IT SECURITY IN THE SUPPLY CHAIN WITH BLOCKCHAIN TECHNOLOGY

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PUBLIC

SECURE CONNECTIONS FOR A SMARTER WORLD

Agenda

- Introduction
- Blockchain Basics & Components
- Blockchain Implementation
- Blockchain Use Cases in the Supply Chain
- Summary

INTRODUCTION

Christopher Nigischer

Curriculum Vitae

1998 – Sales for IT projects (BI, DWH), Vienna
2005 – Business Unit Manager Altran Technologies, Hamburg
2011 – first own incorporation of consider it GmbH
2014 – Industrial Competence Center, NXP

Founder of

consider it GmbH – IT-Consulting & Headhunting
CHAINSTEP GmbH – Blockchain Training, Consulting & Implementation
SICOS S.à.r.l. – ICO Advisory & Harvest Token Platform

Activities

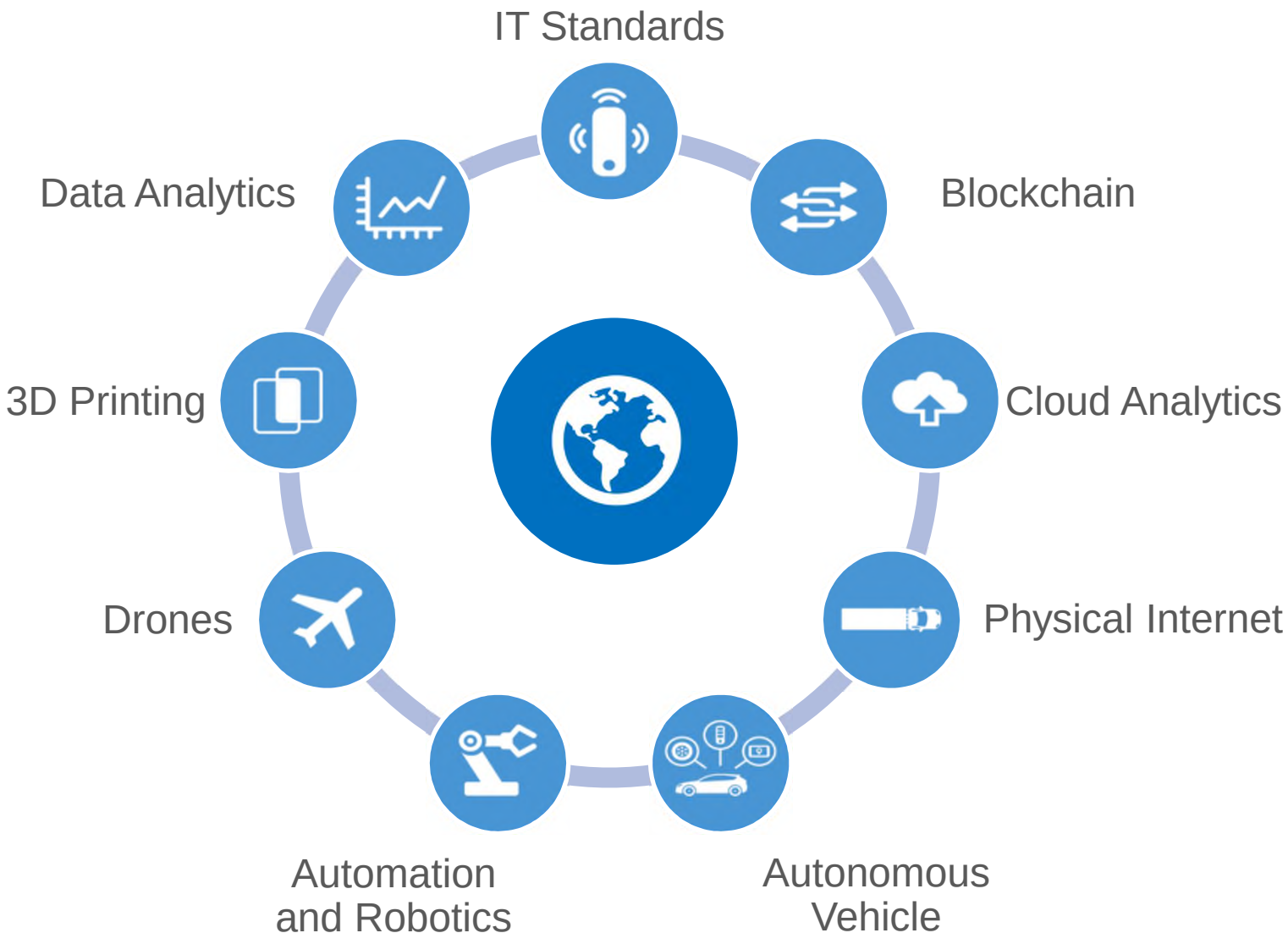
Bitkom – Board Member of Working Group Blockchain
Bundesverband Blockchain – Founding Member
Blockchain Research Lab – Managing Director

Projects with Blockchain Technology

SAMPL – Secure Additive Manufacturing Platform, BMWI/PAiCE, 11/2016
Innovationforum Blockchain – Networking and Conference, BMBF/Mittelstand, 06/2017
ETIBLOGG – Energy Trading via Blockchain, BMWI/SSW2, exp.: 04/2018
HANSEBLOC – Blockchain technology for logistics, BMBF/KMU-NetC, exp.: 04/2018

Industrial Competence Center NXP

Digitisation is speeding up – also in the Supply Chain



Reference: PWC "Shifting Patterns - The future of the logistics industry", 2016

IT Security becomes the main priority – also for the Supply Chain

"IT Security is the process of implementing

measures and systems

designed to

securely protect and safeguard information

utilizing various forms of technology developed to create, store, use and exchange such information against any unauthorized access, misuse, malfunction, modification, destruction, or improper disclosure, thereby preserving the value,

confidentiality, integrity, availability,

intended use and its ability to perform their permitted critical functions."

Reference: SANS Institute, https://www.sans.org/it-security/

Challenges in Supply Chain and IT Security

Challenges in Supply Chain	Challenges in IT Security
Unreliable and inaccurate (tampered) information	Cyber Security Risks, Hacks, Leaks, Manipulation
Increasing complexity leads to growing value of trust in Supply Chains	Hardware & Software attack Data Security
Lack of Real Time Data Access and Communication	Maintenance of Communication and Collaboration
Inaccurate Forecasts of Demand for more Effective Planning Strategies	Accuracy and Availability of Data
Inability to Fully Utilize the Technological Resources Available	Untrained Staff

BLOCKCHAIN
BASICS & COMPONENTS

My Blockchain context

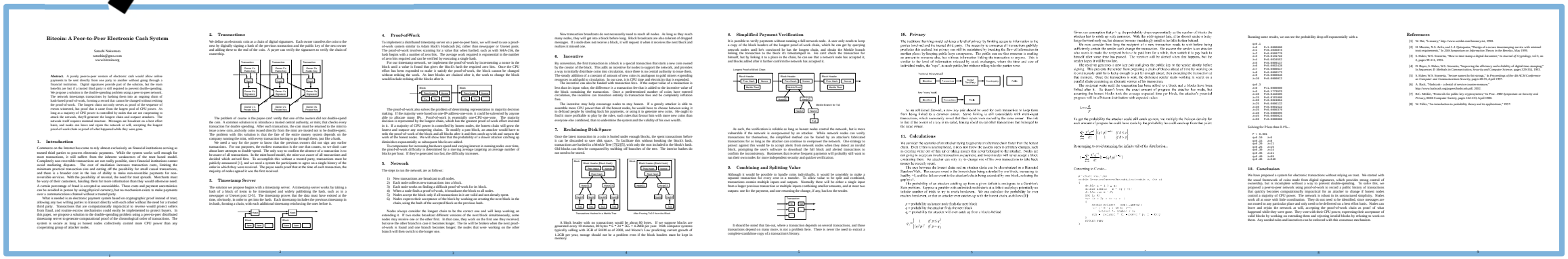
Evolution of Trade	Evolution of Money	Internet Years	Blockchain Promises
New trade theory	E-money	Social interactions	Decentra-lization of trust
Classical trade theory	Plastic money	E-commerce	Value flow without inter-mediary
Mercantilism	Paper currency	Self Publishing	
Barter system	I owe you	Personal Communication	
	Coinage		
	Commodity		
	Barter money		

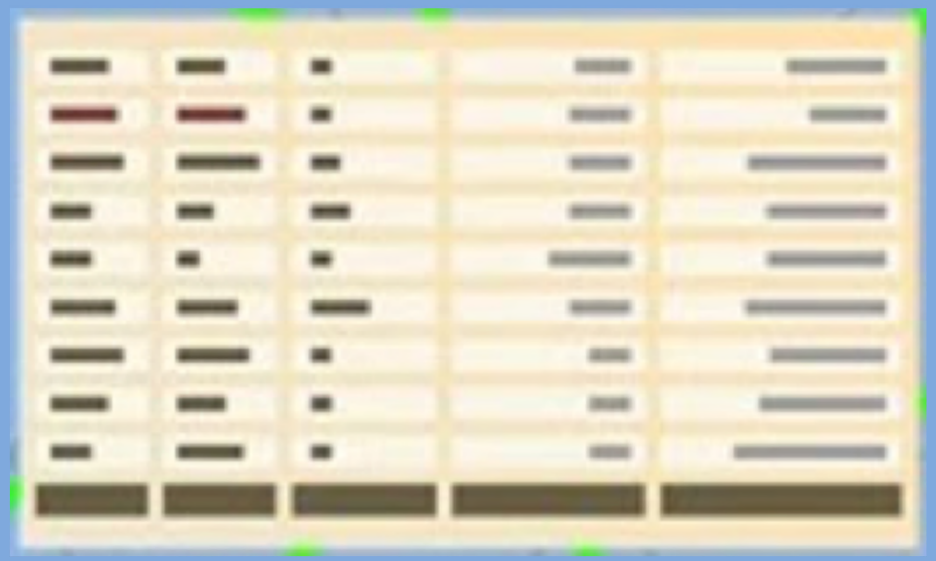
Bitcoin Whitepaper published on 31.10.2008 by Satoshi Nakamoto

Bitcoin: A Peer-to-Peer Electronic Cash System

Satoshi Nakamoto
satoshin@gmx.com
www.bitcoin.org

Abstract. A purely peer-to-peer version of electronic cash would allow online payments to be sent directly from one party to another without going through a financial institution. Digital signatures provide part of the solution, but the main





A Blockchain is a decentralized data structure that allows participants to transact directly with each other and stores the state and history of participants' transactions.

Source: DutchCoin on YouTube

BLOCKCHAIN CHARACTERISTICS

Peer-2-Peer

transparent

encrypted

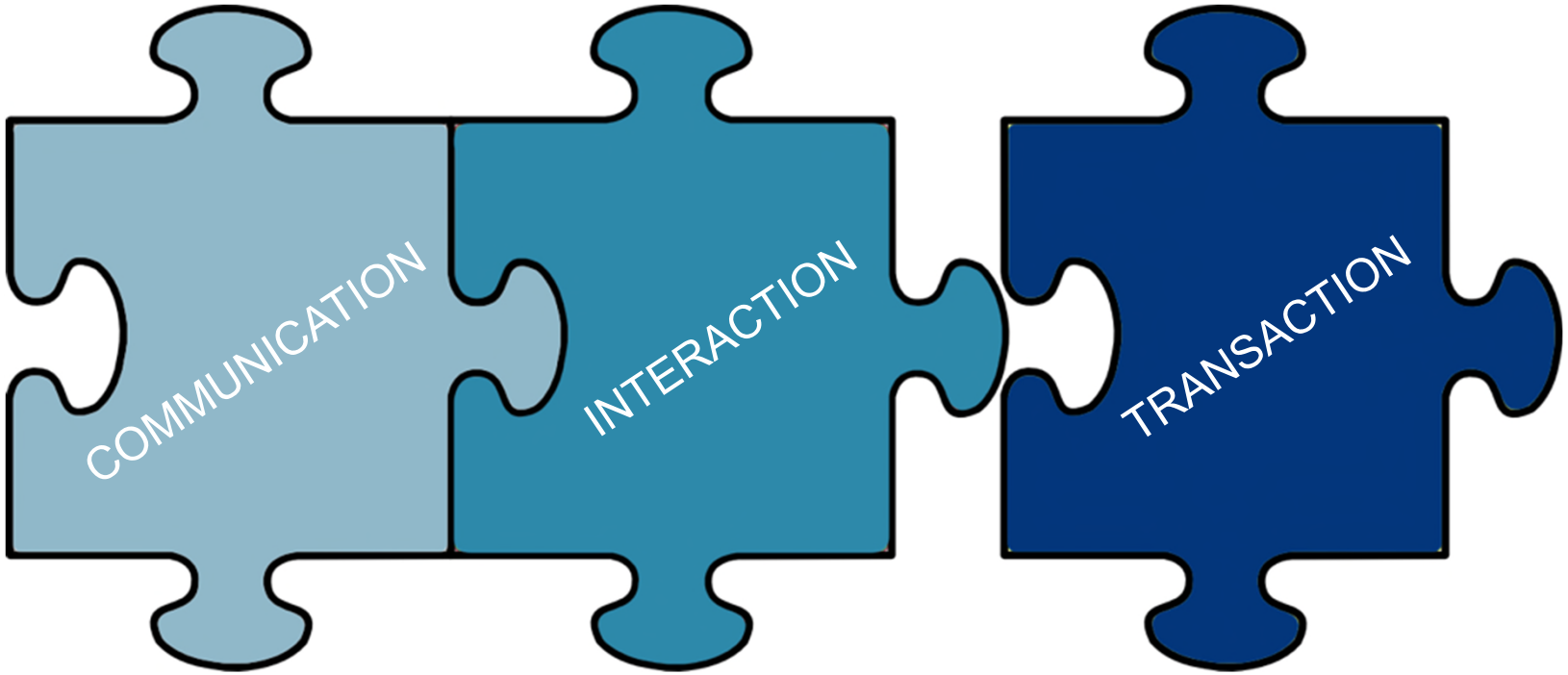
private

uncensorable

immutable

http://www.economist.com/news/leaders/21677198-technology-behind-bitcoin-could-transform-how-economy-works-trust-machine

Blockchain adds a transaction layer to the internet



Key Benefits

disintermediation

increased efficiency
decreased costs
faster processing

more security

cryptographically secured/validated
accountability and provenance
ownership tracking

less systemic risk

increased transparency
improved risk diversification
automated regulatory oversight

more automation

internal record keeping
documentation processing
multiparty process compatibility
M2M and AI on the internet (IoT)

Blockchain Components

Transaction

Smart Contract

Token

Oracle

Governance

Transactions

Transact

Lightning Network

Transact Compute

Raiden Network

Proof of Stake

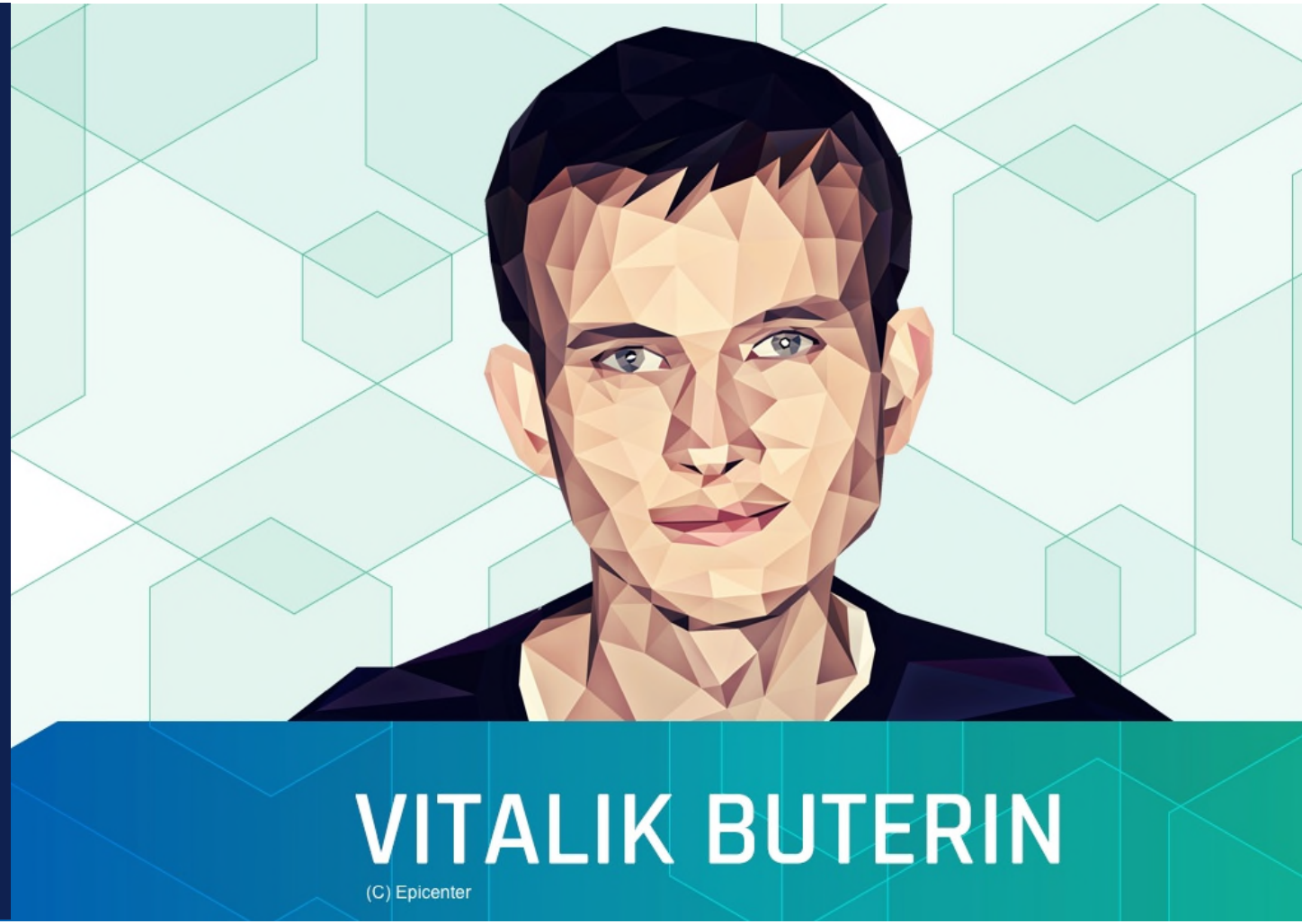
Transact real-time

IoT Data Marketplace

Smart Contracts

„My one sentence definition of "smart contract":
A smart contract is a computer program that directly controls some kind of digital asset. “

Vitalik Buterin
Inventor Ethereum



Token Archetypes

Crypto-currency

- Used as store-of-value or means-of-payment; unit of account
- Not issued by a central authority
- Can be mineable or pre-mined

Tokenized Asset

- Gives access to assets like gold, even in a micro transaction scale
- The underlying asset needs to be held by the issuing party
- Thus introduces counterparty risk, contrary to cryptocurrency

Tokenized Platform

- Platform-like network, not owned & operated by a single entity
- Before users had limited roles in a platform, now roles are distributed and available to every network participant
- Value (financial/utility) flows freely through the network

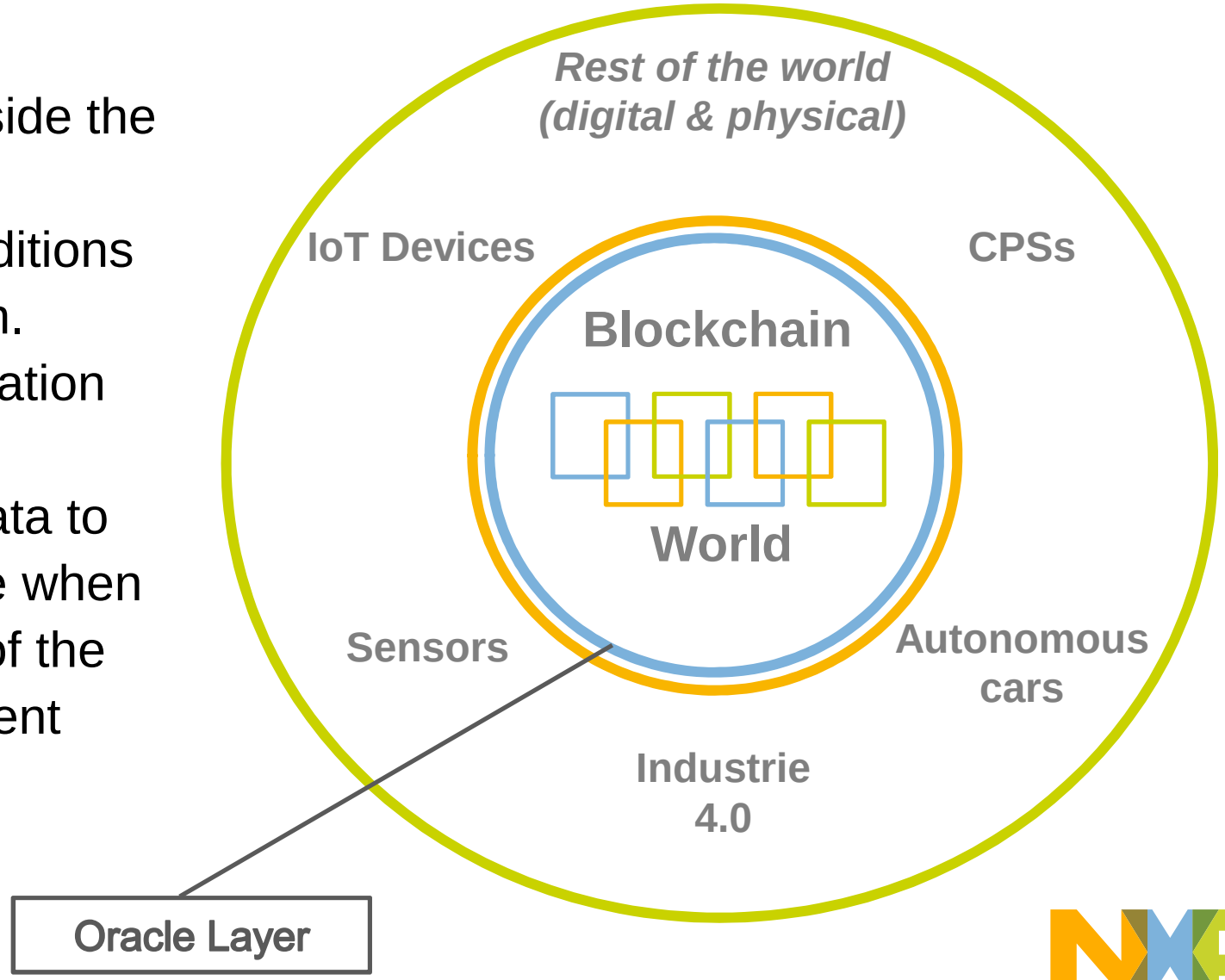
Token-as-a-share

- A tokenized instrument to invest in companies (non-regulated) that has characteristics of stock & currency
- Shares on steroids: flexible and programmable via smart contracts
- Regulatory frameworks only beginning to emerge

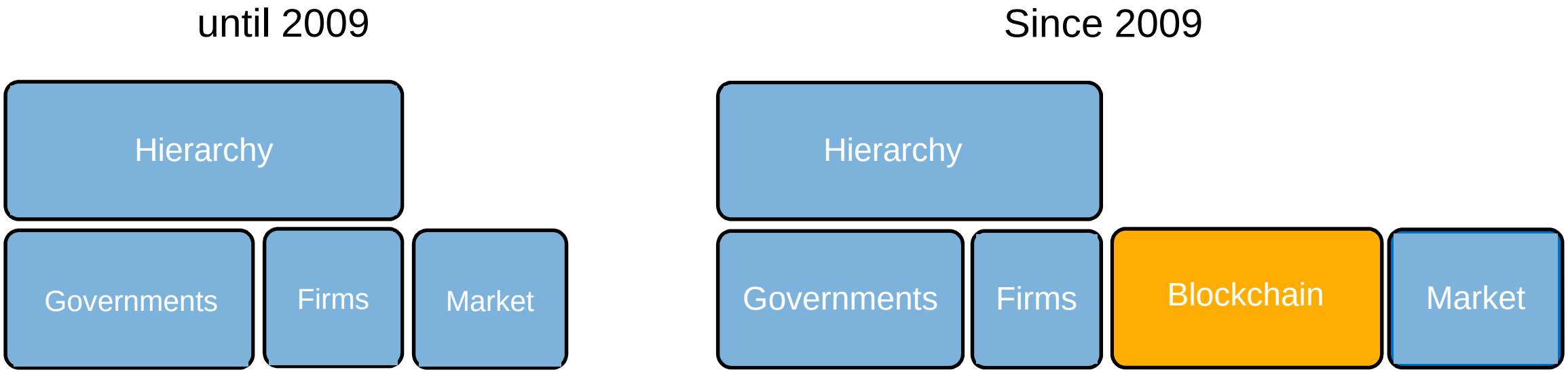
Source: http://www.untitled-inc.com/token-classification-framework/

Smart & secure Oracles to avoid „immutable garbage“

- No access for Blockchains (deterministic) to information outside the chain.
- No direct way to validate the conditions that smart contracts are based on.
- Oracles are translators for information provided by an outside platform.
- Oracles provide the necessary data to trigger smart contracts to execute when conditions match with the terms of the contract (e.g. temperature, payment completion, price change, etc.)

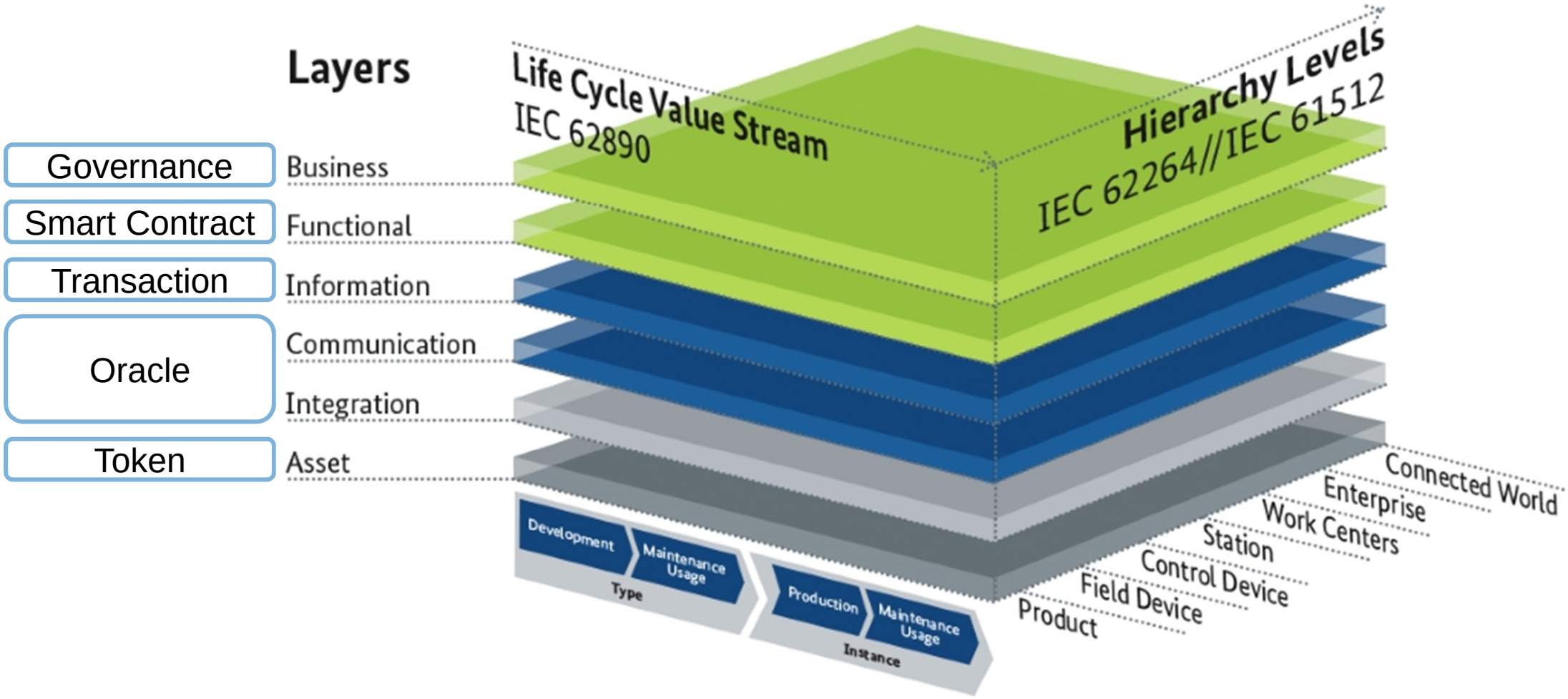


Social, technical and market governance



Source: Davidson, De Filippi, Potts: „Economics of the Blockchain“, 2016

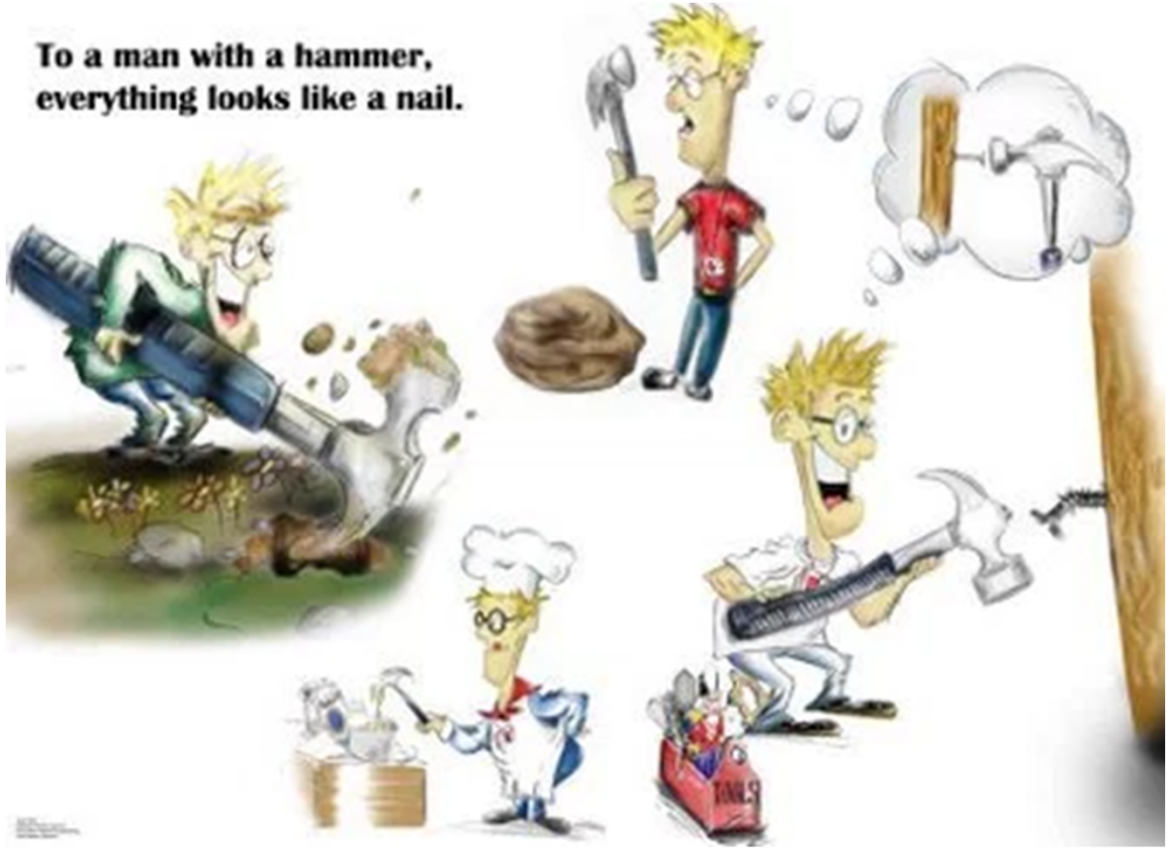
Blockchain & Industry 4.0



Source: https://www.zvei.org/themen/industrie-40/das-referenzarchitekturmodell-rami-40-und-die-industrie-40-komponente/

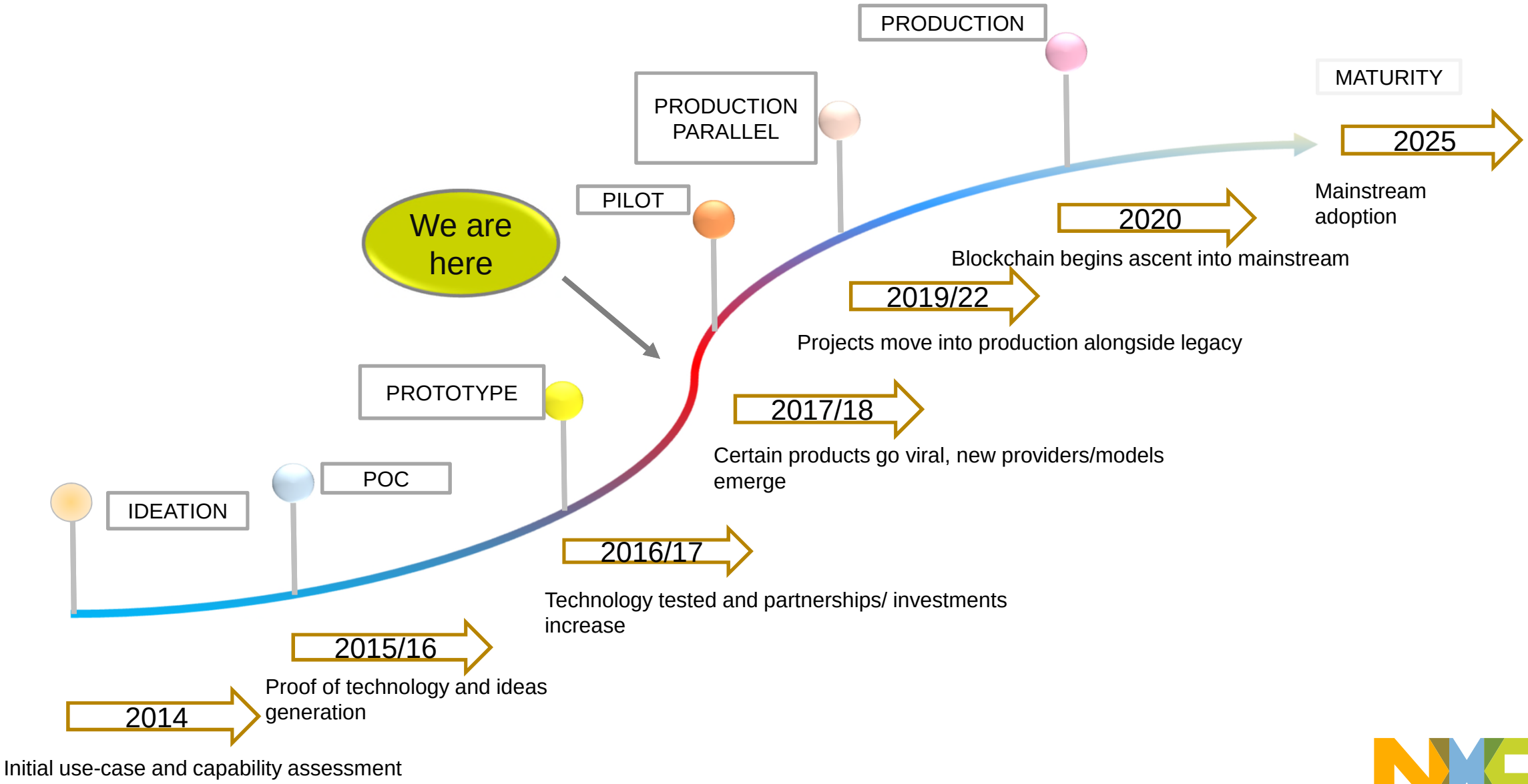
BLOCKCHAIN IMPLEMENTATION

FUD (fear, uncertainty & doubt) and FOMO (fear of missing out)



Source: https://janav.wordpress.com/2013/06/10/man-with-a-hammer-syndrome/

Development stages



Source: Credit Suisse „Blockchain 2.0“, 2018

BSI on Blockchain

Bundesamt
für Sicherheit in der
Informationstechnik

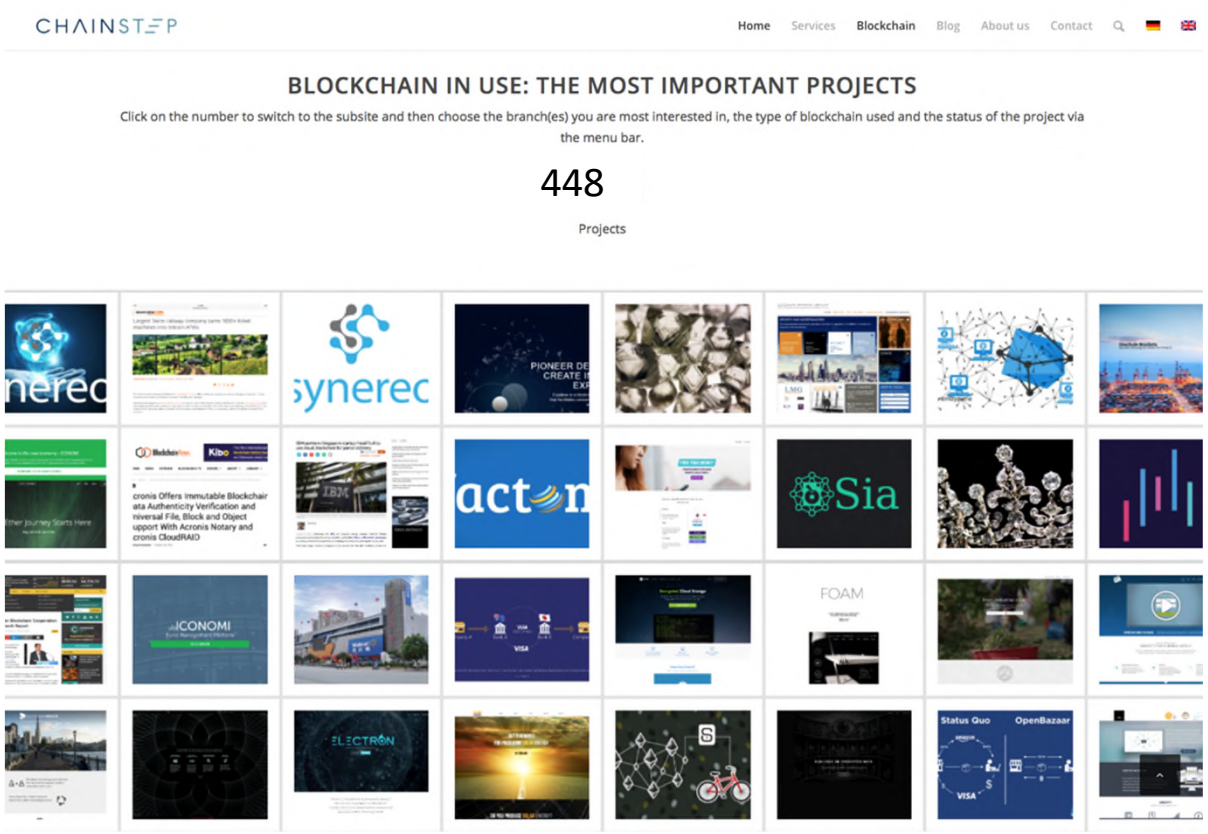
Blockchain sicher gestalten – Eckpunkte des BSI

- Blockchain alone doesn’t solve IT security issues
- Selection of the right Blockchain-model is important
- Call for Security-by-Design
- Long-term security to be considered (post quantum security)
- Security Levels need to be defined and implemented

Source:https://www.bsi.bund.de/SharedDocs/Downloads/DE/BSI/Krypto/Blockchain_Eckpunktepapier.pdf?__blob=publicationFile&v=3

BLOCKCHAIN USE CASES IN THE SUPPLY CHAIN

An overview on Blockchain Use Cases



https://www.chainstep.com/use-cases/

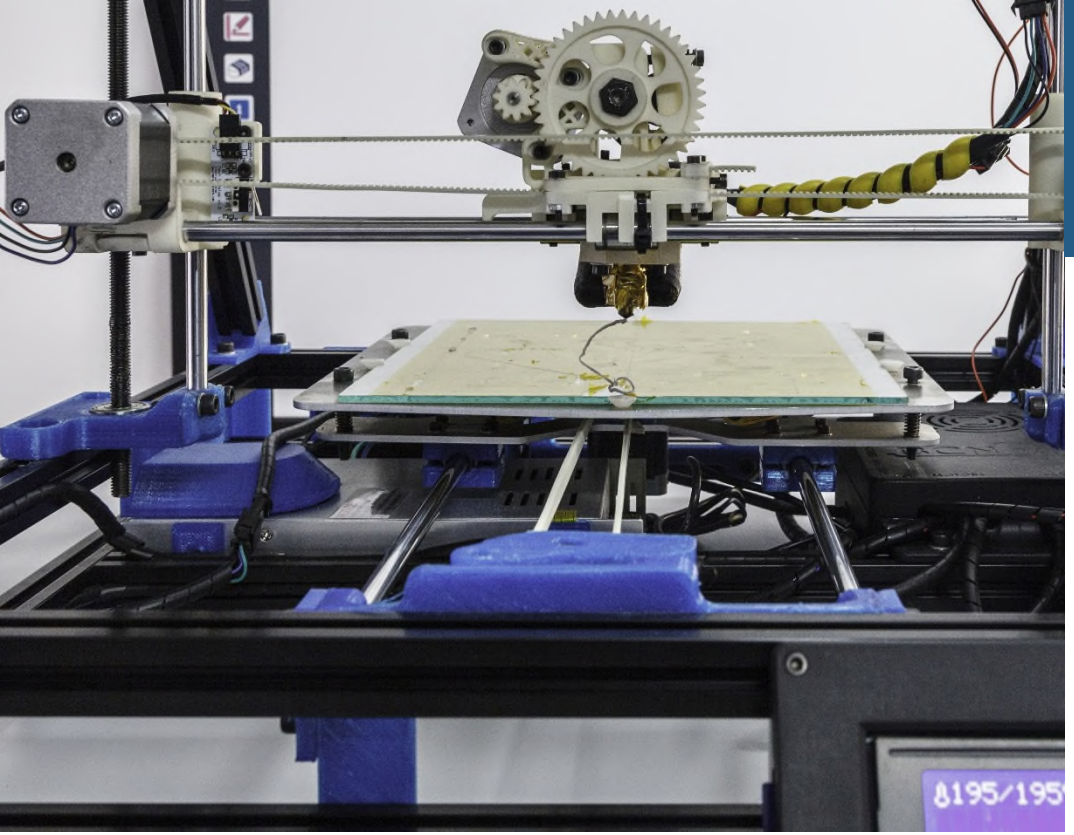
„Blockchain in use“ segments

Segment	No. of projects*
Finance	108
Enterprise	44
Supply Chain Mgt	40
Government	34
Internet of Things	22
Security	18
Energy	18
Entertainment	12

* As of February 18, 2018, 448 projects in total, multiple tagging possible

Most relevant applications in the supply chain

- Document Management
- Tracking & Tracing
- Multiparty Agreements
- Finance / Payment
- Additive Manufacturing (3D Printing)



SAMPL – Secure Additive Manufacturing Platform

Scope:

- Implementing end-to-end security for 3D printing
- Blockchain based license management for 3D printing data
- Establishing a chain of trust extending into the printed objects by integrated NFC components

NXP Contribution:

- Providing the technology for extending the chain of trust to 3D printers and printed objects
- Investigating possibilities to integrate NFC components into printed products
- Linking the blockchain based license management to the integrated NFC chip

Partners

AIRBUS GROUP

3D micro PRINT

PROSTEP integrate the future

dwf

consider it

ulm university universität uulm

TUHH Technische Universität Hamburg

Supported by:

Federal Ministry for Economic Affairs and Energy

on the basis of a decision by the German Bundestag

Fraunhofer ENAS

DAIMLER EvoBus GmbH

Universität Hamburg DER FORSCHUNG | DER LEHRE | DER BILDUNG

NXP

Contact

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Cooperative Innovation Projects
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► Mobile: +49 160 9060 6897
► Email: georg.menges@nxp.com

The first useful publishing Blockchain – Made in Germany!

Scope:

- Orchestration of digital printing capabilities (lotsize = 1)
- Publishing and Production as a Service (PPaS)
- ChainPrint organizes manufacturing and logistics of printed content via Blockchain technology.
- Production and distribution are provided by independent system partners in a decentralized manner.

Outlook:

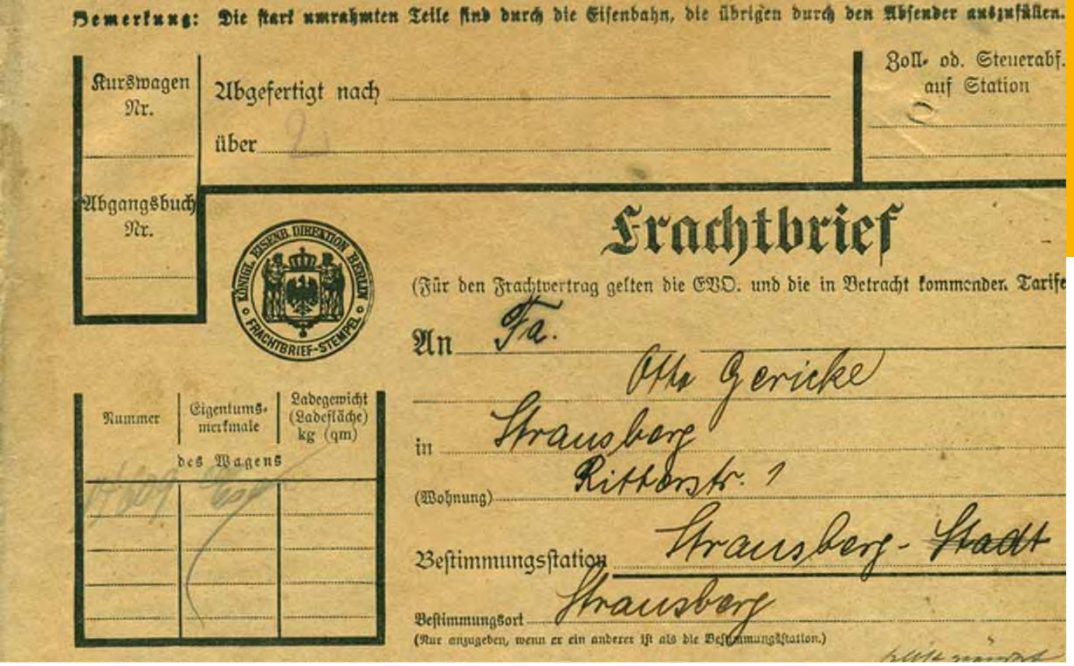
- enabler of a decentralized production network for the publishing industry
- ChainPrint will be an open platform for authors, publishers, print buyers, printers, logistic service providers, distributors and dealers.
- Every author, publishing house, print-manufacturer, etc. will be able to participate via a co-operative

ChainPrint
PUBLISHING BLOCKCHAIN

www.chainprint.io

Process-Automation → Blockchain for optimizing industrial workflow → Blockchain to establish an incentive-system

HANSEBLOC – Hanseatic Blockchain Innovations for Logistics


Bemerkung: Die stark umrahmten Teile sind durch die Eisenbahn, die übrigen durch den Absender auszufüllen.

Kurswagen Nr.

Abgefertigt nach

über

Zoll- od. Steuerabf. auf Station

Abgangsbuch Nr.

Frachtbrief

(Für den Frachtvertrag gelten die EVO. und die in Betracht kommenden Tarife

An Fa. Otto Gericke

in Strausberg

(Wohnung) Rittorstr. 1

Bestimmungsstation Strausberg-Stadt

Bestimmungsort Strausberg

(Nur anzugeben, wenn er ein anderer ist als die Bestimmungsstation.)

Nummer | Eigentumsmerkmale | Ladegewicht (Ladefläche) kg (qm) des Wagens

Reference: www.sampor.de, Bill of Lading, 1917

Challenges:

- No established trust center for bill of lading and freight documents
- Many stakeholders along complex global supply chains
- Increasing amount of real time real world information required for efficient management of supply chains

Ambition:

- Blockchain technology for securing the electronic bill of lading
- Implement business and process logic in Smart Contracts
- Use Smart Oracles as interfaces to real world data
- Cooperative innovation of SMEs and cluster organizations

Partners

Logistik-Initiative Hamburg

itemis

CHAINSTEP

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Federal Ministry of Education and Research

HEC IT-ENGINEERING

consider it

SOVEREIGN

shot logistics
superior handling optimal transport

EMONS Multitransport GmbH

HAW HAMBURG

THE KLU
KÜHNE LOGISTICS UNIVERSITY

NXP

Contact

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► Email: nigischer@consider-it.de

Industry giants are ”all in”

SUMMARY

IT Security in the Supply Chain with Blockchain Technology

Efficiency

- Free of intermediary, immutable, low cost
- **How to reach scalability and usability?**

Trust

- Generate trustworthy digital information
- **How will the regulatory framework look like?**

Smart Oracles

- Any kind of information available for Blockchain
- **How to secure them & avoid immutable garbage?**

Smart Contracts

- Programmable X (assets, money, identity, …)
- **How to validate them and make them secure?**