



Energiewirtschaft und Digitalisierung

Rechtsrahmen, Umsetzung und
Geschäftsmodelle

28. September 2016

Blockchain im Energiemarkt

Blockchain Institute

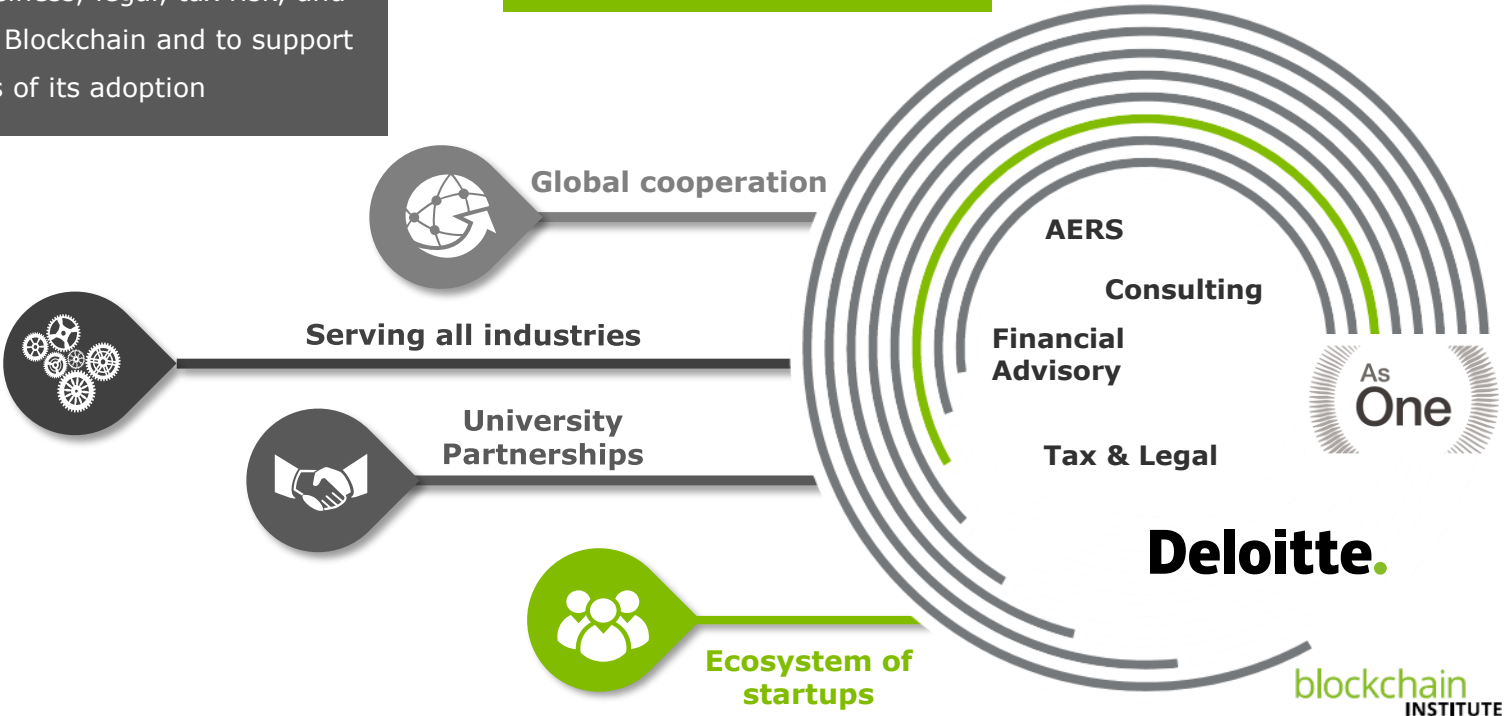
Our vision and goals

Our Vision

Become the Center of Excellence for Blockchain technology in Deloitte Germany that builds the capabilities to advise our clients in the business, legal, tax risk, and audit impacts of Blockchain and to support them in all areas of its adoption

Our Goal

Deliver services to our clients as the leading trusted partner of our clients in all areas impacted by the rise of Blockchain technology



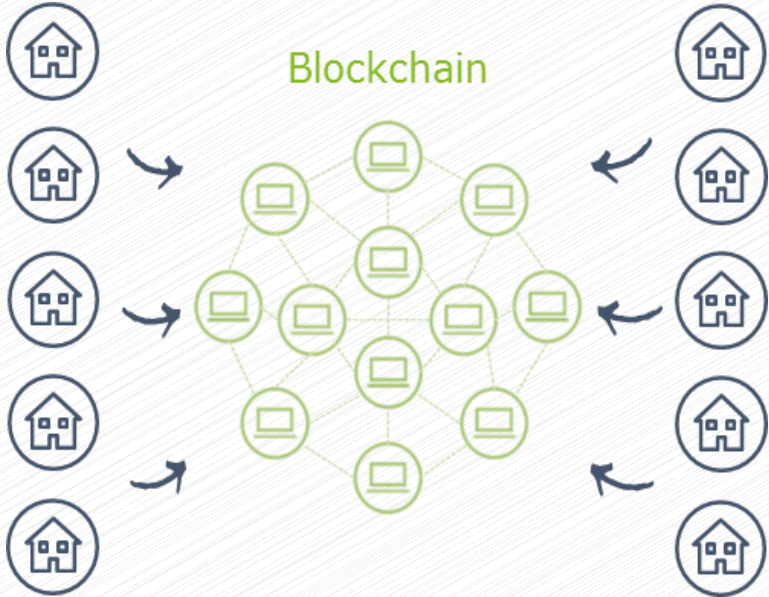
Blockchain & Energy landscape

Brooklyn MicroGrid



5 households produce energy thanks to their solar panels

5 households buy the surplus of produced energy



Smart contract

- ✓ Manage flow of electricity
- ✓ Store history of produced energy and performed transactions

Introduction

High expectations

"94% of the financial professionals surveyed believe that the blockchain could be used in mainstream finance."

Greenwich Associates

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

World Economic Forum

What is a Blockchain?

A Blockchain is a digital, chronologically updated, distributed and cryptographically sealed record of all data transfer activity

Digital

Almost any type of information can be expressed in digital format. Subsequently referenced through a ledger entry.



Chronologically updated

Permanent time stamped each block points and refers to the data stored in the previous block in the chain, so all blocks are linked to one another.



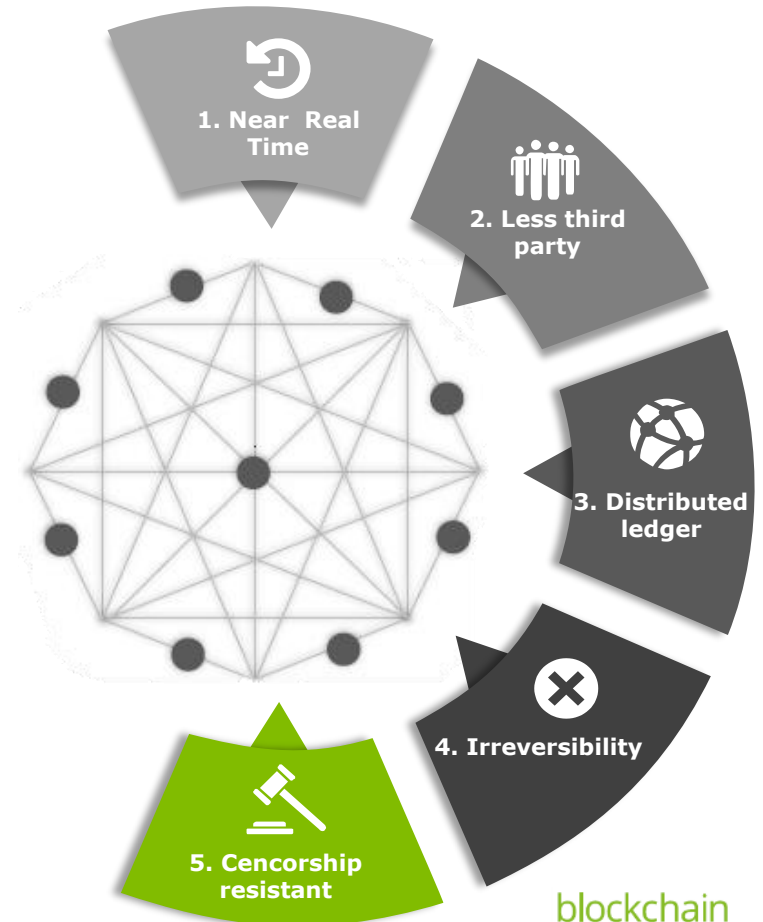
Distributed

Identical copies of all records are shared. Participants can independently verify information. Verification processes are not dependent on a centralized verification. If one node fails, the remaining can continue to operate ensuring availability and reliability.



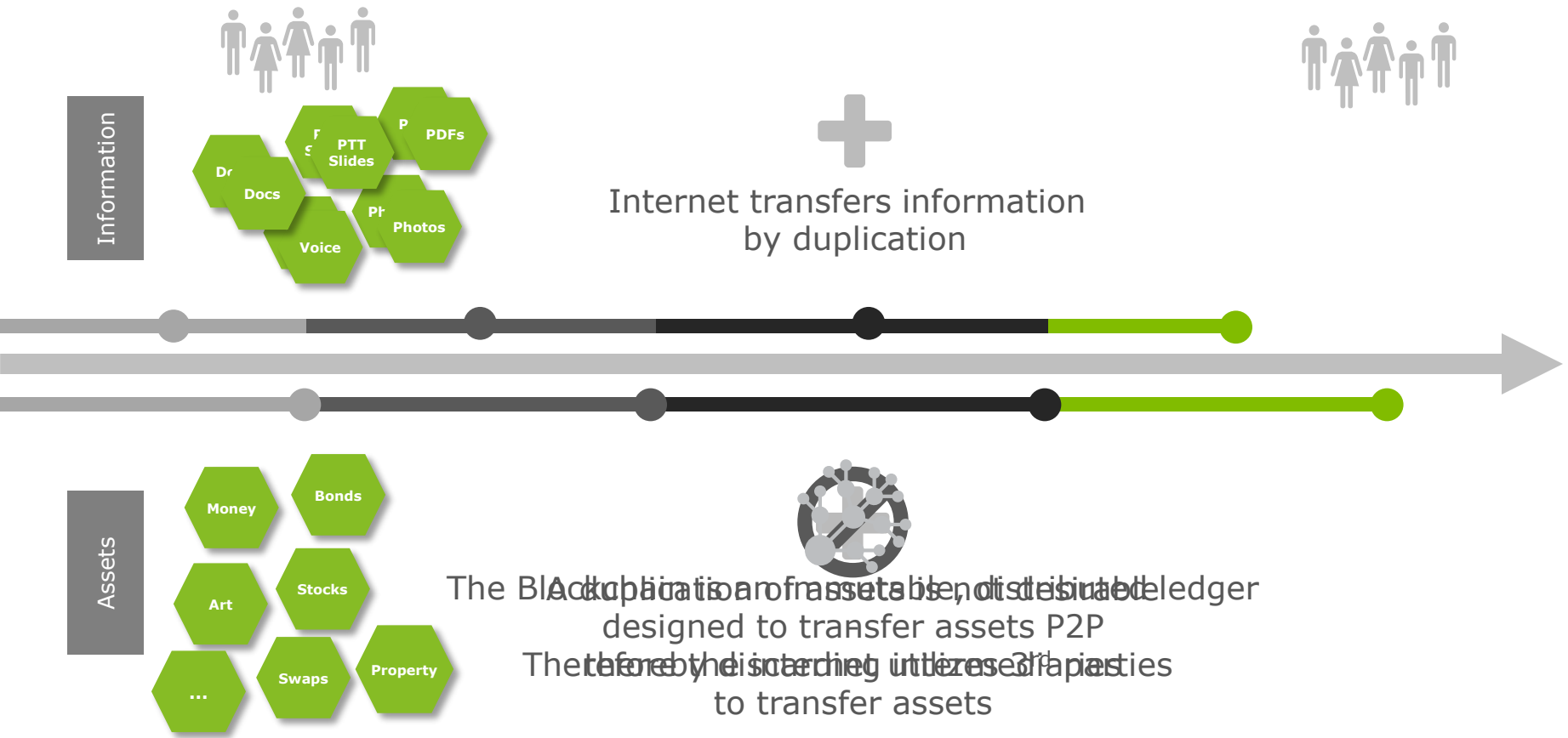
Cryptographically sealed

Permanent time stamped each block points and refers to the data stored in the previous block in the chain, so all blocks are linked to one another.



Blockchain enables asset transactions

Internet exchanges information whereas Blockchain exchanges assets



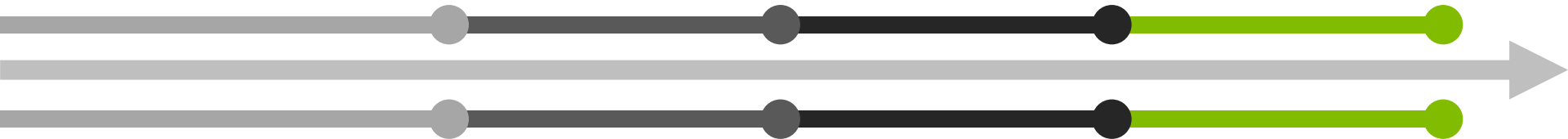
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Jens H. Paulsen



Appendix

Blockchain

Benefits of Blockchain based solutions

Peer-to-Peer Systems

- Massive reduction of energy loss due to short transportation routes
- Lower risk of power failure due to multiple, decentral energy providers
- Increased independence and flexibility for consumers
- Reduced costs

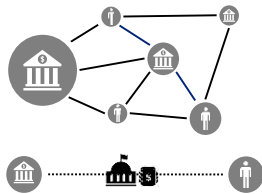
Smart Grid

- Control over the sustainability of energy sources via Blockchain data
- Generated data allows an exact analysis of weather conditions, supply and demand
- Flexible and cost-optimized energy production based on data analysis

Blockchain creates Decentralized Trust

A Blockchain is a record, or ledger, of digital events — one that's "distributed" between many different parties. It can only be updated by consensus of a majority of the participants in the system. And, once entered, information can never be erased. The Blockchain contains a certain and verifiable record of every single transaction ever made

Centralized system



- A **central intermediary** (e.g., a bank, ACH) transfers actual value between two parties
- **All parties** involved in a transaction maintain a **separate ledger**
- Often requires **multiple intermediaries** to connect parties because no single intermediary has connections to all parties
- **Security and accuracy** of system is dependent on each central intermediary

Distributed system - Blockchain



- Each node keeps a copy of a single **distributed ledger**, which is updated upon a transaction request
- Has **native currencies** that can be transferred within the system, often exclusively
- **Peer to Peer transactions** using digital tokens to represent assets and value
- Requires validation of **consensus** among several copies of a ledger kept at **multiple individual nodes** prior to approval of the request to maintain accuracy
- Utilizes **cryptographic protocols** for enhanced security
- Transaction data is **immutable**

Why You Can't Cheat at Bitcoin

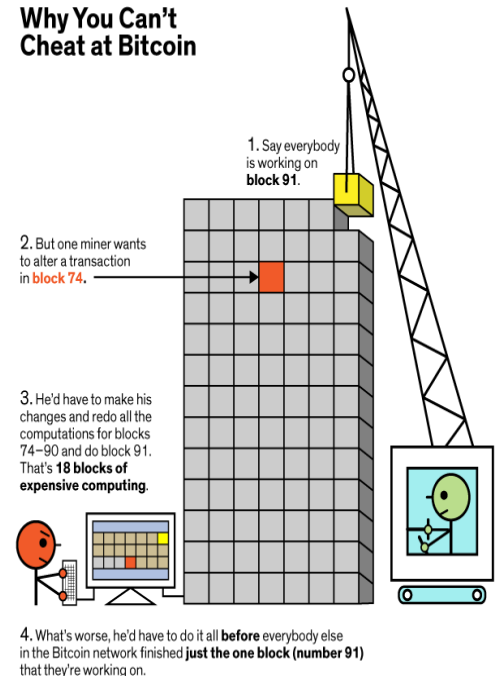


Illustration: Mark Montgomery
Source: IEEE Spectrum

blockchain
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Realized applications the energy industry

What are examples for implemented Blockchains in the energy sector?



- Real-time metering of local energy generation and usage by LO3 and Consortium Systems
- Transactions on the decentral Ethereum based platform
- Demonstration project in a neighbourhood in Brooklyn

Block.it

- Development of Blockcharge, a Smart Plug, with RWE
- Loading at charging stations and places with electricity infrastructure
- Control and payment via an app



- Digital and interactive market for self-generated energy with a selection of sustainable sources
- The start-up by Vattenfall addresses the customers' requirement for more control and interaction

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