Blockchain - verteiltes Vertrauen

Blockchain - Distributed Trust

NOTICES & LOST AND FOUND

(5100-5102)

Universal Registry Entries:

Zone 2 -

dS8492cgVOFAoP9kvE1XzMOrQ
HgEwzkVbVafNvIkUz99qvq8/ME
p5v9EFSG8XxzMBalGQQ==

Zone 3 -

JnFCg+HCmvhj8GmmUP7VZna71
NgZup/RfuKUQNzCHWXMuqL.K
durxHQV5pSHL.qBGPRIv+mg==

These base64-encoded values represent the combined fingerprints of all digital records notarized by Surety between 2009-06-03Z 2009-06-09Z.

www.surety.com   571-748-5800

About us

Institute of Data Analysis and Process Design (IDP)

Research Groups:

- Data Analysis and Statistics

- **Finance, Risk Management and Econometrics**

- Operations Research and Operations Management

- Smart Services and Maintenance

- Transport and Traffic Engineering

In addition to research, also active in ...
- **Teaching** (university and higher education)
- **Business consulting**

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IDP Team

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Content

- What is blockchain?

- Achieving Trust in the Digital Age

- Our blockchain projects
    - Digitales Immobiliendossier
    - Digital assets on the blockchain
    - Digital signature
    - Fairtrade and supply chain using blockchain
    - Robo market-making for secondary bond markets on the blockchain
    - EU Fintech project

Zürcher Hochschule
für Angewandte Wissenschaften

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Blockchain Revolution: How the Technology Behind Bitcoin ...

Blockchain Revolution: How the Technology Behind Bitcoin and Other Cryptocurrencies Is Changing the World [Tapscott, ... The Wall Street Journal, Bookshelf

How Technology Will Revolutionize Public Trust

Though Americans increasingly distrust their institutions, digital [...] another like never before

HZ — Das Wirtschaftsportal von Handelszeitung und BILANZ

Home > Zahl der Schweizer Blockchain-Unternehmen steigt trotz Corona-Krise

Das «Crypto Valley» in Zug wächst trotz der Krise weiter

🕐 Lesezeit: 1 Minute

Teilen   Merken   Drucken   Kommentare

[...]der Schweiz und [...]n-Report rund 50

HZ+

Die Schweiz macht ihr Blockchain-Wissen zum Exportgut

Neue Zürcher Zeitung

Meinung

GASTKOMMENTAR

Die Schweiz als Vorreiter in der Blockchain-Technologie

Es hilft der schnell wachsenden Fintech-Industrie, wenn ihr keine unnötige und ungewollte sektorspezifische Regulierung aufgezwungen wird.

Finanzen   Neue Zürcher Zeitung

Erster Vermögenswert traut sich auf die Blockchain

Die Bank Vontobel bietet als erster Emittent ein strukturiertes Produkt als Asset-Token an. Das Wettrennen um die Tokenisierung von traditionellen Wertschriften, in das viele Schweizer Institute involviert sind, ist damit nicht entschieden.

Blick

live auf Blick TV: Das macht heute Schlagzeilen

Blockchain

Nationalrat setzt bessere Rahmenbedingungen für Blockchain

Die Schweiz soll sich als Standort für die Blockchain- und Distributed-Ledger-Technologie (DLT) weiterentwickeln können. Der Nationalrat hat am Mittwoch Gesetzesänderungen zugestimmt, welche die Rahmenbedingungen verbessern sollen.

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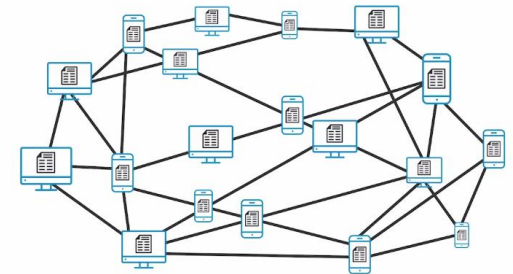
6

What is Blockchain?

Blockchain

- A list of records, called blocks, linked together ("chained"), using cryptography.

Distributed Ledger

- A distributed ledger, with cryptography, that is append only

- Each transaction entered on the blockchain is verified by a large peer-to-peer network


Properties

- Each block contains a cryptographic hash of the previous block, a timestamp, and transaction data

- Once recorded, the data in any given block cannot be altered retroactively without alteration of all subsequent blocks, which requires consensus of the network majority.

- Blockchain data is shared thanks to consensus-based algorithms

History

- Blockchain was invented by a person (or group of people) using the name Satoshi Nakamoto in 2008 to serve as the public transaction ledger of the cryptocurrency bitcoin

Blockchain - Distributed Trust
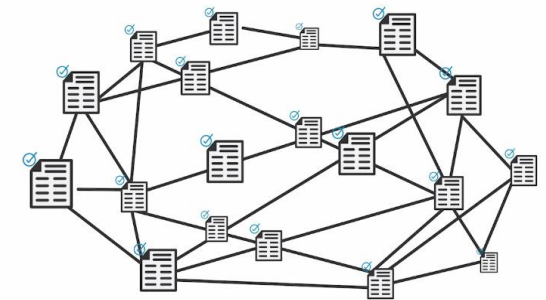
Ledgers are Important

- Ledger is the system of record for a business
  - records asset transfer between participants.

- Business will have multiple ledgers for multiple business networks in which they participate.

- The principal book (or computer file) for recording and totaling financial transactions by account type, with debits and credits in separate columns and a beginning monetary balance and ending monetary balance for each account.

What is Blockchain? – Internet of Value

Blockchain technology could cut banks infrastructure costs for cross-border payments, securities trading, and regulatory compliance.

We can program a blockchain to record virtually everything of value and importance:

- not only payments and profits
- birth and death certificates
- marriage licenses
- deeds
- titles of ownership
- educational degrees

Beyond financial accounts, it can also track:

- votes
- medical procedures
- insurance claims
- origins of every ingredient in our meal.
- It can track anything that we can express in code.

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History of Distributed Ledger Technology

2009-2012

Foundation days

- Emergence of Bitcoin based on a paper by Satoshi Nakamoto
- On January 3, 2009, the Genesis block was mined
- Experimental and limited to cryptographic community
- Blockchain as the backbone of Bitcoin

2012-2014

Moving beyond the cryptographers

- Rise of Bitcoin exchanges
- Mixed response to Bitcoin as it struggles with money laundering and criminal activity, but also gains acceptance across some online retail stores among others
- Rise of Bitcoin- based startups
- Bitcoin price surged to US$1,000
- Blockchain gains attention of financial services firms (begins internal trials)

2014-2015

Blockchain buzz years

- Blockchain, the underlying technology behind Bitcoin, gets serious attention and investment from financial services firms, regulators, and VCs
- Explosion of use cases within BFSI
- Announcement of consortiums to accelerate adoption, innovation, and common standards
- Banks experiment with their versions of cryptocurrencies
- Global service providers and technology companies put their weight behind Blockchain

2016-2017

Crossing the chasm

- The next two years are critical for Blockchain technology to demonstrate sustainable value and show adoption beyond proofs of concept by FS firms
- Startups backed by VC funding and consortiums need to show results to justify the large sums of funding and/or investment of time and resources
- Scalability and throughput issues need to be solved for the Blockchain technology to cross the chasm to mainstream adoption

2018-2020

Adoption movement

- Consortiums will be instrumental in defining protocols and common standards to facilitate widespread adoption
- Regulatory bodies likely to play a key role in facilitating adoption while ensuring compliance
- Explosion of use cases beyond BFSI
- IT service providers likely to accelerate investments to build capabilities around Blockchain technology implementation
- Rise of IPOs and Unicorns in the Blockchain startup ecosystem

beyond

Accelerated adoption

- Blockchain will gain adoption within and beyond BFSI, leading to new business models at the intersection of advanced analytics, IoT, and Blockchain based smart contracts
- Blockchain is referenced in two major shifts expected to occur in the nearest future, according to a report by World Economic Forum: The first tax collected by government using the Blockchain technology by 2023. The second one is storing more than 10% of global gross domestic product in Blockchains by 2027
- Banks' infrastructure costs for cross-border payments, securities trading, and regulatory compliance reduced by US$15-20 billion a year from 2022, according to a recent report by Spanish bank Santander

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The power of distributed ledgers

It *can be used* without a central authority by individuals or entities with no basis to trust each other

It *can be used* to create value or issue assets

It *can be used* to transfer value or the ownership of assets

A human being or a Smart Contract can initiate the transfer

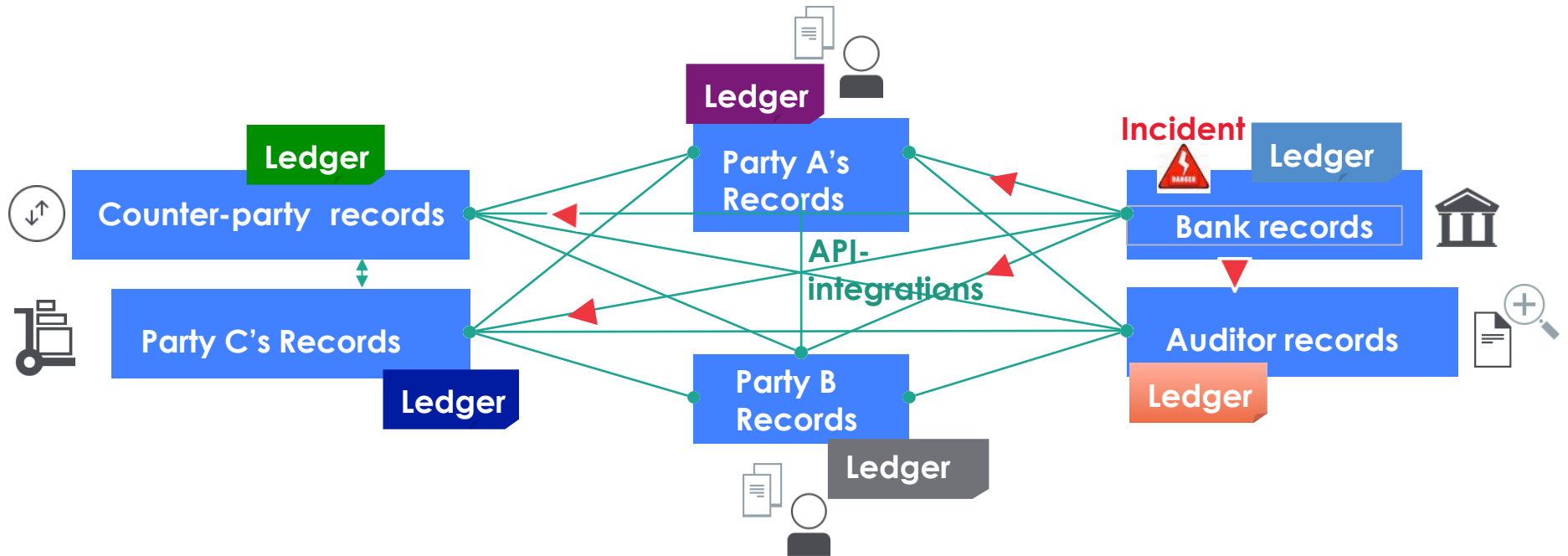It *can be used* to record those transfers of value or ownership of assets

These records may be very difficult to alter, such that they are sometimes called effectively immutable

It *can be used* to allow owners of assets to exercise certain rights associated with ownership, and to record the exercise of those rights.

The degree of trust between users determines the technological configuration of a distributed ledger.
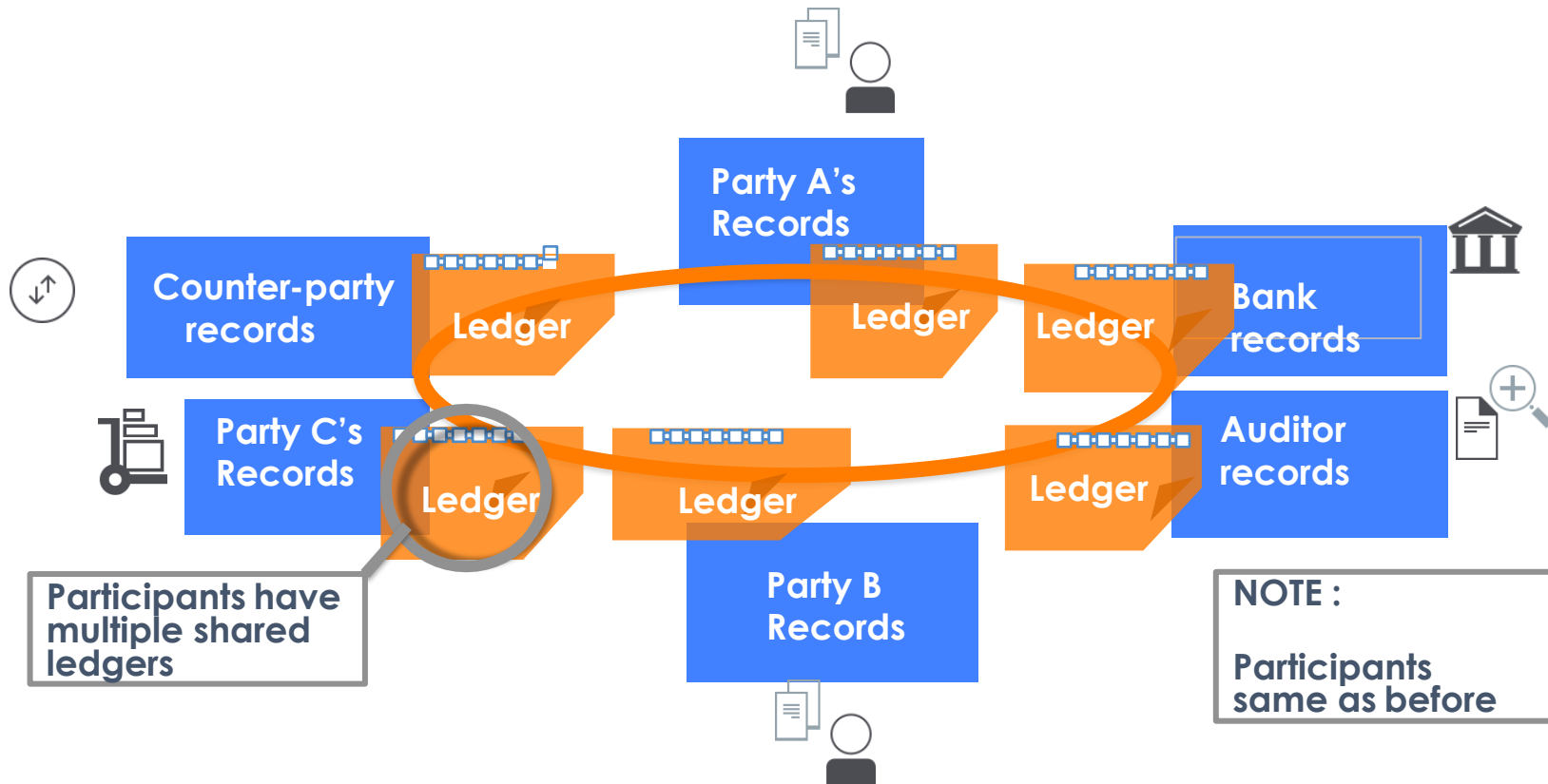
Blockchain - Distributed Trust

Problem - Difficult to monitor asset ownership and transfers in a trusted business network

Inefficient, expensive, vulnerable

Solution – a permissioned, replicated, shared ledger

Party A's Records

Counter-party records

Ledger

Party C's Records

Ledger

Ledger

Ledger

Ledger

Ledger

Ledger

Bank records

Auditor records

Party B Records

Participants have multiple shared ledgers

NOTE :

Participants same as before

Consensus, provenance, immutability, finality

Blockchain - Distributed Trust

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Achieving Trust in the Digital Age

- **Trust** - The expectation that the other party will act with integrity.

1. Honesty

When a person or an organization makes a statement, it must be truthful, accurate and complete.

2. Consideration

In any transaction, all parties care about the others and will operate in good faith.

3. Accountability

Making clear commitments and sticking with them.

4. Transparency

Operating out in the open, in the light of day.

Blockchain – not for all . . .

NEGATIVE Indicators

1. **Need high performance (millisecond) transactions**

2. **Small organization (no business network)**

3. **Looking for a database replacement**

4. **Looking for a messaging solution**

5. **Looking for transaction processing replacement**

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Innosuisse Project: FairCapital

Fairtrade producers in developing countries often have a **sustainable business model** and also face **growth opportunities** (e.g. expansion of production) for which they need **third-party funding**.

Access to finance is often limited in most developing countries due to a **lack of financial infrastructure**.

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Innosuisse Project: FairCapital

What is the goal of the project?

- To offer Fairtrade producers **demand-based financing.**
- **Fairtrade consumers in Switzerland enable them to invest in these producers.**

How does it work?
- <u>Fairtrade Consumers:</u> grant a **payment in advance** (e.g. 10%) to Fairtrade manufacturers for next years production, similar as a loan.
- <u>Fairtrade manufacturers:</u> are obliged to sell products later at a **discount** (e.g. just over 10% to cover interest)
- Values transferred via a new token

Integrated ecosystem

- The financial value chain will be blockchain-based, including all actors:
  - consumers
  - producers
  - supply chain partners
- **Reason:** create a transparent, efficient and scalable financing solution.

This leads to **research questions** related to
- **economical aspects** (token characteristics)
- **technology** (implementation in a blockchain)
- **legal** issues (compliance with legal regulations)

Secondary market trading for bonds using a blockchain

1. Origination

Borrower	Intermediary	Lender

p2p — Rating / KYC +

Bank — Rating / KYC +

. . .

Blockchain-based
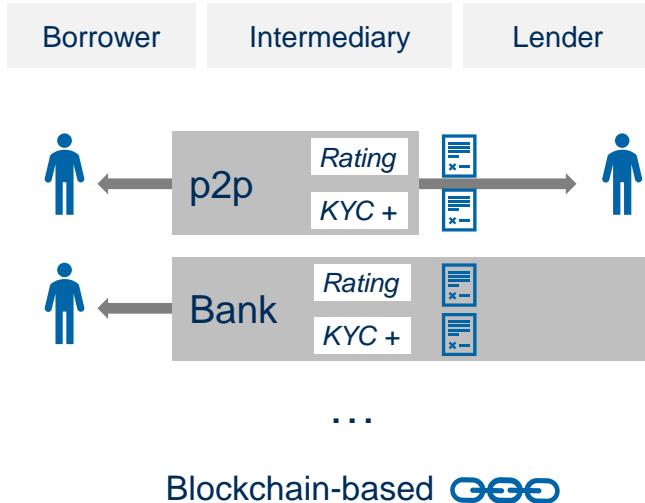
2a. Secondary Market Trading

Market place: Trading with tokens

- Robo Market Maker for market liquidity
- Rating agency for confirmation of internal ratings
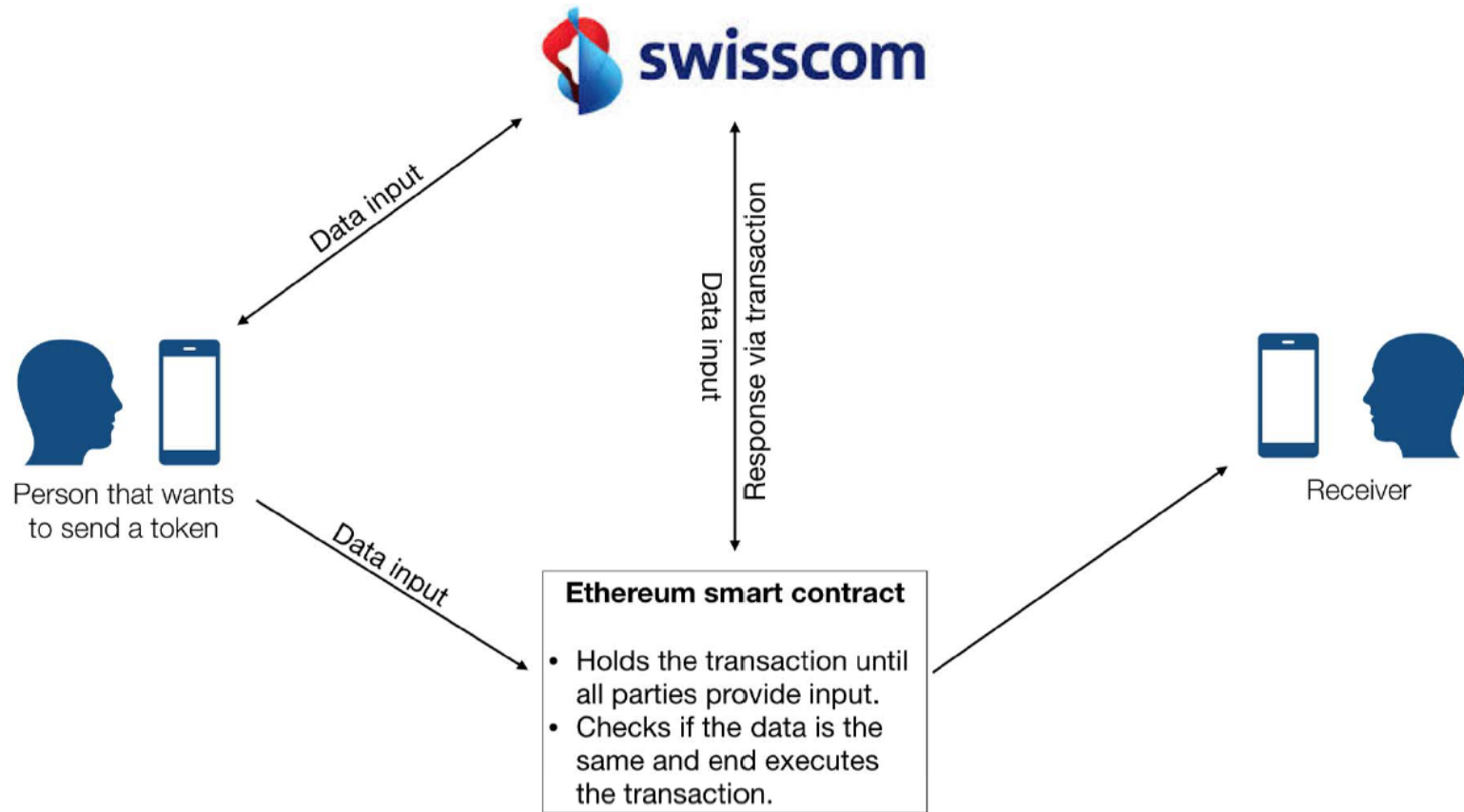- Audit by audit certified auditors

2b. Securitization

- A Robo Market Maker could also be used for systematic buying up of contracts (on behalf of institutional investors)
- Structuring and valuation services could be sourced from providers

3. Servicing

- Credit agreements are set up as Smart Contracts
- Contract amendments by originator (against fee)

4. Workout Services

- Workout Services by originator

zh School of
aw Management and Law

Transferring ownership on the blockchain in a legally valid way

- Swisscom – SML (Prof. Bärtschi) – SoE
- https://swisscomzhaw.scapp.io/

swisscom

Data input

Data input

Response via transaction

Person that wants
to send a token

Data input

Ethereum smart contract

- Holds the transaction until
  all parties provide input.
- Checks if the data is the
  same and end executes
  the transaction.

Receiver

zh aw

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Innosuisse Projekt: Digitales Immobilien Dossier

- **Obligatorische Feuerversicherung**
    - Versicherungsvertrag
    - Gebäude-Wiedererstellungswert
    - Grundbuchauszug
    - Katasterauszug

- **Private Gebäudeversicherung**
    - Versicherungsvertrag
    - Werte Feuerversicherung

- **Grundbuchamt**
    - Grundbucheintrag Eigentümerverhältnisse
    - Schuldbriefe
    - Katasterinformationen
- **Notare**
    - Kaufvertrag
    - Öffentliche Verschreibung
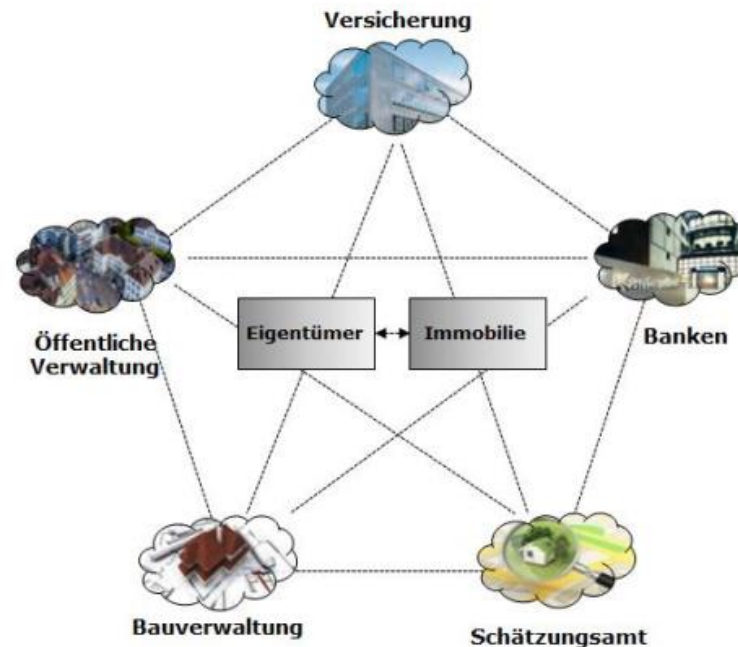- **Steuerverwaltung**
    - Verkehrswerte
- **Bauverwaltung**
    - Baueingaben
    - Baubewilligungen

- **Banken**
    - Hypothekarvertrag
    - Grundbucheintrag
    - Katasterauszug
    - Schuldbriefe
    - Verkehrswerte

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- 24 universities
- All 29 national financial regulators (Finma, Bundesbank, Bank of England, …)
- Eight international organisations (ECB, BIS, ESMA, IMF, OECD, …)

What is it?
A two-year European research programme (EU H2020) focusing on new developments in the Fintech area as well as risk management

What are the research topics?
- Credit Risk for P2P Lending
- Machine-Learning Solutions in Finance
- Blockchain and Risk Management

What is the role of ZHAW?
- Executive Board Member
- Work package lead for Blockchain
- Main partner for research (budget)
- Host for the final review session of the European Commission
- Host for two international research conferences (out of three)
- Host for two technology workshops (out of six)

BUDGET
EUR 2.5 Million

FINTECH RISK MANAGEMENT
www.fintech-ho2020.eu

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EU H2020 Project Fintech

Cryptocurrency markets	Blockchain	Regulatory/governance
- Lead Behaviour in Bitcoin Markets (Ying et al. 2020) - A Statistical Classification of Cryptocurrencies (Pele et al. 2020) - VCRIX - A Volatility Index for Crypto-Currencies (Kim et al. 2019) - Momentum and contrarian effects on the cryptocurrency market (Kosc et al. 2019) - Using High-Frequency Entropy to Forecast Bitcoin's Daily Value at Risk (Pele and Pele, 2019) - Phenotypic convergence of cryptocurrencies (Pele et al. 2020)	- A Decentralised Digital Identity Architecture (Goodell and Aste, 2019) - The other side of the coin: Risks of the Libra blockchain	- A probative value for authentication use case blockchain (Guegan et al. 2019) - Can Cryptocurrencies Preserve Privacy and Comply with Regulations? (Goodell and Aste, 2019)

Blockchain conference – March 2021

Monthly Blockchain seminars : https://www.meetup.com/Fintech_AI_in_Finance/

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