

Blockchain, Bitcoin, Crypto Assets and STOs: Emergence of a New Financial System?



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WHAT WE DO

The Frankfurt School Blockchain Center was **founded in 2017** by Professor Philipp Sandner. We are a **think tank and research center** which investigates implications of the blockchain technology for companies and their business models.



Consulting,
prototypes
& research



Education
& trainings



Startups advisory
& incubation



Community
& events

FACTS AND FIGURES



16 employees



100+ presentations worldwide



10 seminars



15+ research papers



20+ events



3 conferences



15 consulting & research projects

OUR PARTNERS



An aerial view of a city skyline, featuring several prominent skyscrapers. The image is overlaid with a blue-tinted network of white lines and dots, suggesting a digital or technological theme. The text "Hype and reality" is centered in the image in a white, bold, sans-serif font.

Hype and reality

KRYPTOBRANCHE

Börse Stuttgart steigt als erster Börsenbetreiber in den Bitcoin-Handel ein

Revolution auf Schwäbisch: Mit dem „Projekt Bison“ will die Börse Stuttgart den Kryptomarkt umkrempeln. Das ist eine riskante Wette auf die Zukunft.



Felix Holtermann



Andreas Kröner



Handelsblatt

H MEINE NEWS | HOME POLITIK UNTERNEHMEN TECHNOLOGIE **FINANZEN** AUTO KARRIERE ARTS & STYLE MEINUNG VIDEO SERVICE

Börsenkurse ▾ Märkte ▾ Anlagestrategie ▾ Banken + Versicherungen Geldpolitik Immobilien ▾ Vorsorge ▾ Finanzberater Steuern + Recht ▾ Tools ▾

🏠 Handelsblatt > Finanzen > Märkte > Devisen + Rohstoffe > Start-up will Bitcoin an die Frankfurter Börse bringen

Suchbegriff, WKN, ISIN 🔍

KRYPTOWÄHRUNGEN

Start-up will Bitcoin an die Frankfurter Börse bringen

Der Bitcoin kommt an die Börsenplätze Frankfurt und Luxemburg: Das Start-up Iconic will ein Derivat auf die wichtigste Kryptowährung auflegen.



Felix Holtermann

28.10.2019 - 14:09 Uhr • [1 x geteilt](#)



When the Stock Exchange of Thailand Set Out to Disrupt Itself with Digital Asset Technology.



Turbo Panumarch Following

Oct 15 · 9 min read

Digital Asset and Blockchain are the words we are hearing more and more, especially in the competitive financial businesses which are looking for a new way to reduce cost and create a new opportunity to increase the profit from the new business model.

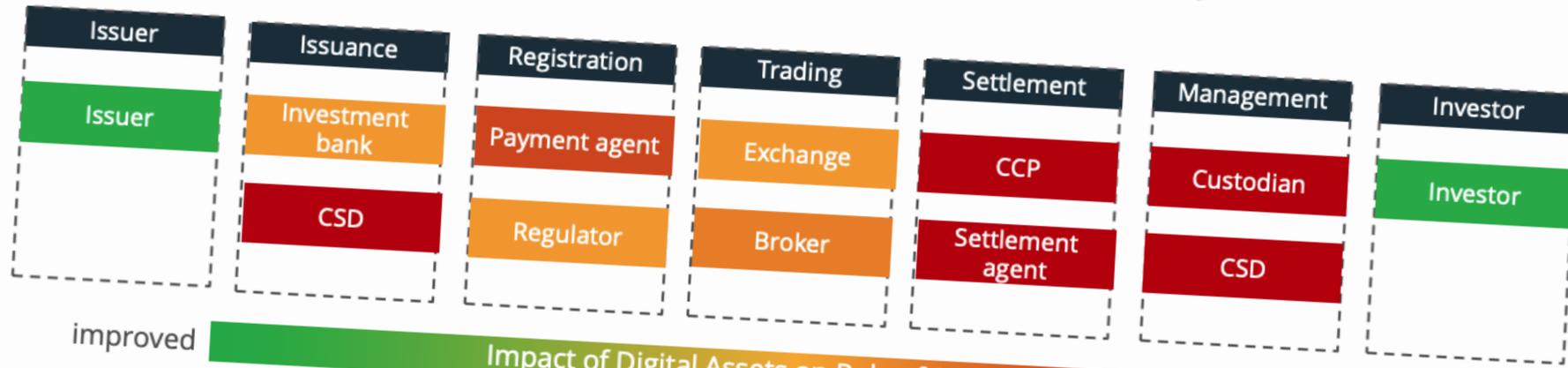
At the moment, we are not going to ask “whether the digital asset is coming?” but we will rather ask “When” or “How” digital asset is coming.

And the most important aspect is how the digital asset will impact the financial businesses in the near future?

When the Stock Exchange of Thailand Set Out to Disrupt Itself with Digital

Heat Map – Digital Asset Value Chain

Potential impact of digital assets on existing stakeholders



improved

Impact of Digital Assets on Role of Stakeholder

challenged

- Tokenization of security through smart contracts
- Direct issuance of digital assets on the primary market

- Allocation and payment (DvP) through atomic swaps
- Filing with regulator and approval of smart contracts

- Listing of digital asset and on-chain trading
- Market making and price discovery

- Consolidation of trades with DLT (off-chain trading)

- Storage of private keys
- Monitoring of security registry



we must
accept
blockchain



Bundesministerium
für Wirtschaft
und Energie

Bundesministerium
der Finanzen

Blockchain-Strategie der Bundesregierung

Wir stellen die Weichen für die Token-Ökonomie

Eckpunktepapier

BMF will elektronische Wertpapiere ermöglichen

Elektronische Wertpapiere sollen generell nach deutschem Recht möglich sein, verkünden BMF und BMJV. Zunächst soll die Öffnung für Anleihen erfolgen, die Einführung der elektronischen Aktie will man zu einem späteren Zeitpunkt behandeln.

Von *Norbert Wulf* // Redakteur 12.03.2019

⌚ Lesedauer: 1 Minute



Gesetzentwurf

der Bundesregierung

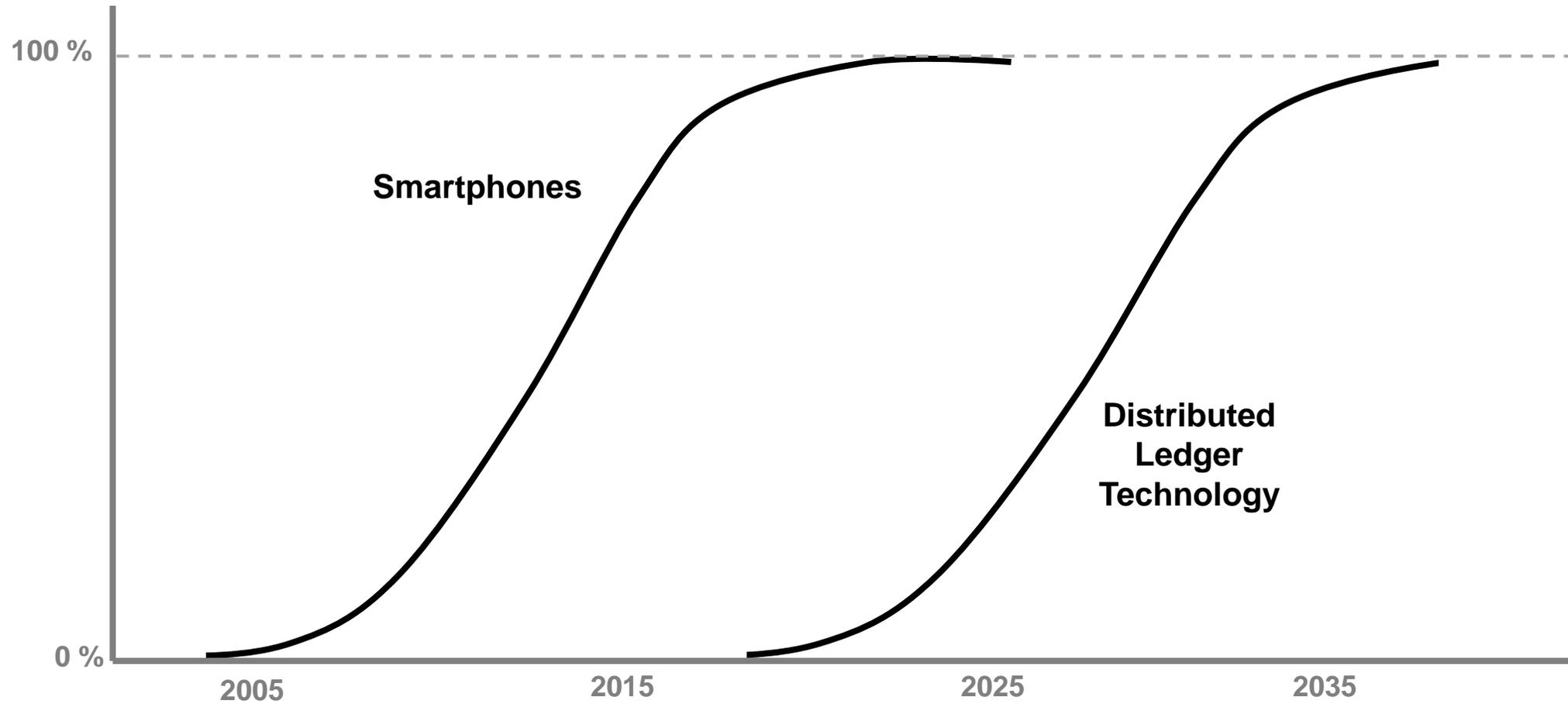
Entwurf eines Gesetzes zur Umsetzung der Änderungsrichtlinie zur Vierten EU-Geldwäscherichtlinie

A. Problem und Ziel

Die Richtlinie (EU) 2018/843 des Europäischen Parlaments und des Rates vom 30. Mai 2018 zur Änderung der Richtlinie (EU) 2015/849 zur Verhinderung der Nutzung des Finanzsystems zum Zwecke der Geldwäsche und der Terrorismusfinanzierung und zur Änderung der Richtlinien 2009/138/EG und 2013/36/EU (im Folgenden: Änderungsrichtlinie) ist von den Mitgliedstaaten bis zum 10. Januar 2020 umzusetzen.

Die Änderungsrichtlinie ändert die Richtlinie (EU) 2015/849 des Europäischen Parlaments und des Rates vom 20. Mai 2015 zur Verhinderung der Nutzung des Finanzsystems zum Zwecke der Geldwäsche und der Terrorismusfinanzierung, zur Änderung der Verordnung (EU) Nr. 648/2012 des Europäischen Parlaments und des Rates und zur Aufhebung der Richtlinie 2005/60/EG des Europäischen Parlaments und des Rates und der Richtlinie 2006/70/EG der Kommission (im Folgenden: Vierte Geldwäscherichtlinie) und adressiert gezielt Themen, die im Nachgang zu den terroristischen Anschlägen von Paris und Brüssel sowie dem Bekanntwerden der sogenannten „Panama Papers“ in den Fokus der Aufmerksamkeit gerieten. Die Vorgaben für die nationale Gesetzgebung zur Verhinderung der Geldwäsche und der Terrorismusfinanzierung sind erweitert worden. Die neuen Regelungen sehen unter anderem vor:

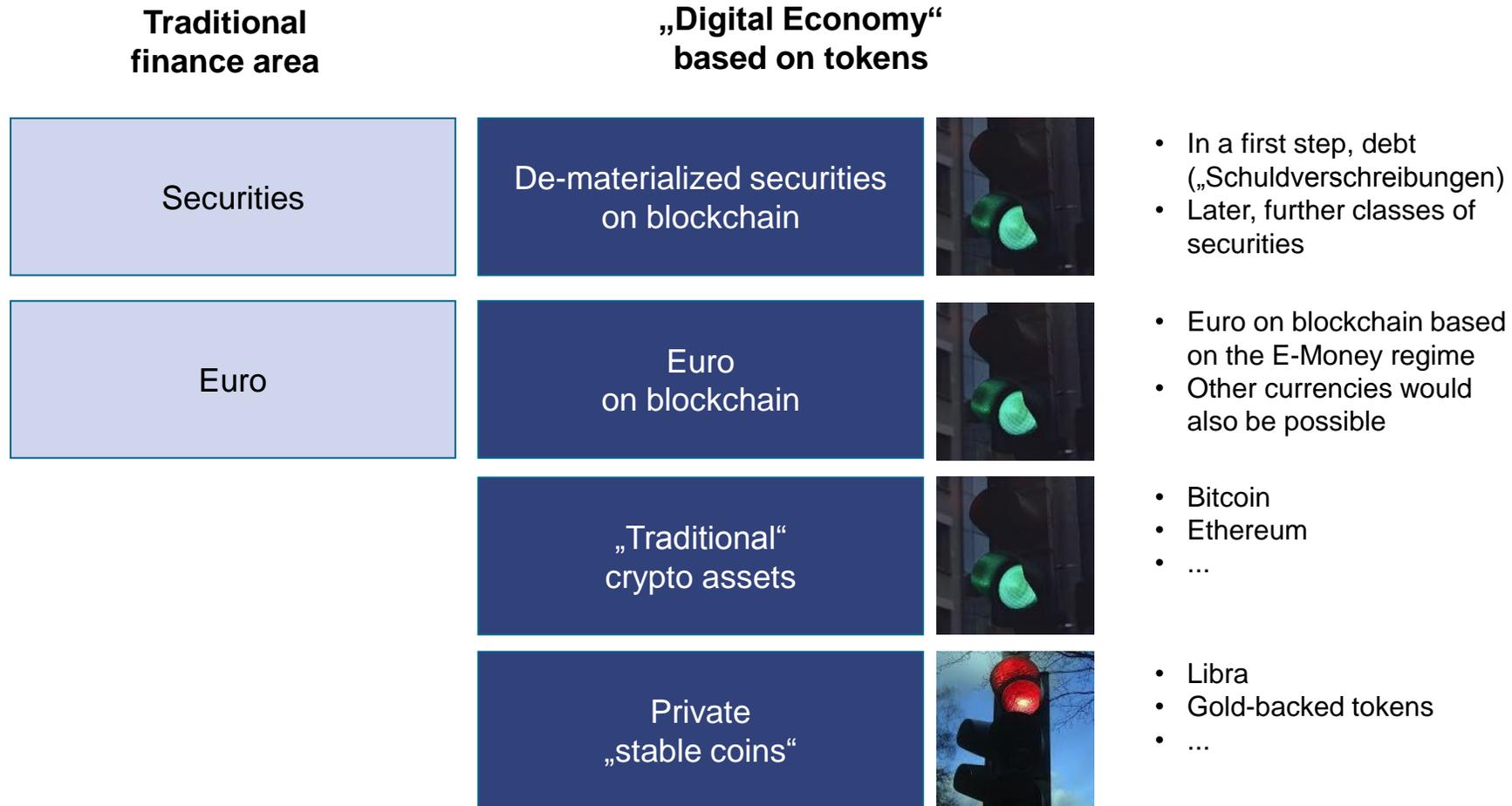
What is the current state of DLT?



An aerial view of a city skyline, likely Frankfurt, Germany, featuring several prominent skyscrapers. The image is overlaid with a semi-transparent blue filter and a white network diagram consisting of interconnected nodes and lines, symbolizing blockchain technology. The text 'National blockchain strategy of Germany' is centered in a large, white, sans-serif font.

National blockchain strategy of Germany

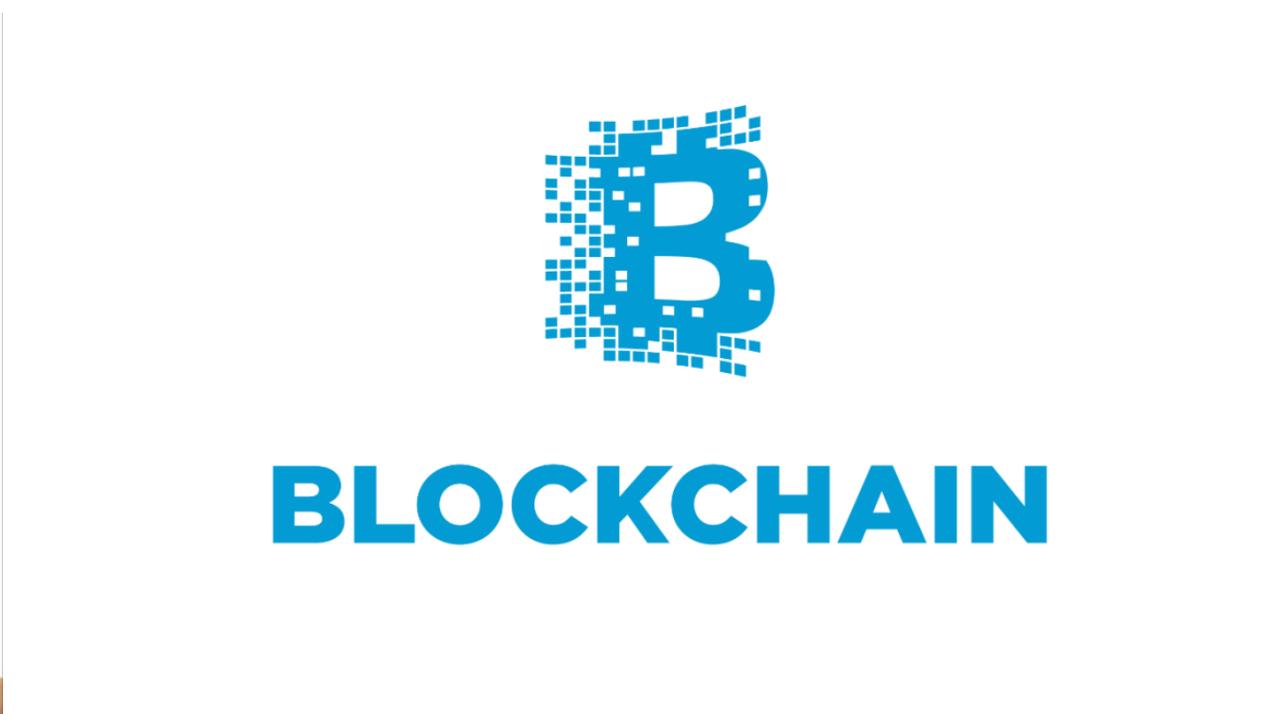
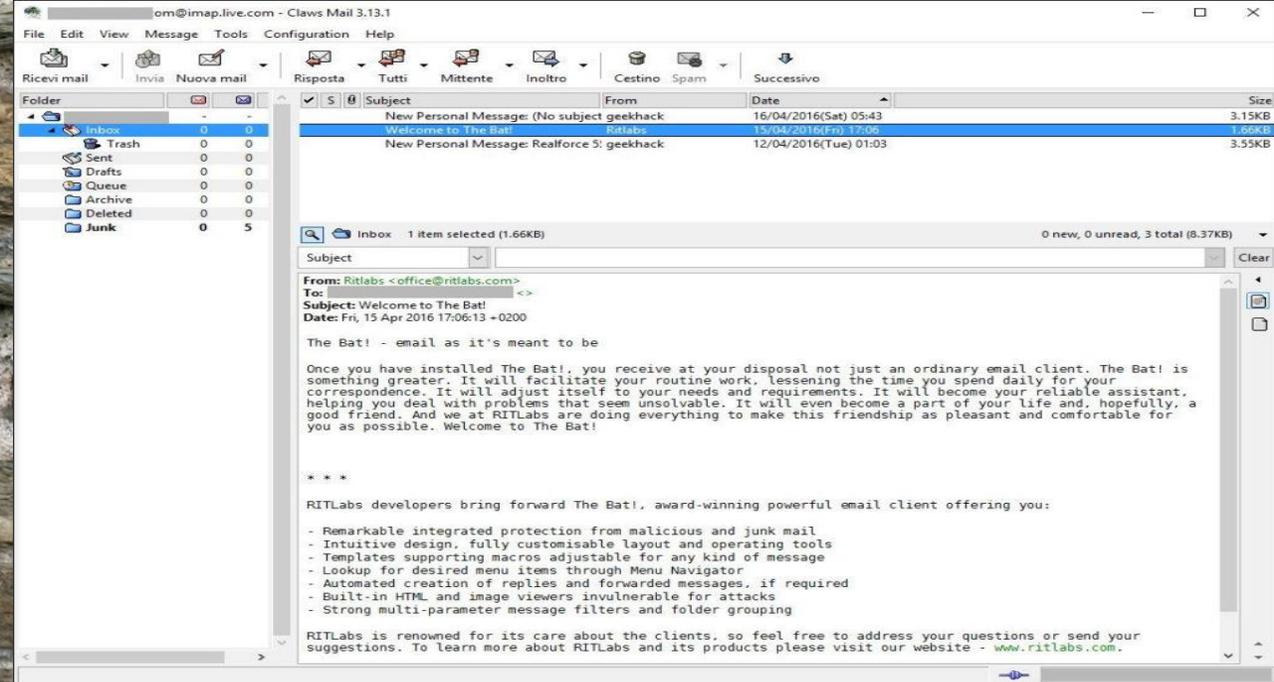
Germany's national blockchain strategy: financial area (simplified)



- In a first step, debt („Schuldverschreibungen“)
- Later, further classes of securities
- Euro on blockchain based on the E-Money regime
- Other currencies would also be possible
- Bitcoin
- Ethereum
- ...
- Libra
- Gold-backed tokens
- ...

An aerial view of a city skyline, likely Chicago, with a prominent skyscraper in the center. The image is overlaid with a blue-tinted network of white lines and dots, suggesting a digital or blockchain theme. The text is centered in white, bold font.

**Which problem does
blockchain technology
solve?**



An aerial photograph of a city skyline, likely New York City, featuring prominent skyscrapers like the Empire State Building. The image is overlaid with a semi-transparent blue filter and a white network diagram consisting of interconnected nodes and lines. The text 'Pipeline vs. register' is centered in white.

Pipeline vs. register

Payment process between two parties



A payment requires multiple stages:
this costs time and can induce errors



Bank

Correspondent bank

Correspondent bank

Bank



Ledger

Bank (Sophie)			Correspondent Bank (Sophie)			Correspondent Bank (Alex)			Bank (Alex)		
Date	Debit	Credit	Date	Debit	Credit	Date	Debit	Credit	Date	Debit	Credit
1 Sep 14		10,000	1 Sep 14		10,000	1 Sep 14		10,000	1 Sep 14		10,000
2 Sep 14	10,000		2 Sep 14	10,000		2 Sep 14	10,000		2 Sep 14	10,000	
3 Sep 14		10,000	3 Sep 14		10,000	3 Sep 14		10,000	3 Sep 14		10,000
4 Sep 14	10,000		4 Sep 14	10,000		4 Sep 14	10,000		4 Sep 14	10,000	
5 Sep 14		10,000	5 Sep 14		10,000	5 Sep 14		10,000	5 Sep 14		10,000
6 Sep 14	10,000		6 Sep 14	10,000		6 Sep 14	10,000		6 Sep 14	10,000	
7 Sep 14		10,000	7 Sep 14		10,000	7 Sep 14		10,000	7 Sep 14		10,000
8 Sep 14	10,000		8 Sep 14	10,000		8 Sep 14	10,000		8 Sep 14	10,000	
9 Sep 14		10,000	9 Sep 14		10,000	9 Sep 14		10,000	9 Sep 14		10,000
10 Sep 14	10,000		10 Sep 14	10,000		10 Sep 14	10,000		10 Sep 14	10,000	

Ledger

Bank (Sophie)			Correspondent Bank (Sophie)			Correspondent Bank (Alex)			Bank (Alex)		
Date	Debit	Credit	Date	Debit	Credit	Date	Debit	Credit	Date	Debit	Credit
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2 Sep 14	10,000		2 Sep 14	10,000		2 Sep 14	10,000		2 Sep 14	10,000	
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4 Sep 14	10,000		4 Sep 14	10,000		4 Sep 14	10,000		4 Sep 14	10,000	
5 Sep 14		10,000	5 Sep 14		10,000	5 Sep 14		10,000	5 Sep 14		10,000
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2 Sep 14	10,000		2 Sep 14	10,000		2 Sep 14	10,000		2 Sep 14	10,000	
3 Sep 14		10,000	3 Sep 14		10,000	3 Sep 14		10,000	3 Sep 14		10,000
4 Sep 14	10,000		4 Sep 14	10,000		4 Sep 14	10,000		4 Sep 14	10,000	
5 Sep 14		10,000	5 Sep 14		10,000	5 Sep 14		10,000	5 Sep 14		10,000
6 Sep 14	10,000		6 Sep 14	10,000		6 Sep 14	10,000		6 Sep 14	10,000	
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8 Sep 14	10,000		8 Sep 14	10,000		8 Sep 14	10,000		8 Sep 14	10,000	
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10 Sep 14	10,000		10 Sep 14	10,000		10 Sep 14	10,000		10 Sep 14	10,000	

Ledger

Bank (Sophie)			Correspondent Bank (Sophie)			Correspondent Bank (Alex)			Bank (Alex)		
Date	Debit	Credit	Date	Debit	Credit	Date	Debit	Credit	Date	Debit	Credit
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2 Sep 14	10,000		2 Sep 14	10,000		2 Sep 14	10,000		2 Sep 14	10,000	
3 Sep 14		10,000	3 Sep 14		10,000	3 Sep 14		10,000	3 Sep 14		10,000
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9 Sep 14		10,000	9 Sep 14		10,000	9 Sep 14		10,000	9 Sep 14		10,000
10 Sep 14	10,000		10 Sep 14	10,000		10 Sep 14	10,000		10 Sep 14	10,000	

The core of blockchain is that all transactions of a specific asset are recorded in one common distributed database



Ledger

2018-01-01		2018-01-02		2018-01-03		2018-01-04		2018-01-05	
Account	Balance								
2018-01-01	100.00	2018-01-02	100.00	2018-01-03	100.00	2018-01-04	100.00	2018-01-05	100.00
2018-01-01	100.00	2018-01-02	100.00	2018-01-03	100.00	2018-01-04	100.00	2018-01-05	100.00
2018-01-01	100.00	2018-01-02	100.00	2018-01-03	100.00	2018-01-04	100.00	2018-01-05	100.00
2018-01-01	100.00	2018-01-02	100.00	2018-01-03	100.00	2018-01-04	100.00	2018-01-05	100.00



The ownership for a property will thereby be transferred from an old owner to a new owner

1

Register technology
(i.e., technology to maintain registers)

2

Capitalized register
(i.e., registry organizing ownership of money or assets)

3

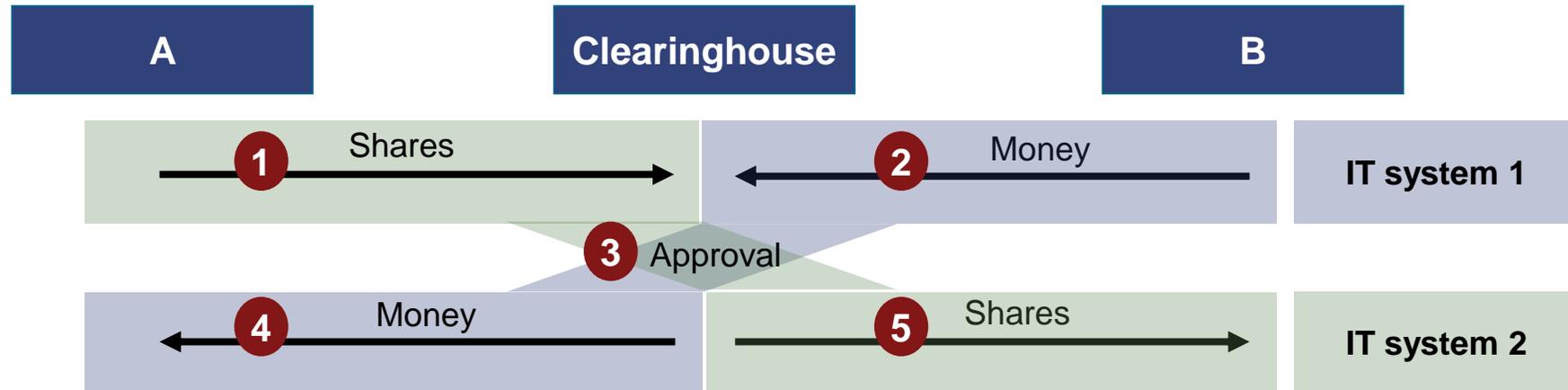
Programmable money, tokenized assets

An aerial view of a city skyline, likely New York City, with a network of white lines and dots overlaid on a blue-tinted background. The text is centered in the upper half of the image.

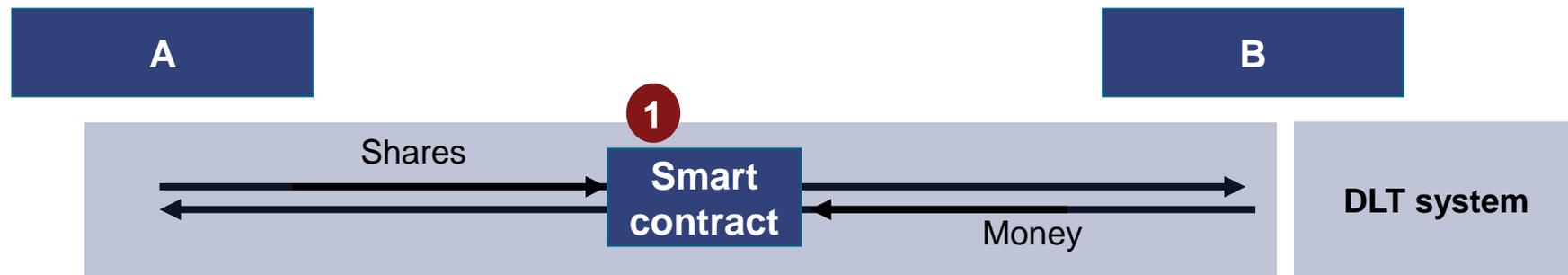
Interaction between tokens and smart contracts

Blockchain technology provides an infrastructure for transactions. Delivery vs. payment (DVP) will therefore be replaced by atomic swaps.

How does a transaction currently works? (2-3 days; fees)



How does a transaction works on a DLT system (atomic swap)? (seconds, no fees)



An aerial view of a city skyline, featuring several prominent skyscrapers. The image is overlaid with a semi-transparent blue filter and a white network diagram consisting of interconnected nodes and lines. The text "Basic principle of tokenization" is centered in the image in a large, white, sans-serif font.

Basic principle of tokenization

Where have tokens been used and where will they be used?



Security token



**Cash on ledger,
stable coin, Euro**

Software license



**Utility token
(Ethereum)**

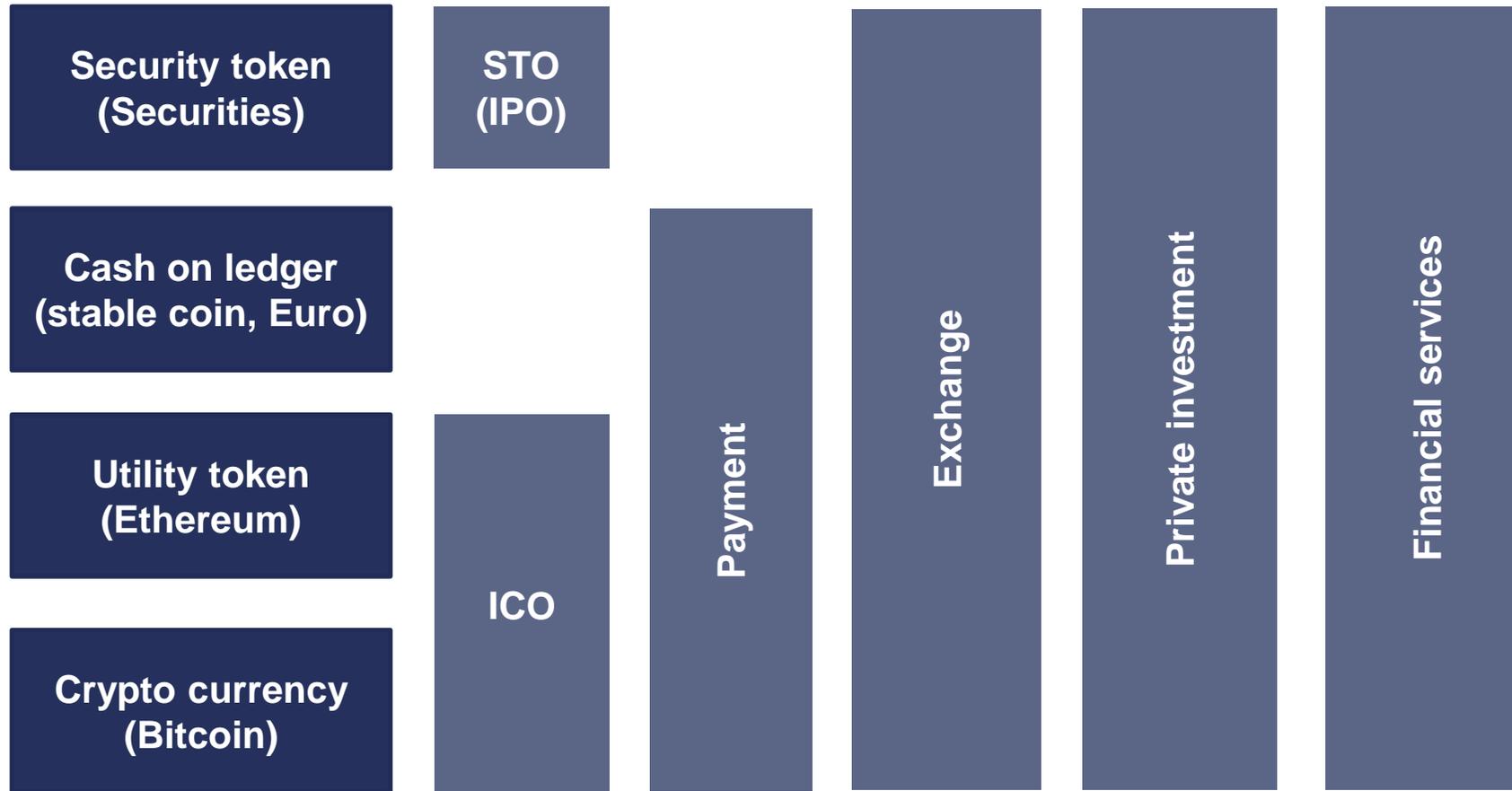
(Nothing)



**Crypto currency
(Bitcoin)**

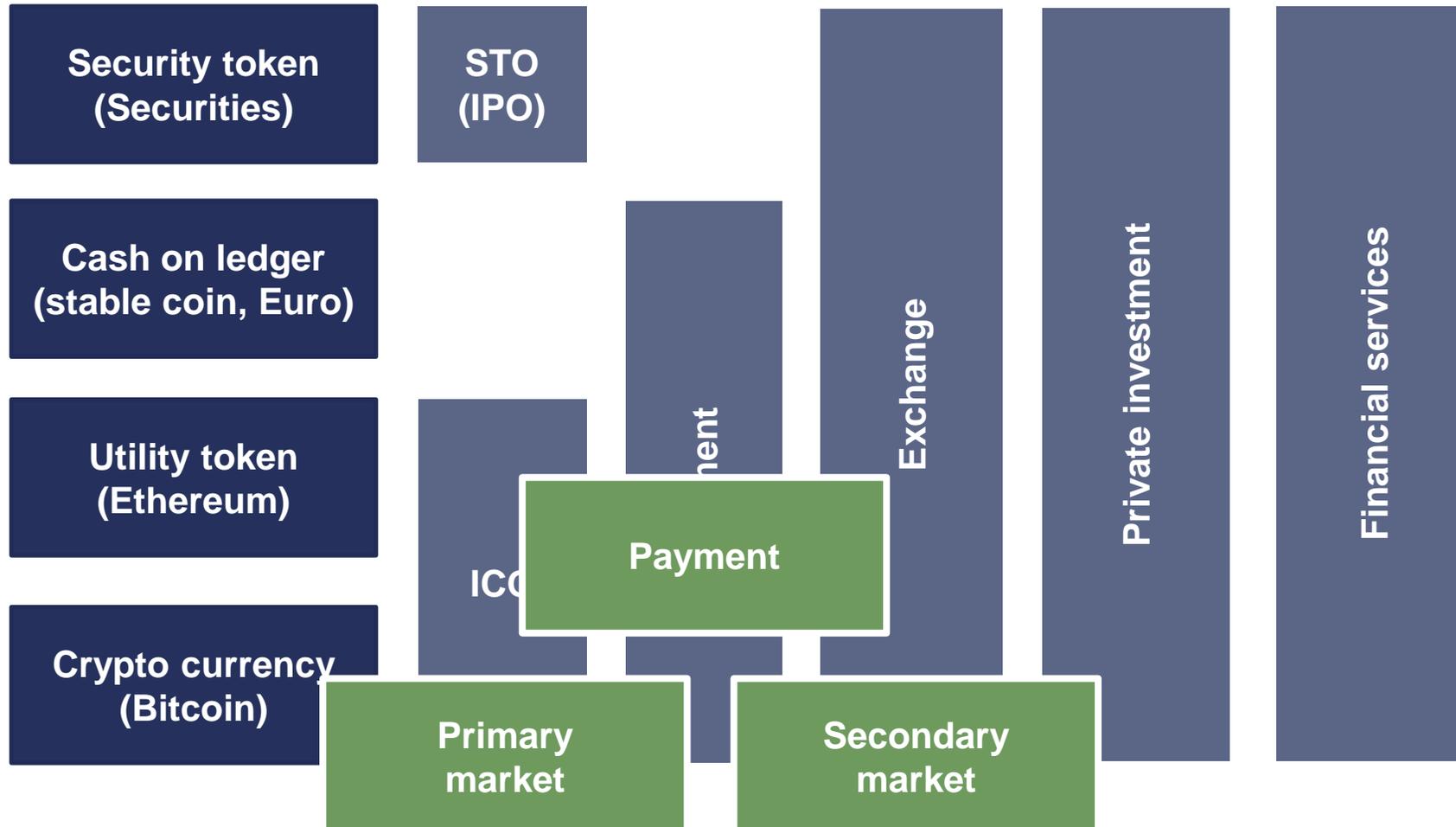
Source: Liechtenstein Blockchain Act (2019)

Where have tokens been used and where will they be used?



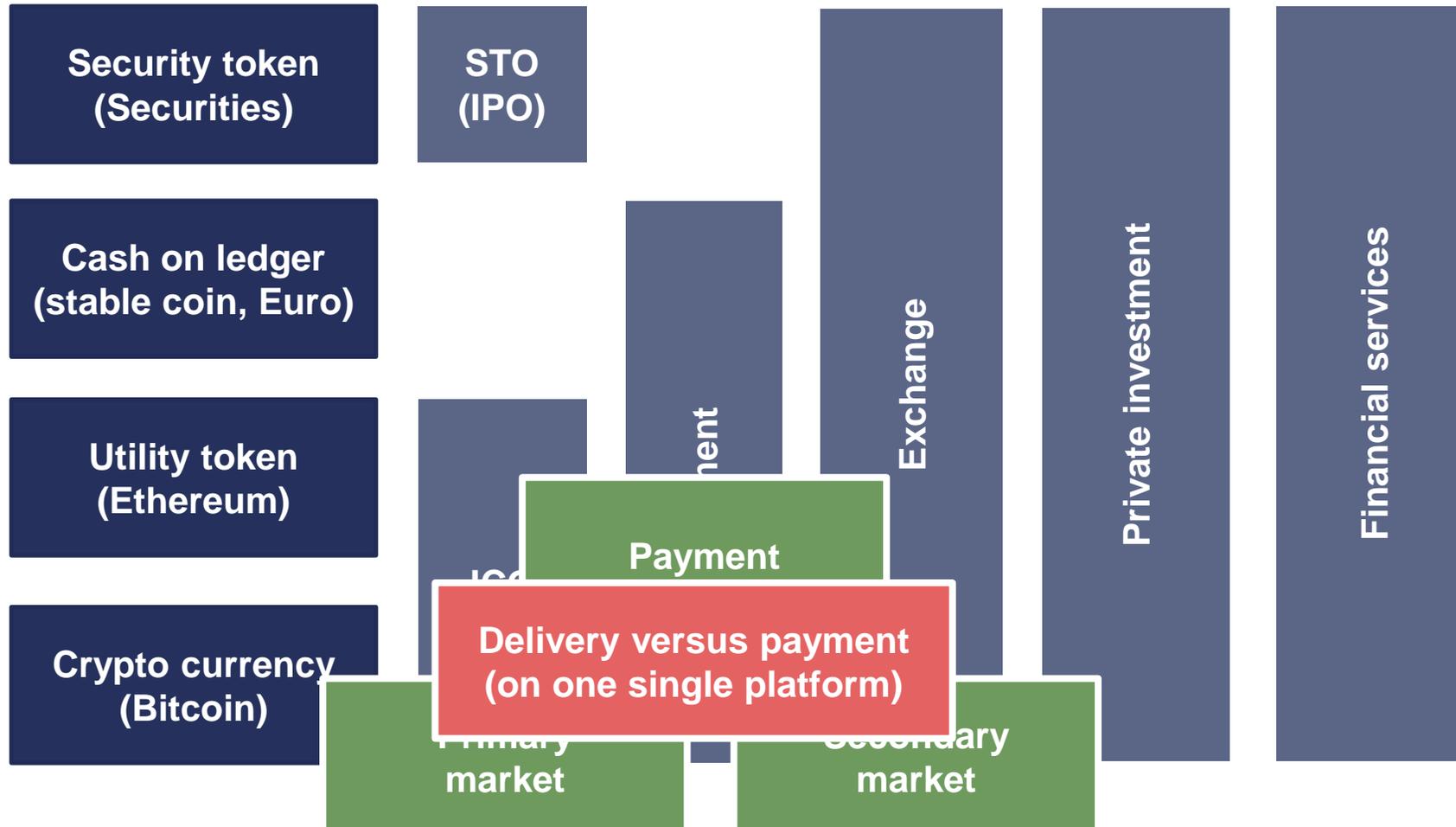
Source: Liechtenstein Blockchain Act (2019)

Where have tokens been used and where will they be used?

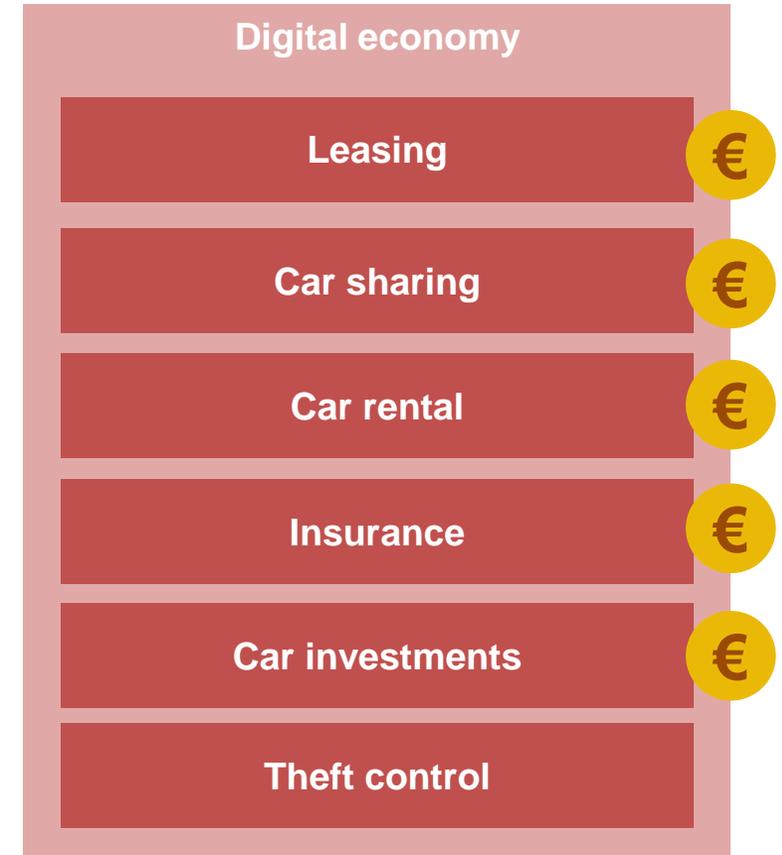
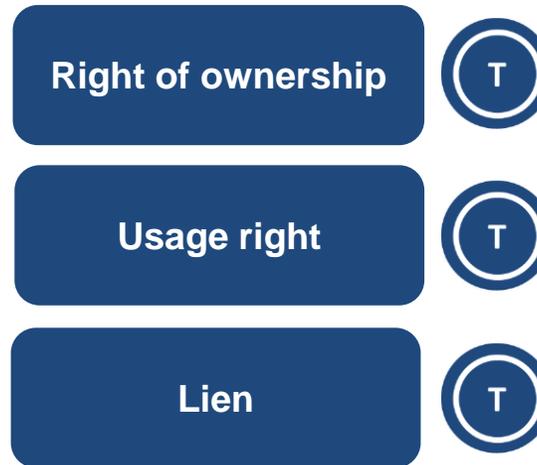


Source: Liechtenstein Blockchain Act (2019)

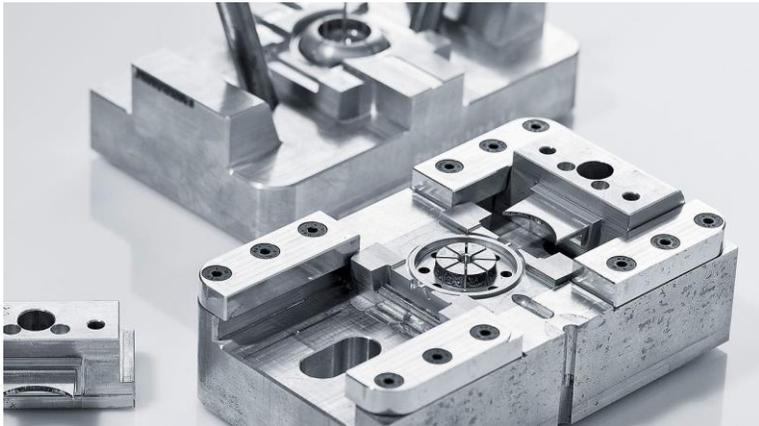
Where have tokens been used and where will they be used?



Source: Liechtenstein Blockchain Act (2019)



Source: Liechtenstein Blockchain Act (2019); Lien in German: "Pfandrecht"



- Right of ownership (T)
- Usage right (T)
- «Right on quality» (T)
- Lien (T)



Source: Liechtenstein Blockchain Act (2019); Lien in German: “Pfandrecht”

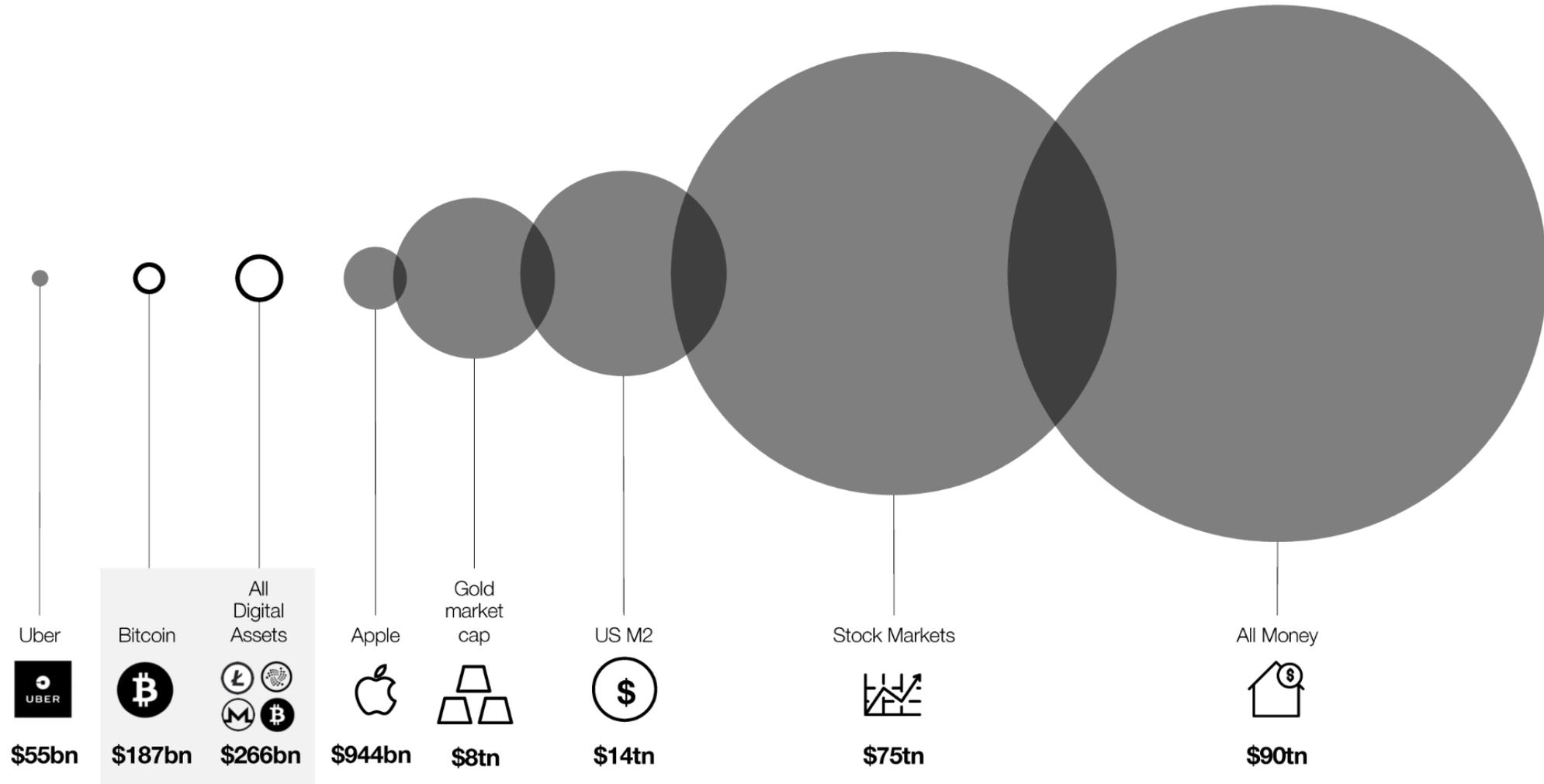
An aerial view of a city skyline, likely Chicago, with a network of white lines and dots overlaid on a blue-tinted background. The text is centered in the upper half of the image.

Bitcoin, crypto assets (public blockchain)

Ranking of crypto currencies

#	Name	Market Cap	Price	Volume (24h)	Circulating Supply	Change (24h)	Price Graph (7d)
1	 Bitcoin	\$104.728.161.312	\$5.920,39	\$15.385.632.211	17.689.400 BTC	-0,23%	
2	 Ethereum	\$17.944.927.567	\$169,32	\$6.418.959.874	105.985.059 ETH	-2,57%	
3	 XRP	\$12.650.629.614	\$0,300252	\$923.711.404	42.133.310.721 XRP *	-0,44%	
4	 Bitcoin Cash	\$5.059.447.850	\$284,70	\$1.504.842.953	17.771.138 BCH	-1,12%	
5	 Litecoin	\$4.561.346.855	\$73,95	\$2.373.943.006	61.682.957 LTC	-1,78%	
6	 EOS	\$4.452.934.521	\$4,89	\$1.673.495.857	910.779.865 EOS *	-0,07%	
7	 Binance Coin	\$2.957.954.002	\$20,95	\$252.609.607	141.175.490 BNB *	-3,99%	
8	 Tether	\$2.770.888.949	\$0,997945	\$12.798.968.065	2.776.595.295 USDT *	-0,26%	
9	 Stellar	\$1.796.407.573	\$0,093744	\$209.228.643	19.162.820.780 XLM *	-3,26%	
10	 Cardano	\$1.674.717.849	\$0,064593	\$43.813.563	25.927.070.538 ADA	-1,35%	
11	 TRON	\$1.653.822.300	\$0,024802	\$795.881.080	66.682.072.191 TRX	3,12%	

Capitalization of crypto assets in comparison to other asset classes



Source: Cryptology (2019)

Tokenization creates new asset classes and revolutionizes existing ones



Bankable assets

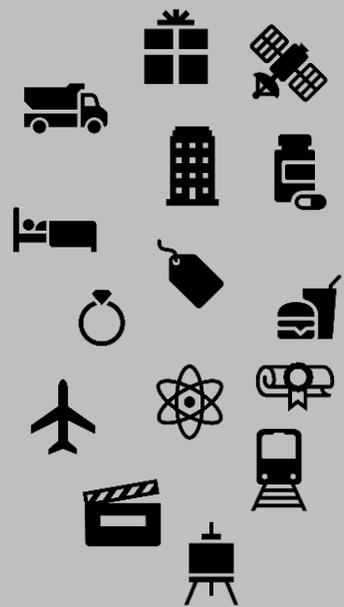
- Stocks, profit participation certificates, currencies, bonds
- Can be directly created on the Blockchain
- Not necessarily backed by real assets
- Issuers must be trusted that value is behind the asset





Non-bankable assets

- Any kind of real assets (real estate, art, patents, certificates, coupons, cars)
- Ownership can be fractionalized and fungibility of asset is created
- Trust issuer that (tangible) asset exists in described conditions



An aerial view of a city skyline, likely Chicago, with a blue overlay and a white network diagram. The network diagram consists of white dots connected by white lines, forming a complex web across the image. The text "Invest in blockchain" is centered in the middle of the image in a bold, white, sans-serif font.

Invest in blockchain

Investment in tokens	
Direct	Indirect
<ul style="list-style-type: none">▪ Crypto exchanges▪ Banks and broker	<ul style="list-style-type: none">▪ Managed accounts▪ Certificates▪ Futures▪ Single asset funds▪ Hedge funds▪ CFDs

Investment in ecosystem and companies	
Infrastructure	Companies
<ul style="list-style-type: none">▪ Mining▪ Master nodes	<ul style="list-style-type: none">▪ Stocks▪ Venture capital

Example of a crypto fund

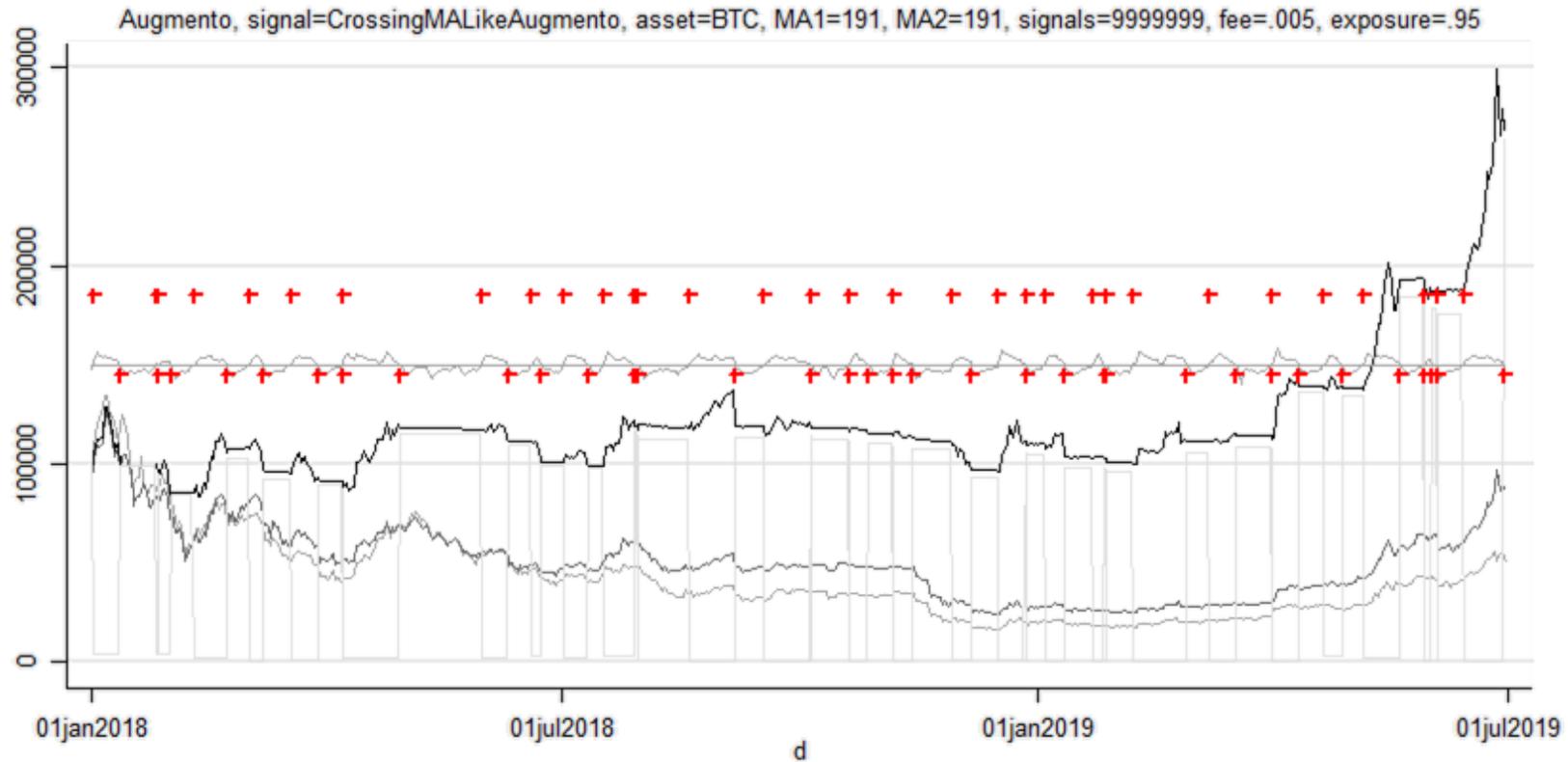
Arbitrage spread analysis and trade execution

1ST/BTC	MAX spread: 0,3322 %	BUY: HitBTC SELL: Bittrex
TRST/BTC	MAX spread: 0,6452 %	BUY: Bittrex SELL: HitBTC
AEON/BTC	MAX spread: 0,2624 %	BUY: Bittrex SELL: HitBTC
SWT/BTC	MAX spread: 0,2898 %	BUY: Bittrex SELL: HitBTC
SNT/ETH	MAX spread: 0,6488 %	BUY: HitBTC SELL: Bitfinex
SAN/ETH	MAX spread: 2,6271 %	BUY: HitBTC SELL: Bitfinex
BCH/ETH	MAX spread: 0,2778 %	BUY: HitBTC SELL: Poloniex
ZRX/USD	MAX spread: 0,7476 %	BUY: Bitfinex SELL: HitBTC
QTUM/ETH	MAX spread: 3,9736 %	BUY: Bittrex SELL: HitBTC
GAME/BTC	MAX spread: 7,3352 %	BUY: HitBTC SELL: Bittrex
NEO/USD	MAX spread: 0,5042 %	BUY: Bitfinex SELL: HitBTC
XVG/BTC	MAX spread: 0,8333 %	BUY: Bittrex SELL: HitBTC
TRX/USD	MAX spread: 0,5683 %	BUY: Bitfinex SELL: HitBTC
SNT/BTC	MAX spread: 0,1211 %	BUY: HitBTC SELL: Bitfinex
BTG/USD	MAX spread: 0,5848 %	BUY: Bitfinex SELL: HitBTC
QTUM/USD	MAX spread: 4,9812 %	BUY: Bitfinex SELL: HitBTC
QTUM/BTC	MAX spread: 4,0296 %	BUY: Bittrex SELL: HitBTC
OMG/USD	MAX spread: 0,111 %	BUY: Bitfinex SELL: HitBTC
FLDC/BTC	MAX spread: 0,3831 %	BUY: Bittrex SELL: Poloniex
GRC/BTC	MAX spread: 0,3145 %	BUY: Poloniex SELL: Bittrex
OMNI/BTC	MAX spread: 0,4265 %	BUY: Bittrex SELL: Poloniex
NAV/BTC	MAX spread: 0,4648 %	BUY: Bittrex SELL: Poloniex
SYS/BTC	MAX spread: 0,032 %	BUY: Poloniex SELL: Bittrex
VIA/BTC	MAX spread: 0,1644 %	BUY: Bittrex SELL: Poloniex
XVC/BTC	MAX spread: 20,6494 %	BUY: Poloniex SELL: Bittrex

Source: Blocksize Capital (2018), www.blocksize-capital.com

Example of a crypto fund

Arbitrage spread analysis and trade execution





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Twitter (@philippsandner).**



Geboren 1980 in Heidelberg

Kontakt: email@philipp-sandner.de

2000-2005

Studium der BWL an der Universität Mannheim

2005-2011

Promotion an der Ludwig-Maximilians-Universität München

Auslandsaufenthalte an der Copenhagen Business School und an der University of California at Berkeley

Post-Doc an der Technischen Universität München

2010-2015

Mitgründer einer auf Innovationsstrategie und IP spezialisierte Unternehmensberatung

2015

Professor an der Frankfurt School of Finance & Management;
Themengebiete: Digitalisierung, Entrepreneurship und Innovation;

seit 2017

Leiter des Frankfurt School Blockchain Centers

Themen

Blockchain, Crypto Assets, Initial Coin Offerings (ICOs),
Digitalisierung und Entrepreneurship

Praxis

Beratung von Unternehmen hinsichtlich ihrer Blockchain-Aktivitäten,
u.a. auch den ersten Crypto Fund Europas oder Startups in
Consensys' Token Foundry Programm

Engagement

FinTechRat des Bundesministerium der Finanzen,
Mitgründer des Blockchain Bundesverband e.V.,
Multichain Asset Managers Association