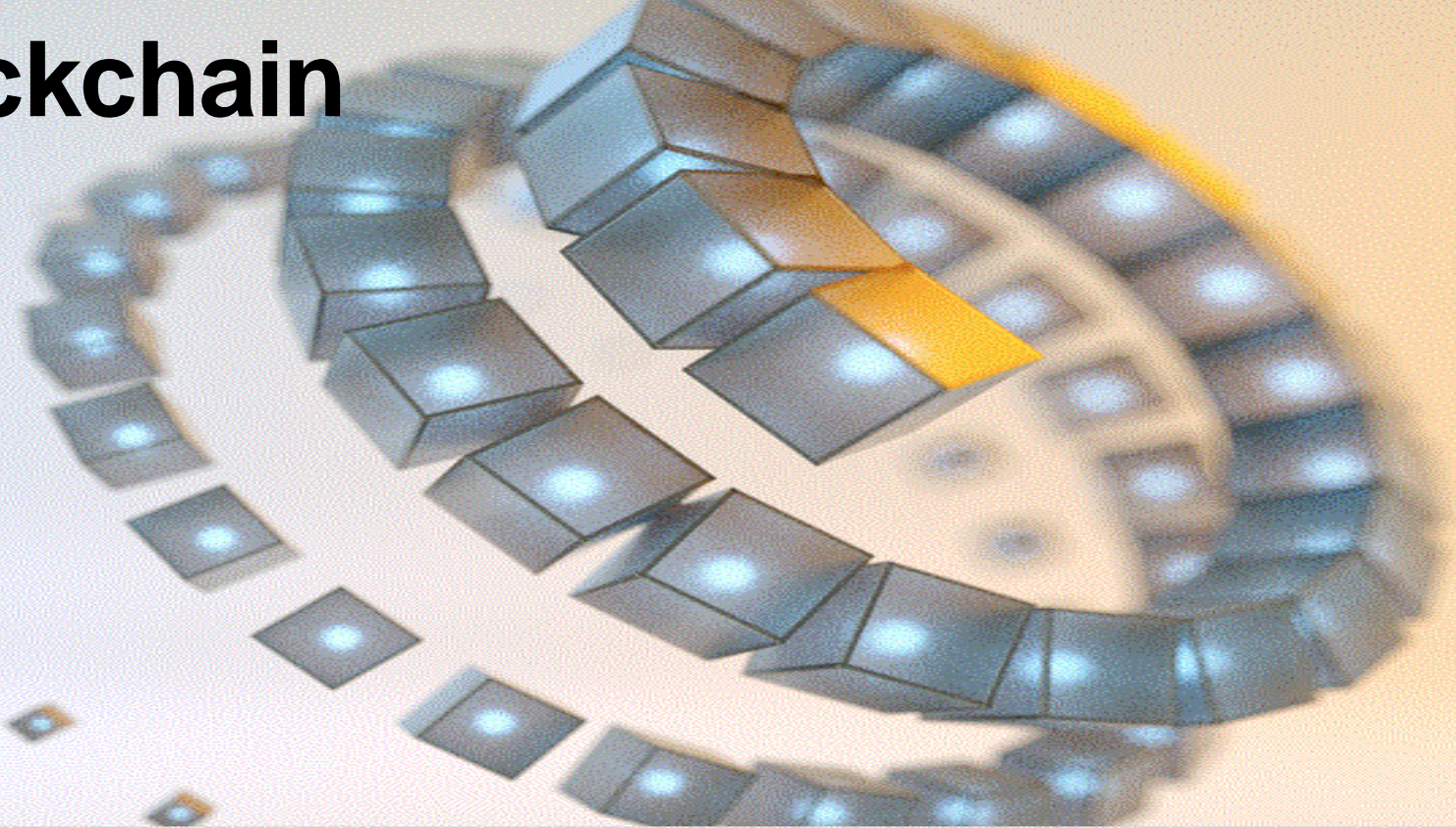


# Blockchain



**ECP**

Platform voor de  
InformatieSamenleving

**introduction, projects and industry use cases**

© 2016 IBM Corporation

**IBM**

# Contents

What

Blockchain is

Why

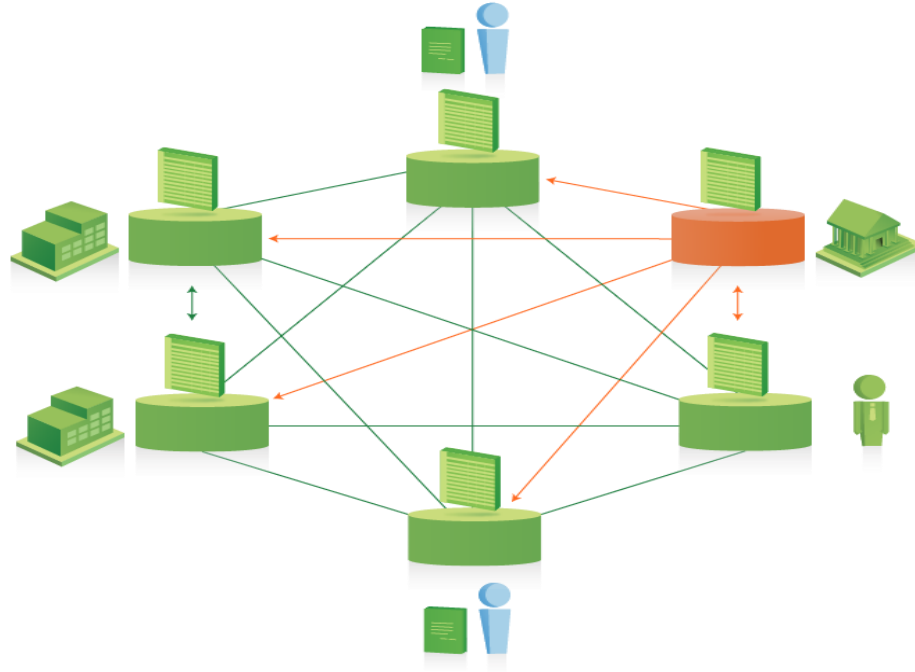


**HYPERLEDGER** PROJECT

How

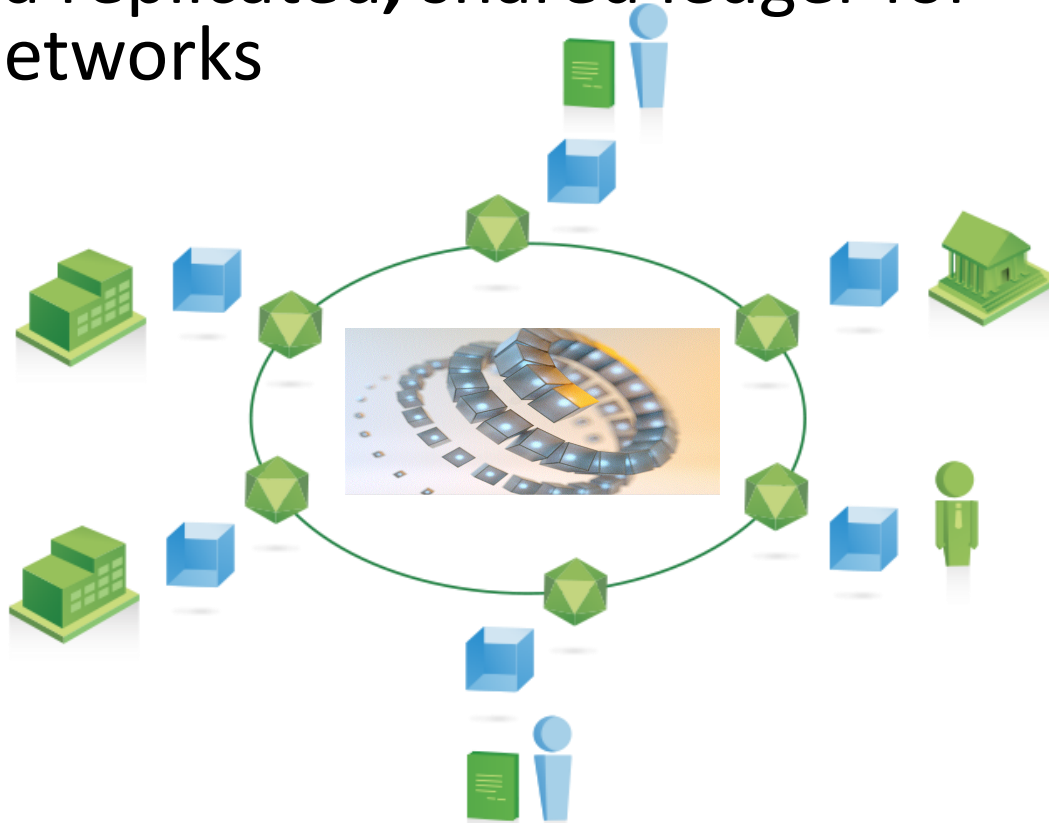
Blockchain use cases

# Problem - asset ownership & transfer in business networks



Inefficient, expensive, **vulnerable**

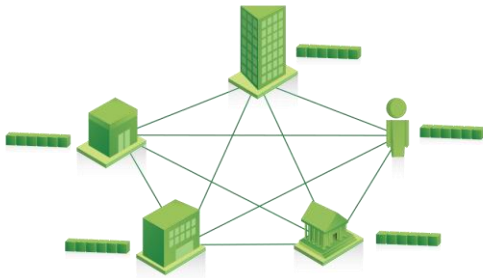
# **Solution** - a replicated, shared ledger for business networks



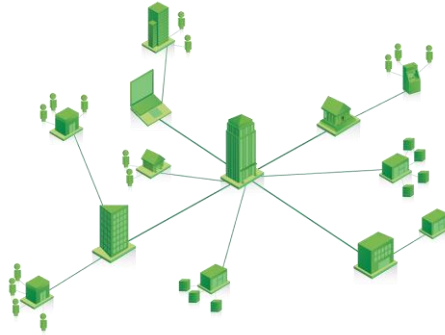
**Consensus, provenance, immutability, finality. permissioned**

# Key Concepts of blockchain

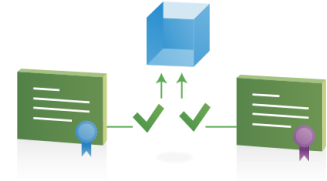
## Shared ledger



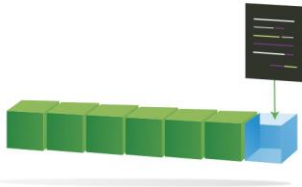
## A business network



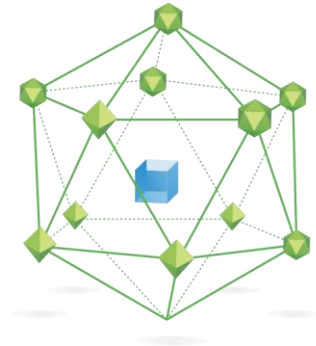
## Privacy and confidentiality



## Smart contracts



## Consensus

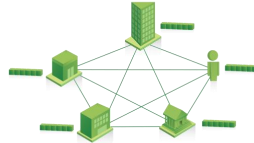


## Distributed Autonomous Organisations

# Blockchain in a nutshell

Append-only distributed  
**system of record** shared  
across business network

**Shared ledger**

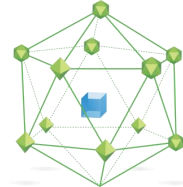


**Cryptography**



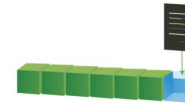
Ensuring secure,  
authenticated & verifiable  
transactions

**Consensus**



All parties agree to  
network verified  
transaction

**Smart Contracts**



Business terms embedded  
in transaction database &  
executed with transactions

DAO –Distributed Autonomous  
Organizations

**Broader participation, lower cost, increased efficiency**





# WHAT IS THE **HYPERLEDGER PROJECT?**

The Hyperledger Project is a collaborative effort created to advance blockchain technology by identifying and addressing important features for a cross-industry open standard for distributed ledgers that can transform the way business transactions are conducted globally.

**Hyperledger.org**

# Linux Foundation's Hyperledger Project

- Linux Foundation project announced December 17, 2015 with 17 founders, now 40 members
- The Hyperledger Project is a collaborative effort to advance Blockchain technology by identifying and addressing important features for a cross-industry open standard for distributed ledgers that can transform the way business transactions are conducted globally
- Open source and open standards-based

Enable adoption of shared ledger technology at  
a pace and depth not achievable by any one company or  
industry

## QUICK FACTS

Chairman	Blythe Masters/DAH
Executive Director	Brian Behlendorf
Technical Chair	Chris Ferris/IBM
Contribution	44,000 lines of code in February 2016
Sprint to one codebase with unified thinking	Target 3Q release

[www.Hyperledger.org](http://www.Hyperledger.org)



## PREMIER



## GENERAL



# Use Case Examples

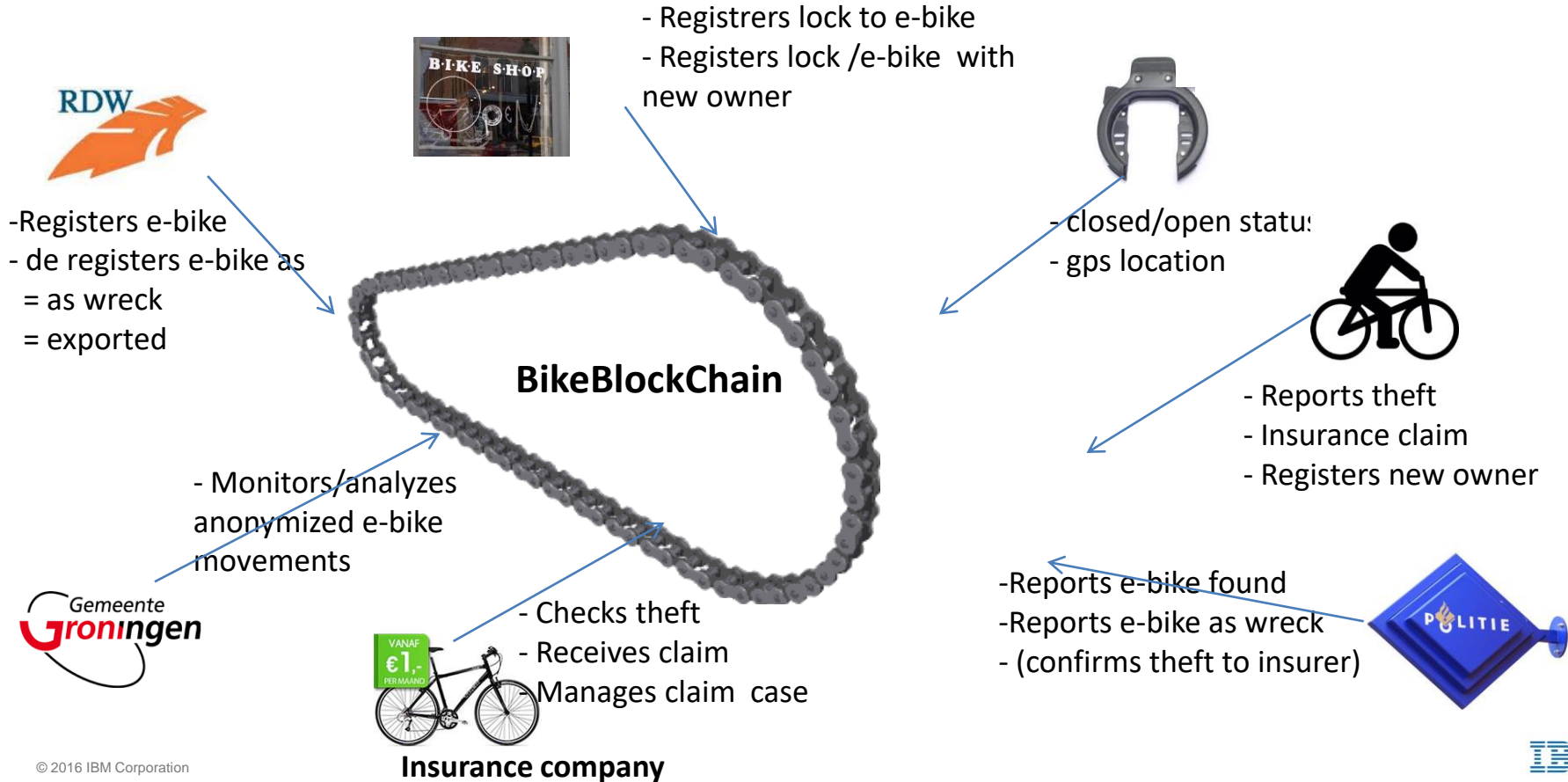
# Blockchain for Healthcare Use Cases

(Selected examples taken from:

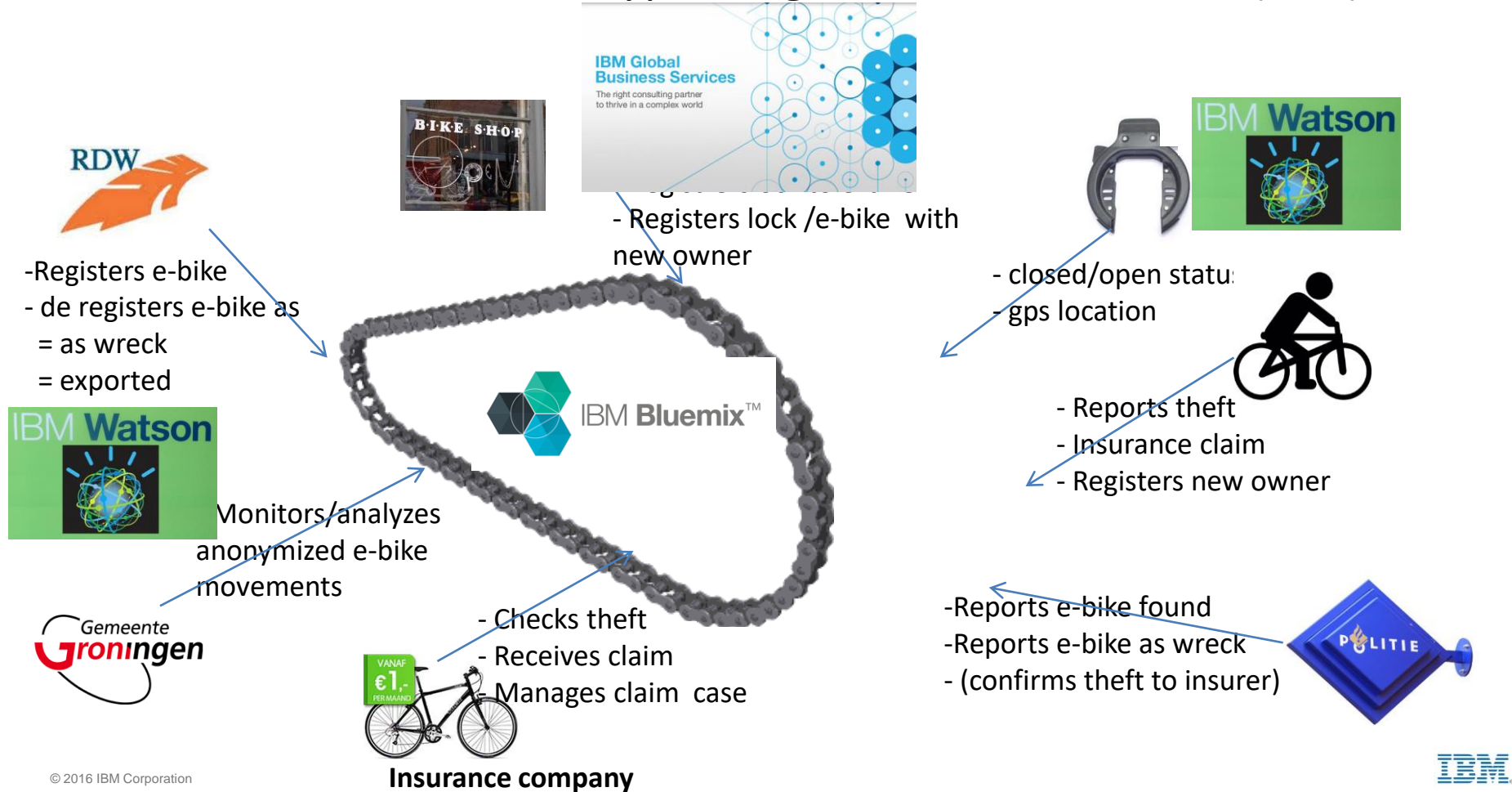
“Blockchain: The Chain of Trust and its Potential to Transform Healthcare – Our Point of View”)

<b>Notarization / Identity Verification</b>	Registration of EMR, insurance, and other healthcare records
<b>Genomics Research</b>	Accessibility to genetic data secured on blockchain
<b>Population Health Management</b>	A blockchain-based personal health record (PHR) system measuring consumer outcomes and influencing medical actions (for example, cases of influenza and preventative vaccines)
<b>Internet of Things and Blockchain</b>	Consumer-generated health data meets IoT wearables through data accessibility and interconnection with health records
<b>Smart Property</b>	Track provenance and introduce anti-counterfeit measures for healthcare assets
<b>EMR</b>	Personal health record storage and access administered using blockchain, with user-key permission for doctors and other authorized parties
<b>Health Document Notary Services</b>	Proof-of-insurance, test results, prescriptions, status, condition, treatment, physician referrals

# RDW: BikeBlockchain – Hyperledger Blockchain for IoT (PoC)



# RDW: BikeBlockchain – Hyperledger Blockchain for IoT (PoC)



# Use Case – Blockchain Internet of Things and Government earthquake sensor network

## What?

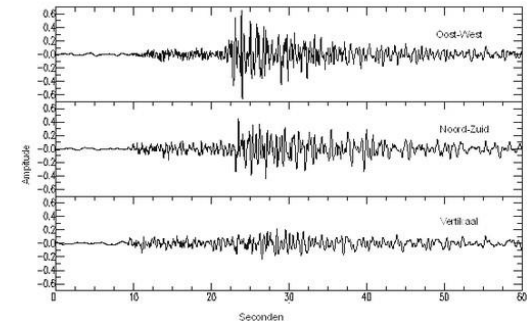
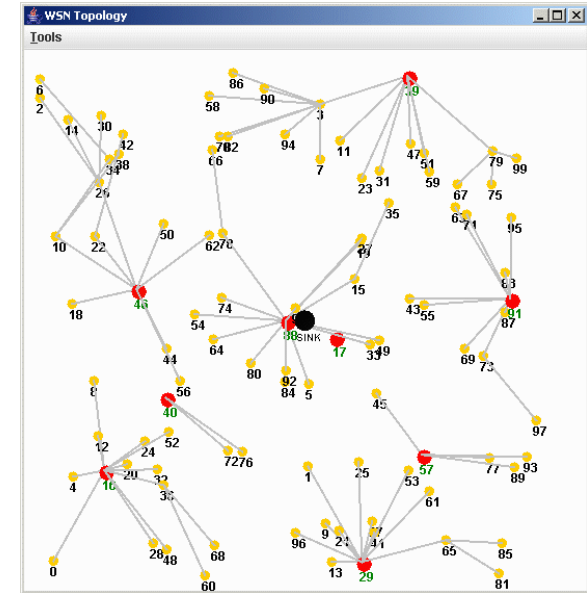
- Record seismic data from individual sensors in a public ledger (Blockchain)

## How?

- Seismic model will verify timestamped recordings by sensors in the network to be belonging to the same earthquake event

## Benefits

1. No trusted third party required for registering and verifying individual seismic events
2. Easier to relate new damage to specific seismic event
3. events transparent to all network members





# Blockchain Enables a Comprehensive View of All IGF Operations

Today's Systems

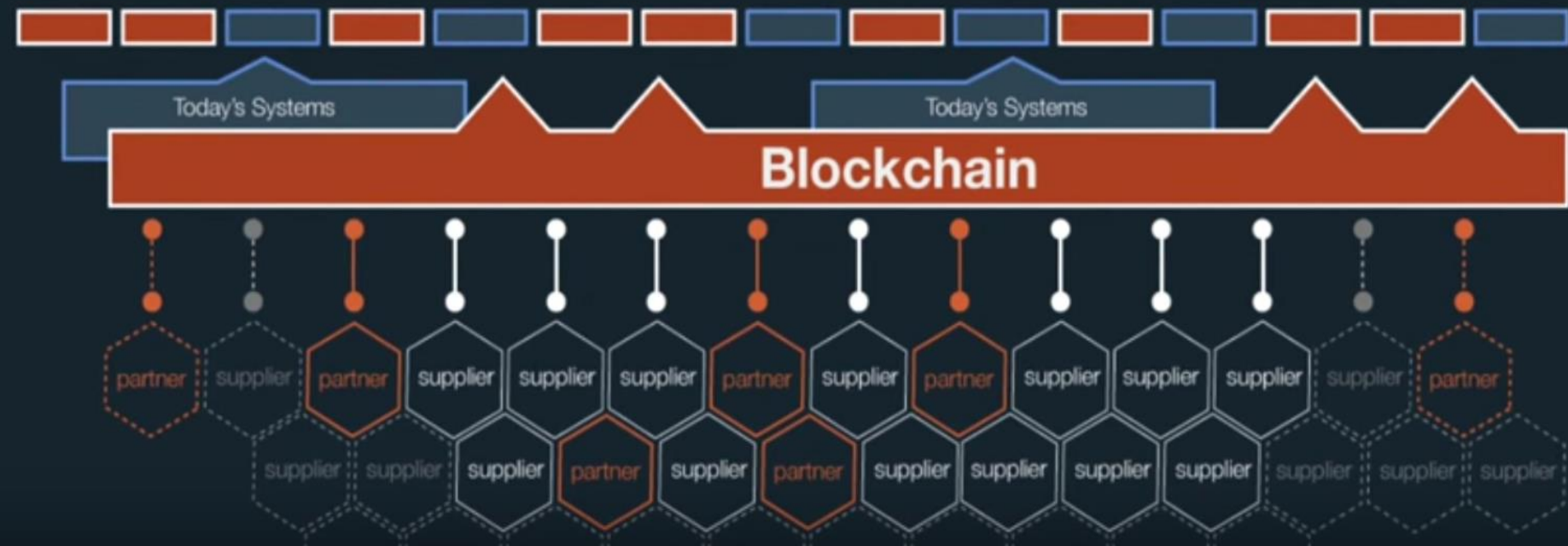
approximately  
**\$100 million** tied up  
at any given time

Today's Systems

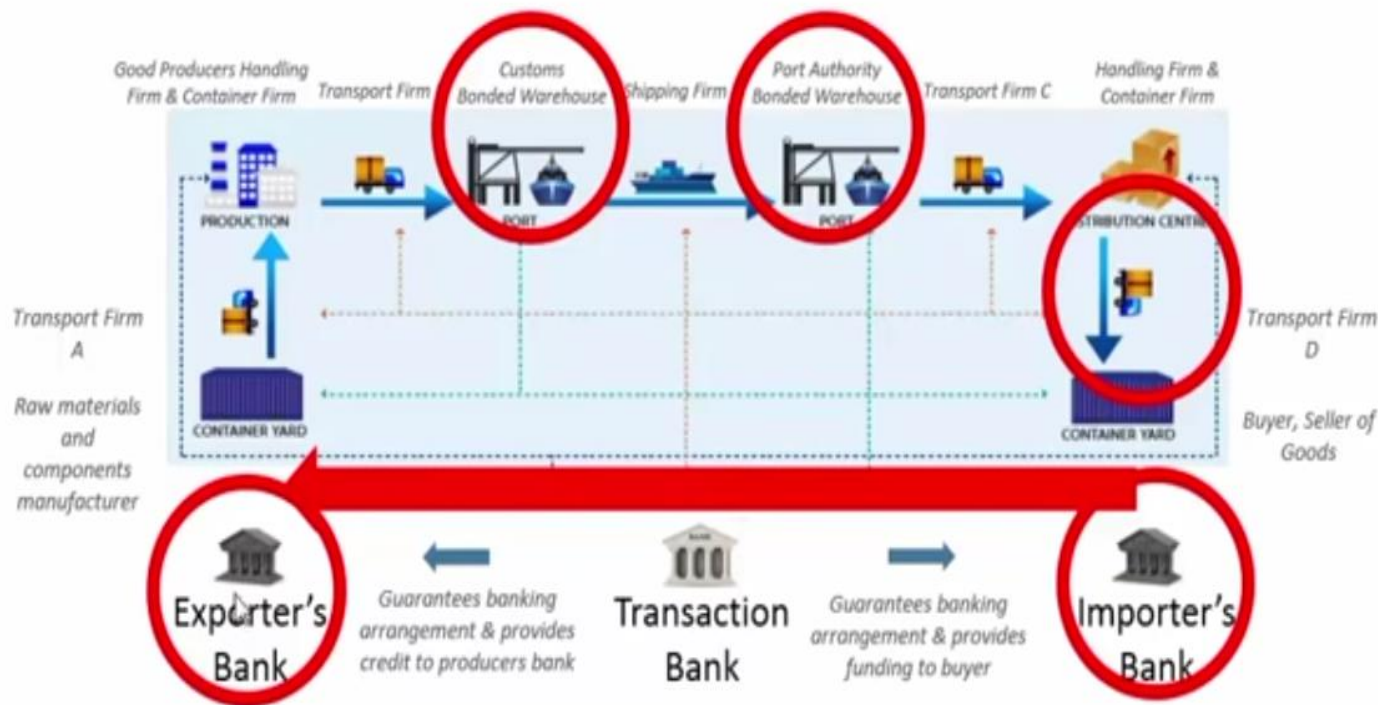
**44 days** on  
average to resolve

Today's Systems

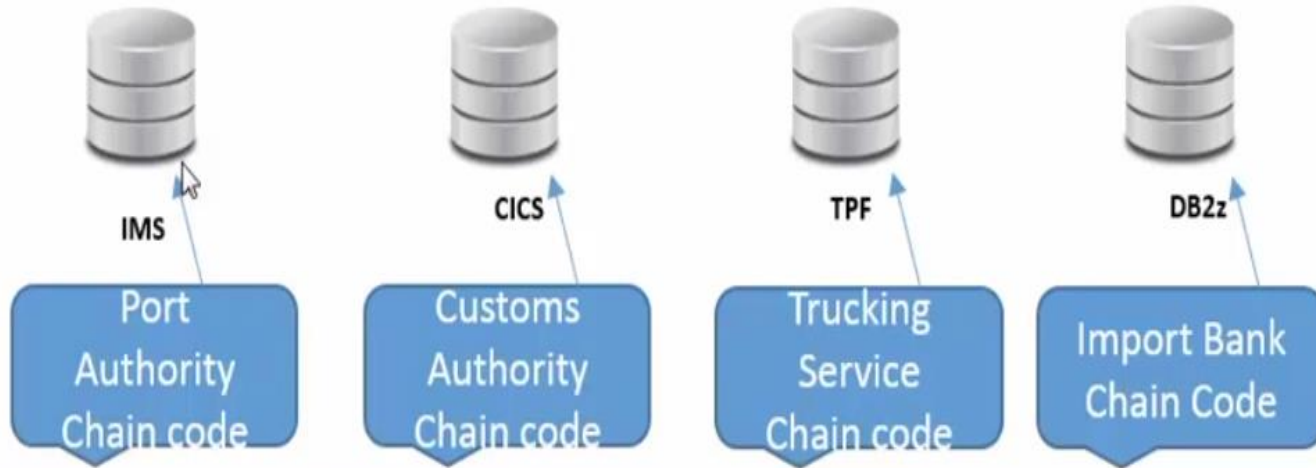
**\$31,000** average  
disputed invoice value



# Traditional Trade Finance: >10 parties, ~30 documents, physical presence and overwhelmingly paper-based



# Trade Finance Smart Contract



**IBM Blockchain applications**

# Provenance – Origin of Goods, and Compliance

## What?

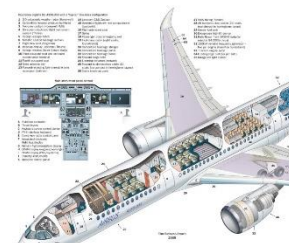
- Provenance of each component part, process, or compliance step in complex system is hard to track
- Manufacturer, production date, batch and even the manufacturing machine program.
- Safety, audit and compliance of drugs, food, regulated industries

## How?

- Blockchain holds complete provenance details of each component part
- Accessible by each vendor in the production and delivery process, consumers, maintainers and government regulators.

## Benefits

- trust increased no authority "owns" provenance
- improvement in system utilization
- Targeted recalls of "specific" goods, rather than cross fleet



# Regulatory Compliance

## What?

- Knowing that a piece of equipment (e.g. engine, measuring system, instrument) has been used per the specifications or in accordance with regulations for the equipment. e.g. work performed, amount of use, type of use, mis-handling events, etc.
- Many interested and dependent parties, with contrasting/conflicting goals e.g. Manufacturer/owner/regulator/inspector/insurer
- Processes, such as the manufacturing or transport of drugs, have regulatory requirements for tracking history and maintaining those records for years and providing to regulatory agencies as well.

## How?

- Use IoT blockchain as a shared ledger of equipment/process history, from usage, maintenance, warranty work, replacement parts, out-of-tolerance or regulation situations.

## Benefits

- Greater transparency of true history: indelible log of equipment sensor readings, or situations logged by the device and reported, process events and history
- Safety Certifications and Auditability
- Greater trust since no single authority "owns" the whole story – or said another way – many parties all keep the same record of events/data
- New business opportunities for insurers, regulators, etc.

# Blockchain for Business – Our Point of View

---



## Community + Code

Linux Hyperledger Project

Open Source Code: Blockchain for business;

**Consensus | Provenance**  
**Immutability | Finality**

Open Governance – 100 member cross industry board

---



## Cloud

IBM Blockchain

**Identity | Consensus | System Integration |**  
**Hardware-assist for Performance & Security**

IBM Blockchain on Bluemix

---



## Clients

Blockchain Solutions  
Blockchain Garage

Making Blockchain real for business

Blockchain Garage;  
**New York | London | Singapore | Tokyo**

---



# IBM approach for Blockchain

## 1. workshop

- 1,5 hrs interactive
- Explain Blockchain
- Jointly Define use cases 1-2

## 2. BlockchainGarage Workshop

- 2 hrs , Blockchain Garage in Groningen
- Blockchain demos
- expand identified pilots (use cases)
- Goal: request for pilot

## 3. Offering Blockchain pilot

## 4. Blockchain pilot project

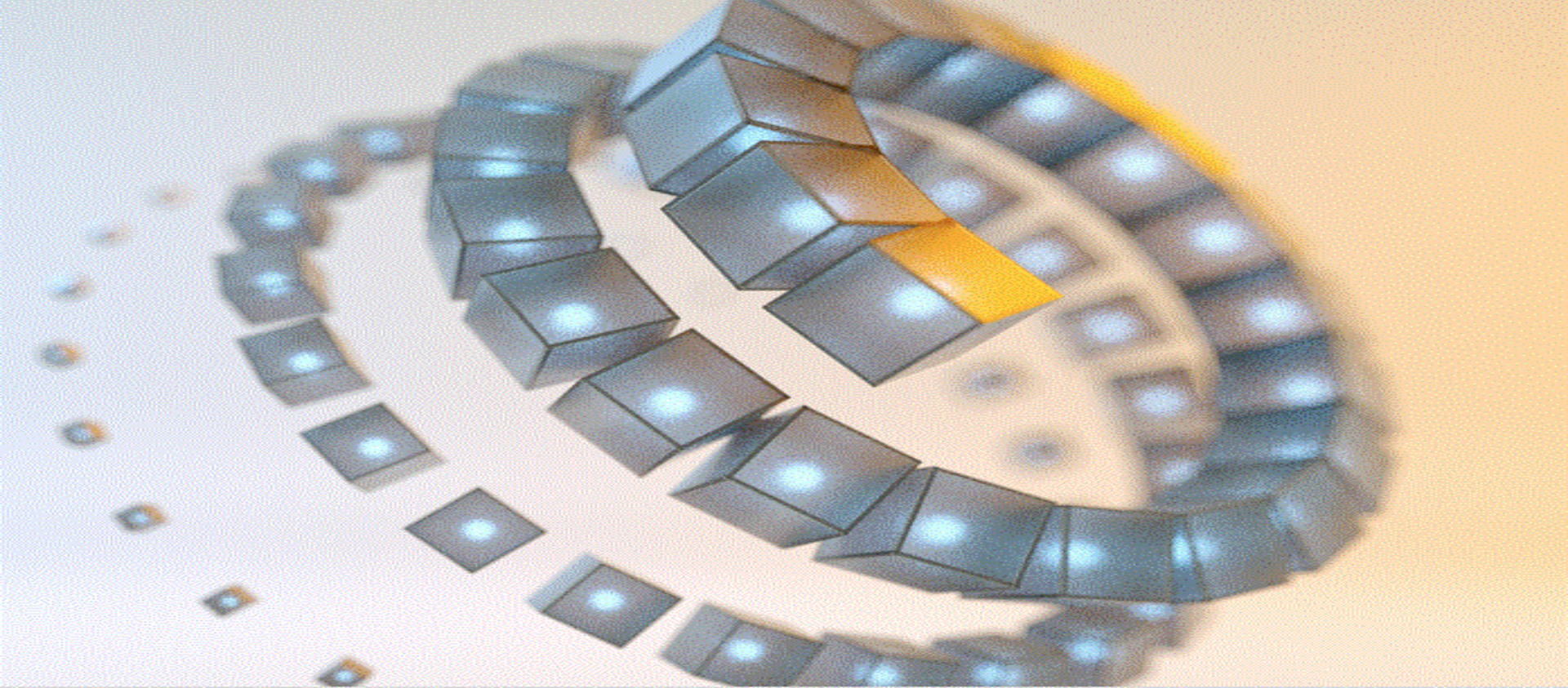
- IBM Blockchain
- involves IBM iX Blockchain consultant and CIC Blockchain programmer
- Agile approach
- realise Blockchain to evaluate effects on business



# Summary

1. Blockchain is a shared, replicated ledger technology
2. Linux Foundation Hyperledger project: an open standards, open source, open governance Blockchain
3. Blockchain can open up business networks by taking out cost, improving efficiencies and increase accessibility
4. Blockchain addresses an exciting and topical set of business challenges, which cross every industry
5. Start identifying the value of blockchain technology in your business network





[Louis\\_de\\_Bruin@nl.ibm.com](mailto:Louis_de_Bruin@nl.ibm.com)

+31653319130