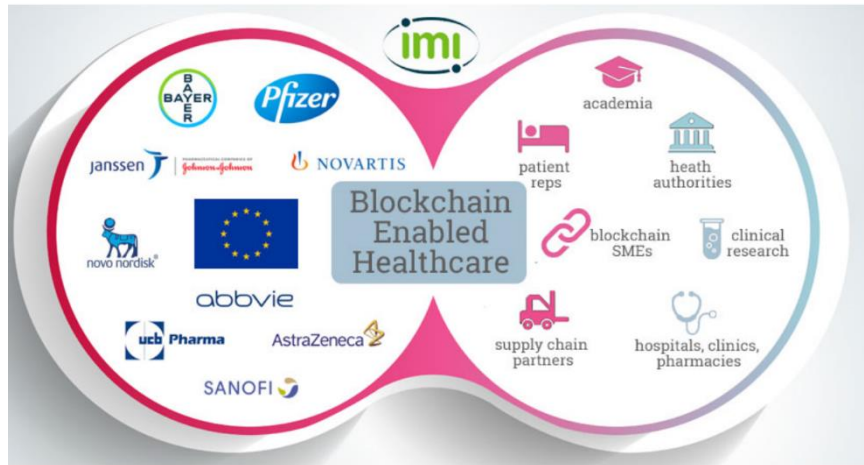


Blockchain Trust Fabric

- ❑ Trusted «Backbone» across silos
- ❑ Single Source of Truth
- ❑ Creating value for all industry participants
- ❑ Building on the serialization foundation

Innovative Medicines Initiative (IMI) Europe's partnership for health

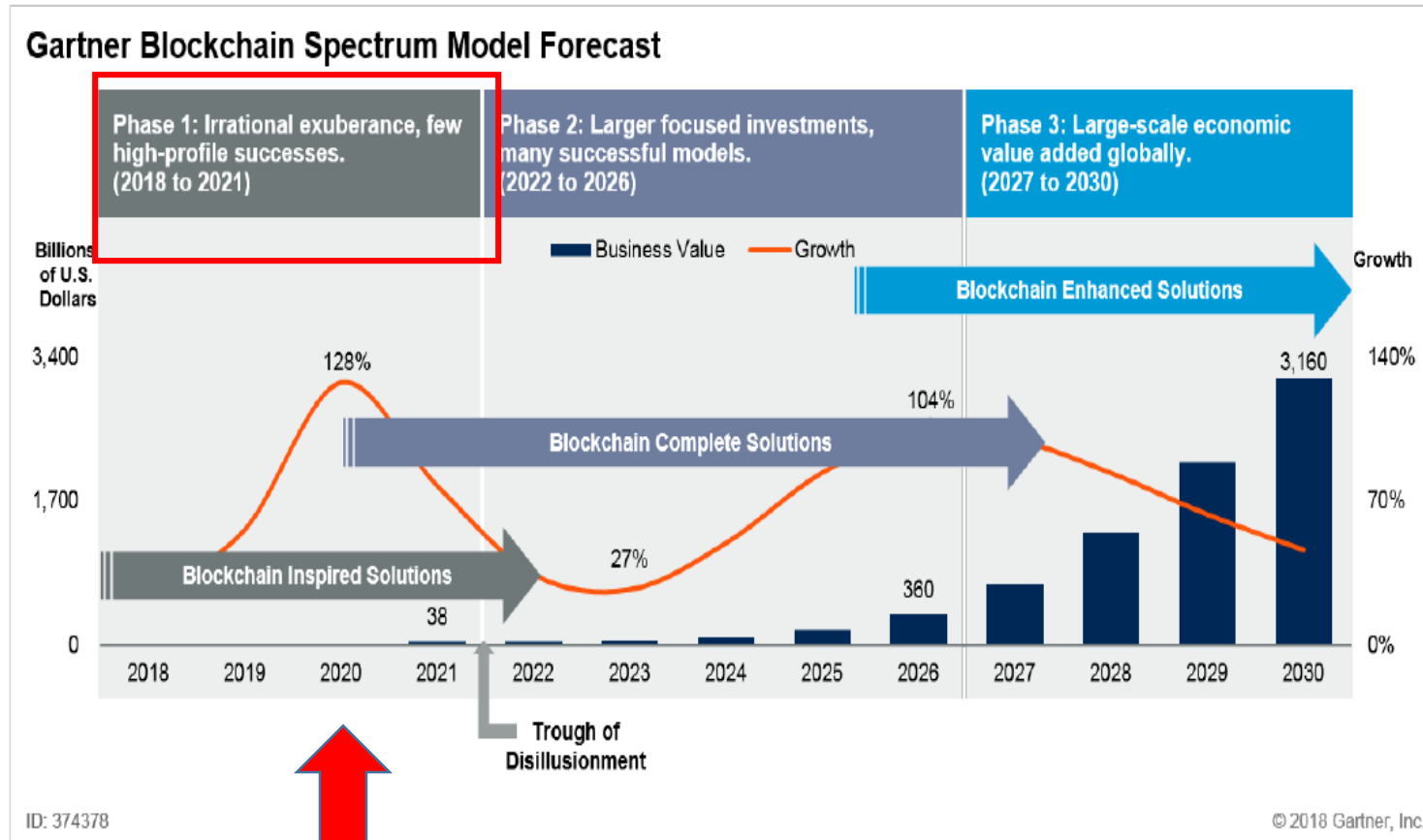
2019 landscape



Gartner Hype cycle : Blockchain growth

Global research/Advisory firm

Figure 1. Gartner Blockchain Spectrum Model Forecast



Source: Gartner (December 2018)

Reference : Gartner: Predicts 2019: Blockchain Business

Next 2 years: 2021 - 2022

30% of supply chain blockchain initiatives will refocus activities to prioritize

- Physical product data capture
- Ecosystem governance
- Stakeholder interoperability

Reference : Gartner: Predicts 2019: Blockchain Business

Consortiums, Associations and Working groups will expand
(Current: IEEE, PDSA, HDA., GS1)

Few questions to ponder

- Is the current trend in US a recipe for adaptation in Pharma for POC to production?
- Is regulation the driving force or is Pharma ready to make “technology driven transformation”?
- Who are the stakeholders who will sponsor and drive the change?



Blockchain is an open, distributed ledger that can record transactions between two parties efficiently and in a verifiable and permanent way.

- Adopted from <https://hbr.org/2017/01/the-truth-about-blockchain>

How does it work?

- Distributed and synchronized
- Peer-to-Peer Transmission
- Transparency
- Traceability
- Irreversibility of Records
- Computational Logic / Automation
- “Trustless”

Three types of models

- **1. Public:** Decentralization **open** to any public participant. Blockchain platform in **permissionless** mode.
- **2. Consortium:** Decentralization **close** among trusted members of a consortium. Blockchain platform in a **permissioned** mode.

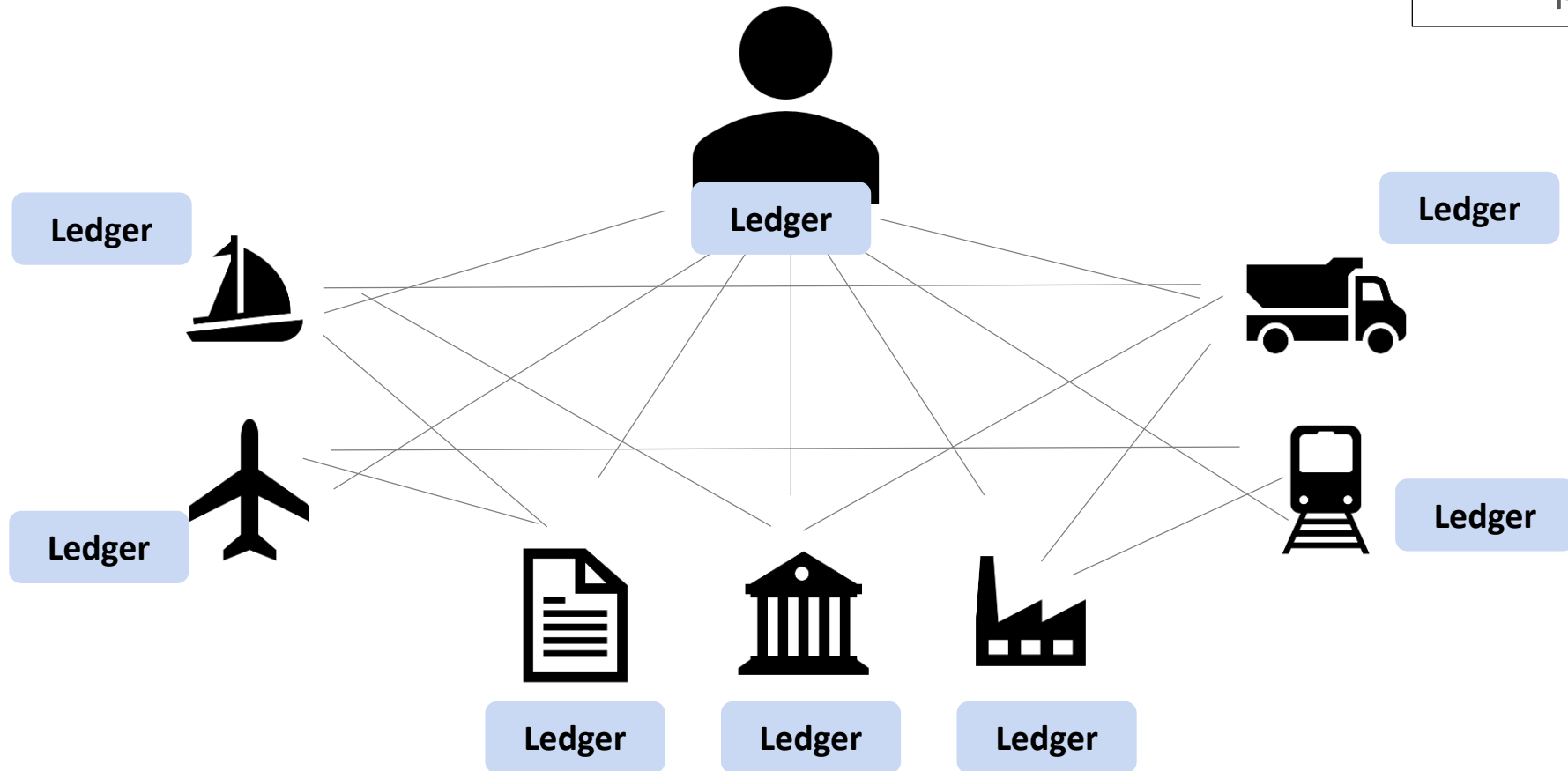


- **3. Private:** Decentralization **internally** in an enterprise that is made of decentralized entities.

What can it mean to supply chains?

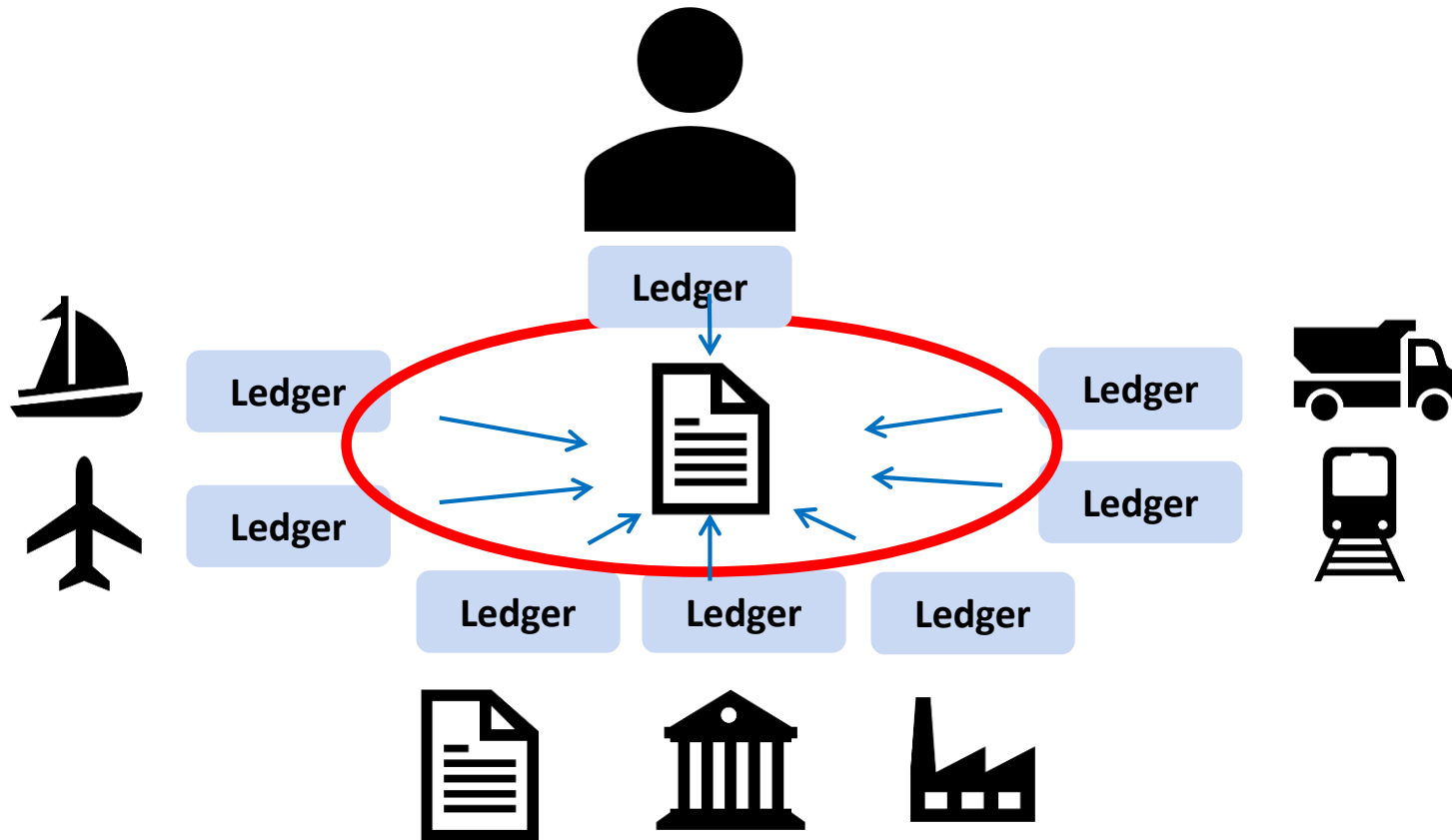
Problem: Difficult to monitor asset ownership and transfers

- Inefficient
- Mis-alignment
- Expensive



What can it mean to supply chains?

- **Solution:** Blockchain – synchronized, consensus, irreversible, provenance and efficiency



Reference and source

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- 2. The Basics of Bitcoins and Blockchains: An Introduction to Cryptocurrencies and the Technology that Powers Them (Cryptography, Crypto Trading, Derivatives, Digital Assets) – Illustrated, September 15, 2018 by Antony Lewis (Author)
- 3. Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies Is Changing the World – June 12, 2018 by Don Tapscott (Author), Alex Tapscott (Author)
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- by Seok-Won Lee (Editor), Irish Singh (Editor), Masoud Mohammadian (Editor)
- 5. Blockchain Basics: A Non-Technical Introduction in 25 Steps by Daniel Drescher (Author) Format
- 6. Cryptoassets: The Innovative Investor's Guide to Bitcoin and Beyond – October 19, 2017 by Chris Burniske (Author), Jack Tatar (Author)