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Campus Lectures – FH Campus Wien

CRYPTO CURRENCIES

RÜCKBLICK & AUSBLICK

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CRYPTO CURRENCIES

RÜCKBLICK & AUSBLICK

- 1) Mining von Cryptowährungen**
- 2) Mining 2.0
- 3) Blockchains: mehr als Cryptowährungen

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**Kühn
Frech
Mutig
Dreist
Gewagt
Tapfer
Waghalsig
Unerschrocken**

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TECHNOLOGY GROUP AG

14 Mio € kumulierter Umsatz bis Ende 2018
40 Mitarbeiter

techbold

HARDWARE SERVICES GmbH

techbold

NETWORK SOLUTIONS GmbH

- IT Full Service für KMU
- Breitestes Spektrum an Dienstleistung
- 70 Kunden mit Wartungsverträgen
- Betreuung von mehr als 2.000 IT Arbeitsplätzen und über 200 Servern

Gegründet 06/2014

techbold

TECHNOLOGY GROUP AG

14 Mio € kumulierter Umsatz bis Ende 2018
40 Mitarbeiter

techbold

HARDWARE SERVICES GmbH

- Computer – and Servicecenter für PC, Mac, Tablet, Smartphone
- Assembling individueller PCs
- **bold.** High-End Gaming PCs
- **bold.** Crypto Mining Rigs
- Reparaturen
- Upgrades
- Datenrettung

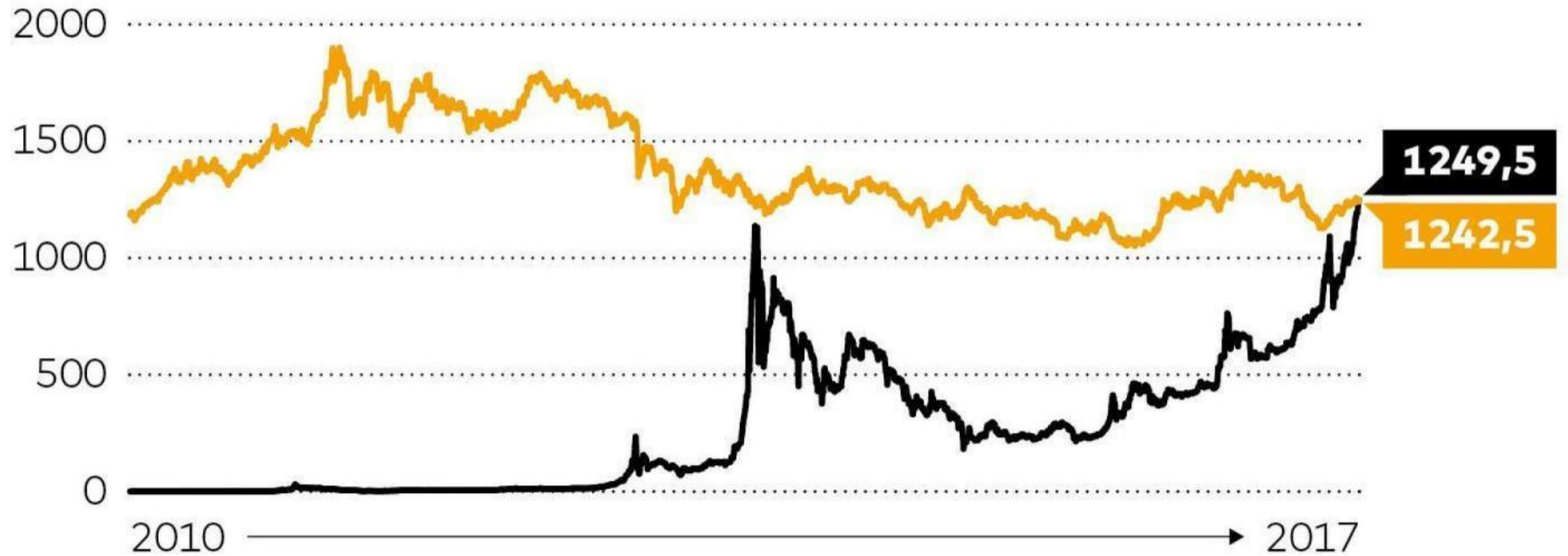
techbold

NETWORK SOLUTIONS GmbH

- 4.000 Bestandskunden, 75% Geschäftskunden
- Bis zu 100 individuell gefertigte PCs pro Monat
- 350 qm Servicecenter

Gegründet 01/2015

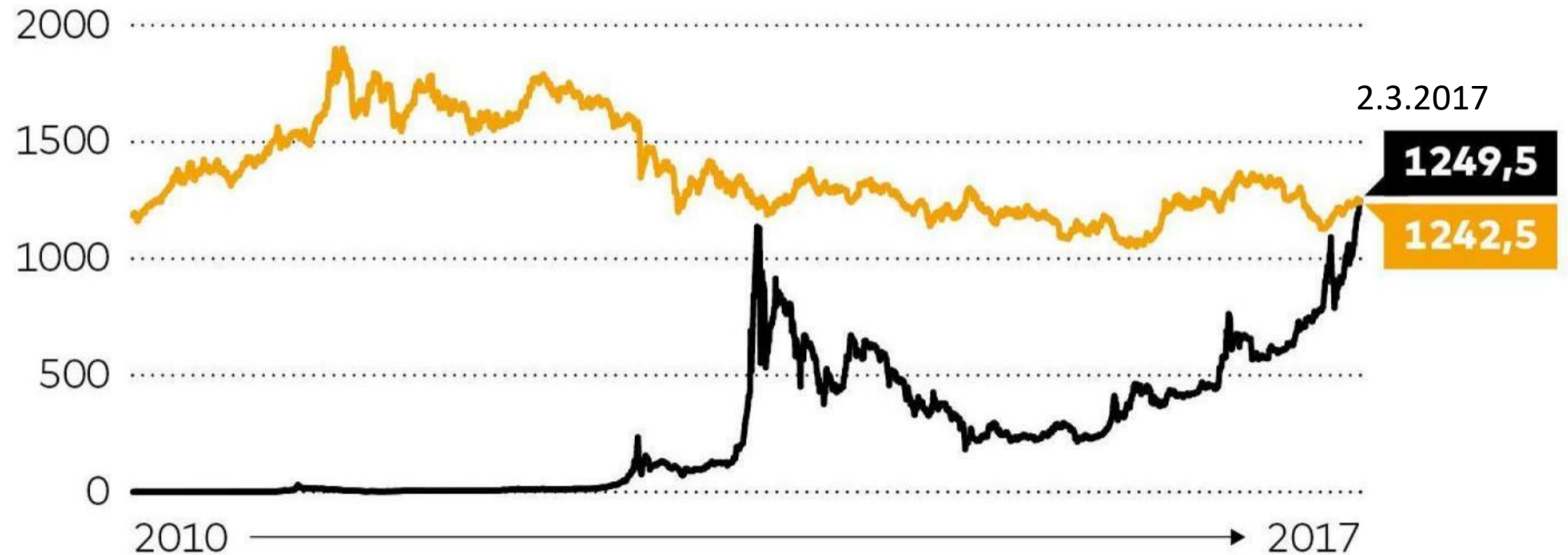
WAS STELLT DIESE GRAFIK DAR?



CRYPTOWÄHRUNGEN WURDEN MASSENTAUGLICH

Digitale Geldwende

Preis pro Feinunze Gold und Preis pro Bitcoin in Dollar



WELT

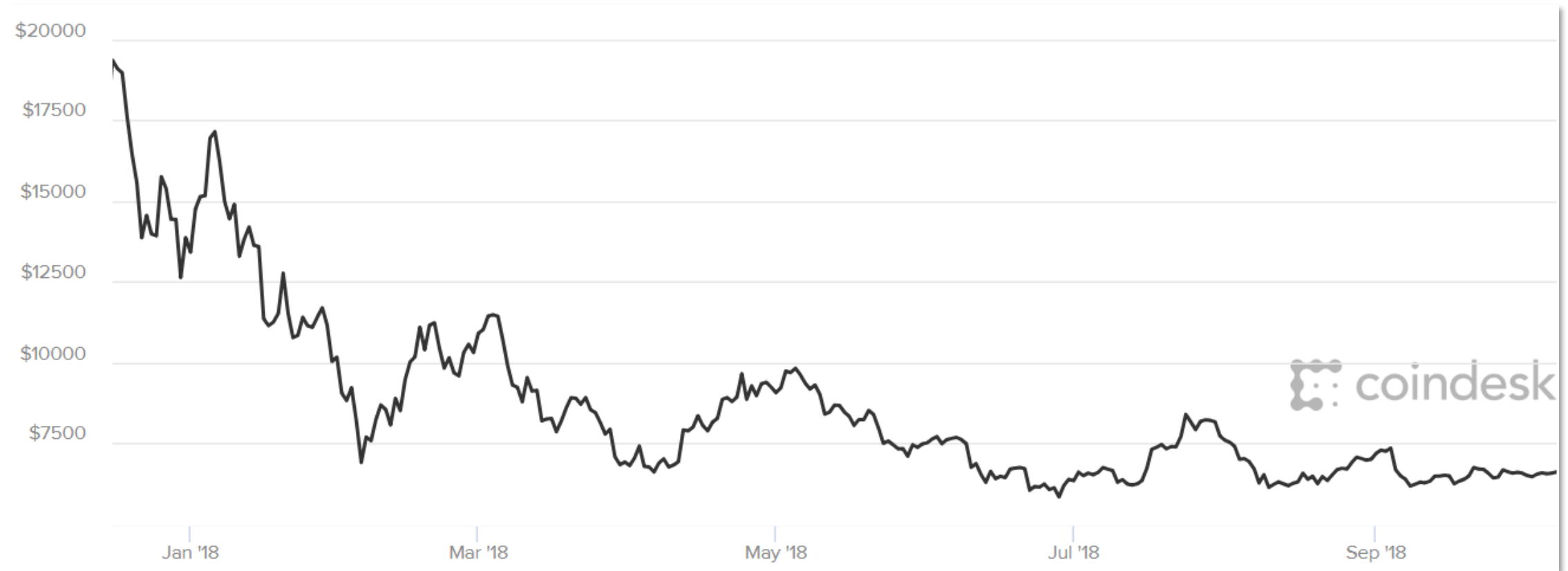
Quelle: Bloomberg

WAS DANACH GESCHAH





UND HEUTE:





1 Jahr später: JEDE ZWEITE WÄHRUNG GEÄNDERT

#	Name	Market Cap	Price	Volume (24h)	Circulating Supply	Change (24h)	Price Graph (7d)
1	Bitcoin	\$121.845.792.142	\$7313.13	\$4.483.020.000	16.661.237 BTC	4.41%	
2	Ethereum	\$28.091.459.445	\$294.17	\$794.999.000	95.492.666 ETH	3.31%	
3	Bitcoin Cash	\$11.358.328.696	\$677.92	\$2.126.340.000	16.754.600 BCH	22.27%	
4	Ripple	\$7.964.700.284	\$0.206706	\$407.101.000	38.531.538.922 XRP *	9.63%	
5	Litecoin	\$2.927.797.336	\$54.56	\$194.945.000	53.657.057 LTC	4.97%	
6	Dash	\$2.032.594.675	\$265.15	\$70.569.900	7.665.801 DASH	1.89%	
7	BitConnect	\$2.027.575.959	\$274.34	\$24.791.400	7.390.849 BCC	5.76%	
8	NEO	\$1.664.279.500	\$25.60	\$65.120.500	65.000.000 NEO *	3.96%	
9	NEM	\$1.509.975.000	\$0.167775	\$8.095.990	8.999.999.999 XEM *	2.07%	
10	Monero	\$1.302.510.781	\$85.12	\$43.502.500	15.302.916 XMR	3.34%	
11	IOTA	\$1.046.079.002	\$0.376351	\$19.224.100	2.779.530.283 MIOTA *	9.42%	
12	Ethereum Classic	\$1.004.133.415	\$10.34	\$39.598.200	97.075.873 ETC	2.53%	
13	Hshare	\$740.216.365	\$9.76	\$15.564.000	75.803.240 HSR	0.16%	
14	Qtum	\$724.206.809	\$9.84	\$58.901.100	73.633.648 QTUM *	1.33%	

Coinmarketcap.com, 3.11.2017

#	Name	Market Cap	Price	Volume (24h)	Circulating Supply	Change (24h)	Price Graph (7d)
1	Bitcoin	\$114.892.565.915	\$6.636,42	\$3.832.330.873	17.312.425 BTC	0,78%	
2	Ethereum	\$23.430.114.435	\$228,68	\$1.488.918.665	102.460.047 ETH	1,67%	
3	XRP	\$19.198.342.752	\$0,480735	\$452.010.649	39.935.410.492 XRP *	-0,05%	
4	Bitcoin Cash	\$9.014.704.147	\$518,31	\$413.049.235	17.392.638 BCH	-0,15%	
5	EOS	\$5.314.572.458	\$5,86	\$659.342.896	906.245.118 EOS *	2,15%	
6	Stellar	\$4.650.767.820	\$0,246212	\$46.018.177	18.889.273.792 XLM *	0,72%	
7	Litecoin	\$3.456.646.630	\$58,94	\$353.097.704	58.645.327 LTC	2,20%	
8	Tether	\$2.696.926.585	\$0,996492	\$2.595.440.376	2.706.421.736 USDT *	-0,06%	
9	Cardano	\$2.220.735.277	\$0,085653	\$65.469.165	25.927.070.538 ADA *	2,42%	
10	Monero	\$1.876.571.698	\$113,91	\$55.336.151	16.473.801 XMR	0,38%	
11	TRON	\$1.683.736.871	\$0,025609	\$217.865.127	65.748.111.645 TRX *	-5,29%	
12	IOTA	\$1.638.368.415	\$0,589441	\$30.473.745	2.779.530.283 MIOTA *	2,34%	
13	Dash	\$1.517.577.681	\$181,28	\$139.571.307	8.371.324 DASH	1,34%	
14	Binance Coin	\$1.229.860.640	\$10,47	\$31.329.277	117.443.301 BNB *	-0,20%	

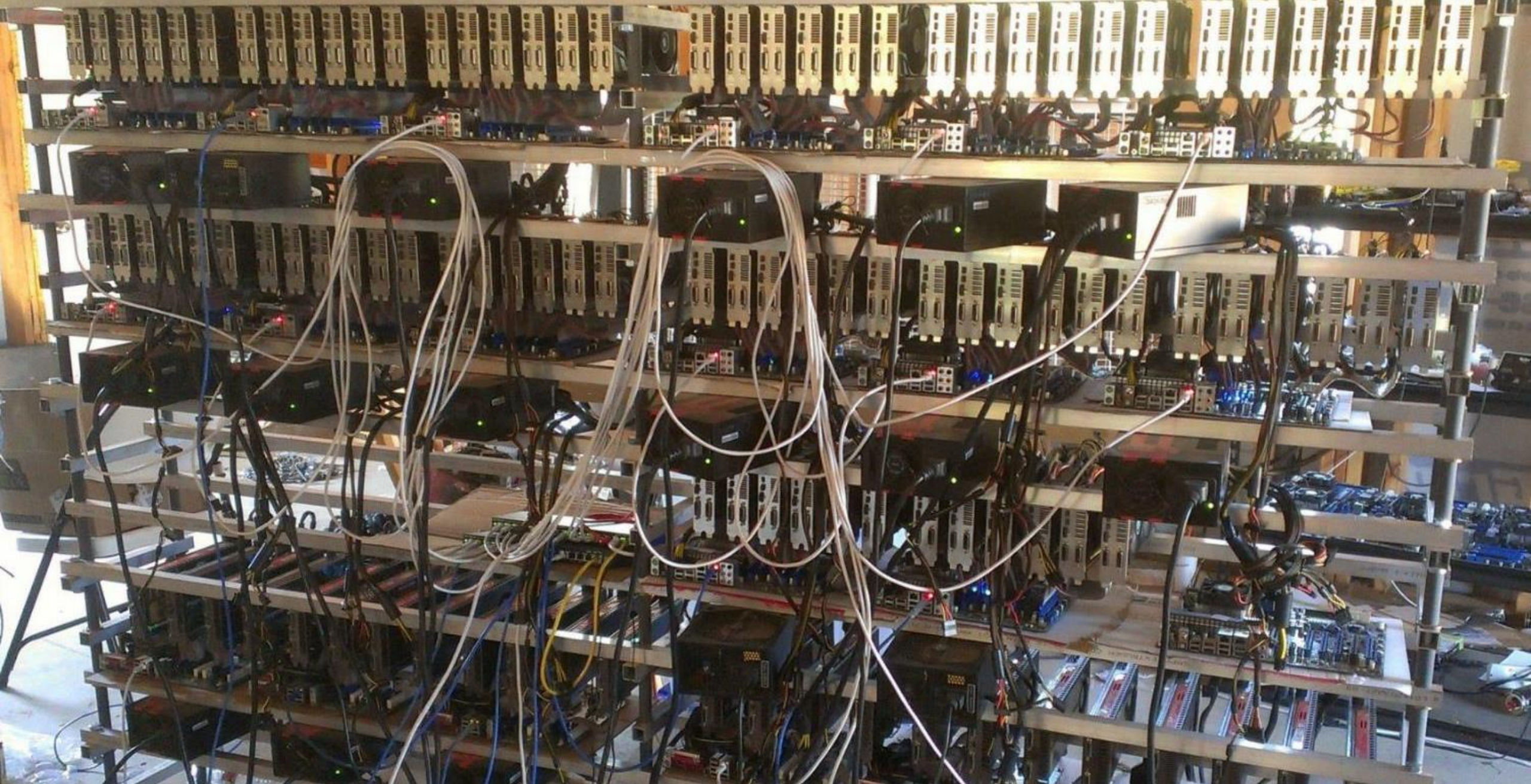
Coinmarketcap.com, 9.10.2018

ASIC VS GPU

Google

mining rig





ASIC VS GPU



Antminer S9-14TH/S ASIC Bitcoin Miner Include PSU

★★★★★ 13 reviews / Write a review

\$1,349.00 ~~\$1,699.00~~

Brand new ASIC miner - Bitmain Antminer S9 14TH/s in stock. It's most powerful Bitcoin miner on the market now. User manual in English included. **180 days warranty.**

Specification:

- **Hash Rate:** 14TH/s Variation of $\pm 5\%$ is expected
- **Power Consumption:** 1372W (14TH/s batch) (at the wall, with Bitmain's APW3 PSU, 93% efficiency, 25°C ambient temp). Expected discrepancy of +10%
- **Power Efficiency:** 0.098 J/GH +10% at the wall (with Bitmain's APW3 PSU, 93% efficiency, 25°C ambient temp)
- **Rated Voltage** 11.60 ~13.00V
- **PSU:** APW3++ PSU **INCLUDED**
- **Chip quantity per unit** 189x BM1387
- **Dimensions** 350mm(L) x 135mm(W) x 158mm(H)
- **Cooling** 2x 12038 fans; Front fan: 6000rpm, Rear fan: 4300rpm
- **Operating Temperature** 0°C to 40°C
- **Network Connection** Ethernet

5 or more \$1,249.00
10 or more \$1,199.00
25 or more \$1,149.00
50 or more \$1,099.00

Brands **BITMAIN**
Product Code: **ANTMINER-S9-14TH**
Availability: **In Stock**



- Die einzige Möglichkeit, BTC zu minen
- Wird bei neuer Generation obsolet = Schrott wert
- Garantie? Man muß den Chinesischen Herstellern vertrauen

MINING RIG SELBST BAUEN?



3 MONTHS LATER:

Woher die Hardware günstig beziehen?
Offene Bauweise oder Gehäuse?

Welche Gehäuse?

Welche Lüfter?

Welches Netzteil?

Welches Betriebssystem?



Erkennt nicht alle GraKas

Kiste stürzt ständig ab

Riser hat Kontaktprobleme

Was in Foren steht
stimmt nicht

Welches VBIOS?



- Professionelles Setup für Privatkunden und Profis
- Beliebige Währung, jederzeit wählbar
- Dauerbelastbar
- Optimierte Rechenleistung bei minimiertem Stromverbrauch

BOLD.
MINING RIG COMPACT
8x GTX 1070



Plug & Mine¹

256 MH/s
1,06 KW

Selbstinstallation²

216 MH/s
1,4 KW

BOLD.
MINING RIG COMPACT
8x GTX 1060



Plug & Mine¹

202 MH/s
0,72 KW

Selbstinstallation²

168 MH/s
1,04 KW

BOLD.
MINING RIG COMPACT
6x GTX 1070



Plug & Mine¹

192 MH/s
0,75 KW

Selbstinstallation²

162 MH/s
1,07 KW

BOLD.
MINING RIG COMPACT
6x GTX 1060



Plug & Mine¹

152 MH/s
0,56 KW

Selbstinstallation²

126 MH/s
0,8 KW

BOLD.
MINING RIG
6x GTX 1070



Plug & Mine¹

192 MH/s
0,75 KW

Selbstinstallation²

162 MH/s
1,07 KW

BOLD.
MINING RIG
6x GTX 1060



Plug & Mine¹

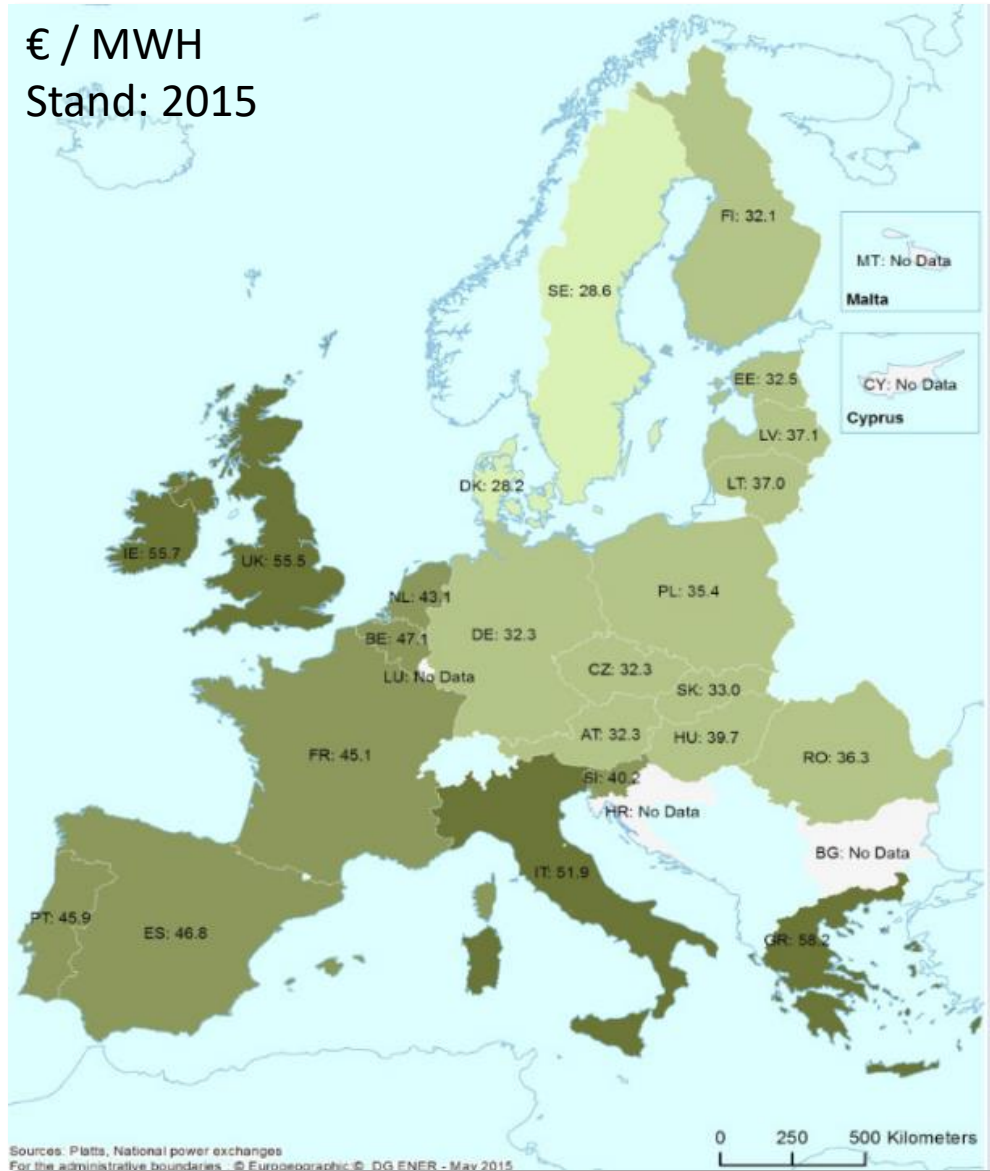
152 MH/s
0,56 KW

Selbstinstallation²

126 MH/s
0,8 KW

STROMKOSTEN

€/ MWH
Stand: 2015



Stromkosten können im
Privathaushalt schnell
50% des Profit auffressen

PROFITABILITÄTSRECHNER ETHEREUM

8x 1070; € 6199 EUR

8x RX 470; € 3599 EUR

5.11.2017



Calculated for
1 ETH = \$ 300.01

Hashing Power

256

MH/s

Power consumption (w)

1060

Cost per KW/h (\$)

0.12

PROFIT RATIO PER DAY

306%

PROFIT PER MONTH

\$ 280.90

Day Profit per day \$ 9.36	Mined/day ≡ 0.04139	Power cost/Day \$ 3.05
Week Profit per week \$ 65.54	Mined/week ≡ 0.2897	Power cost/Week \$ 21.37
Month Profit per month \$ 280.90	Mined/month ≡ 1.24	Power cost/Month \$ 91.58
Year Profit per year \$ 3,417.57	Mined/year ≡ 15.11	Power cost/Year \$ 1,114.27



Calculated for
1 ETH = \$ 300.01

Hashing Power

230

MH/s

Power consumption (w)

1250

Cost per KW/h (\$)

0.12

PROFIT RATIO PER DAY

209%

PROFIT PER MONTH

\$ 226.65

Day Profit per day \$ 7.56	Mined/day ≡ 0.03718	Power cost/Day \$ 3.60
Week Profit per week \$ 52.89	Mined/week ≡ 0.2603	Power cost/Week \$ 25.20
Month Profit per month \$ 226.65	Mined/month ≡ 1.12	Power cost/Month \$ 108.00
Year Profit per year \$ 2,757.58	Mined/year ≡ 13.57	Power cost/Year \$ 1,314.00

9.10.2018



Calculated for
1 ETH = \$ 228.20

Hashing Power

256

MH/s

Power consumption (w)

1060

Cost per KWh (\$)

0.12

Pool Fee (%)

1

PROFIT RATIO PER DAY

31%

PROFIT PER MONTH

\$ 28.71

Day Profit per day \$ 0.9570 Pool Fee \$ 0.04050	Mined/day ≡ 0.01775	Power cost/Day \$ 3.05
Week Profit per week \$ 6.70 Pool Fee \$ 0.2835	Mined/week ≡ 0.1242	Power cost/Week \$ 21.37
Month Profit per month \$ 28.71 Pool Fee \$ 1.22	Mined/month ≡ 0.5325	Power cost/Month \$ 91.58
Year Profit per year \$ 349.29 Pool Fee \$ 14.78	Mined/year ≡ 6.48	Power cost/Year \$ 1,114.27



Calculated for
1 ETH = \$ 228.20

Hashing Power

230

MH/s

Power consumption (w)

1250

Cost per KWh (\$)

0.12

Pool Fee (%)

1

PROFIT RATIO PER DAY

0%

PROFIT PER MONTH

\$ 0.07559

Day Profit per day \$ 0.002520 Pool Fee \$ 0.03639	Mined/day ≡ 0.01595	Power cost/Day \$ 3.60
Week Profit per week \$ 0.01764 Pool Fee \$ 0.2547	Mined/week ≡ 0.1116	Power cost/Week \$ 25.20
Month Profit per month \$ 0.07559 Pool Fee \$ 1.09	Mined/month ≡ 0.4784	Power cost/Month \$ 108.00
Year Profit per year \$ 0.9197 Pool Fee \$ 13.28	Mined/year ≡ 5.82	Power cost/Year \$ 1,314.00

Stand: 5.11.2017 und 9.10.2018. <https://www.cryptocompare.com/mining/calculator>

**Es ist heute sinnvoller ETH
zu kaufen, als zu minen.**

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RÜCKBLICK & AUSBLICK

- 1) Mining von Cryptowährungen
- 2) **Mining 2.0**
- 3) Blockchains: mehr als Cryptowährungen

PoW – Proof of Work



Verrichten einer
Arbeit um nächsten
Block zu schreiben



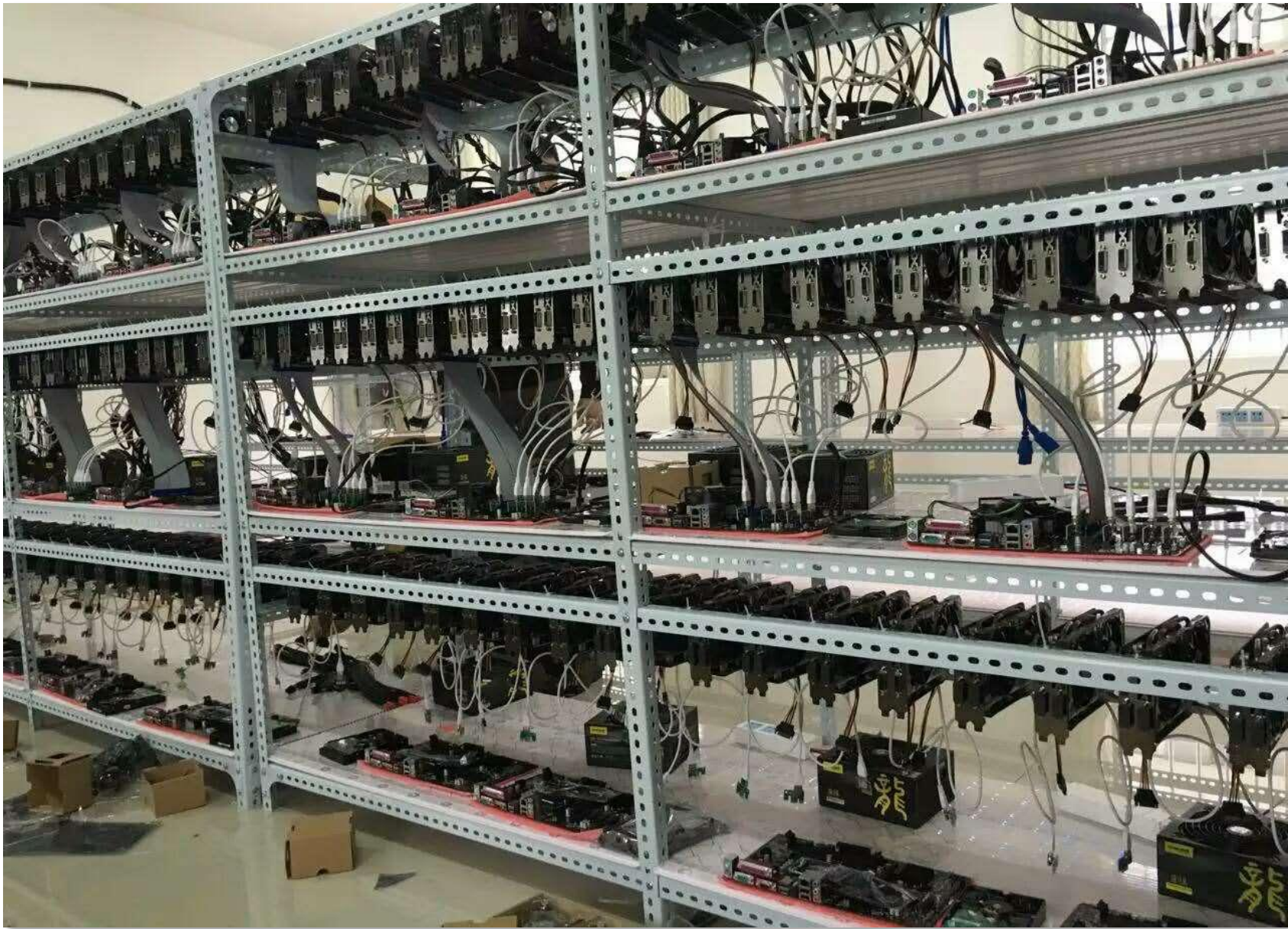
Lösen eines
mathematischen
Rätsels mittels
Computer



Der erste bekommt
einen Reward







PoW – Probleme

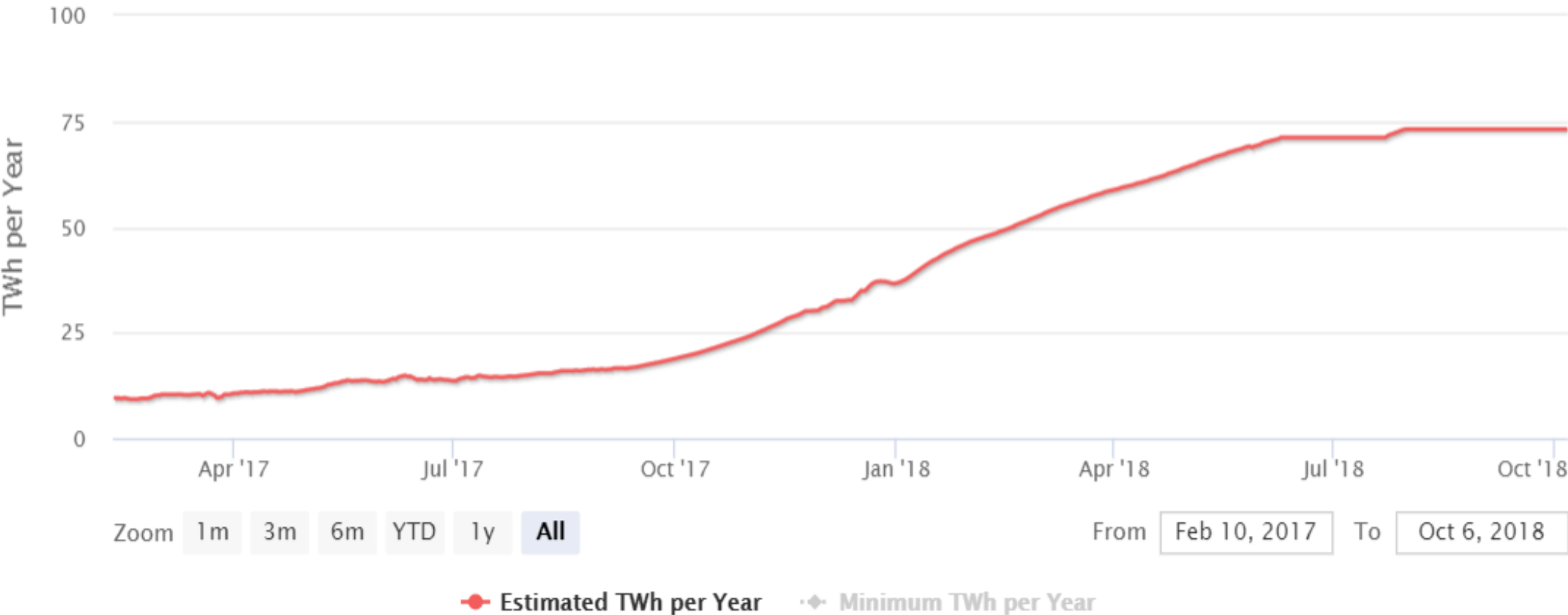
- ☹ hoher Stromverbrauch
- ☹ Miningpools → Zentralisierung → 51% Attacke
- ☹ “Rich getting richer” durch Skalierungseffekte (Hardware Kauf, Stromkosten)

Bitcoin Energy Consumption Index

Bitcoin Energy Consumption Index Chart



Click and drag in the plot area to zoom in



PoS – Proof of Stake



Auswahl nächsten
Block zu schreiben



Zufällige Auswahl
zwischen allen Coin
Besitzern



Ausgewählte bekommt
Reward

PoS – Proof of Stake



PoS – Vorteile

- ☺ Geringer Energieverbrauch
- ☺ Weniger zentralisiert
- ☺ Geringere Investitionskosten
- ☺ Wahrscheinlichkeit einer 51% Attacke geringer

BEISPIELE

- Peercoin
- Lisk
- NXT
- ETH (Casper)
- Cardano

Weitere Probleme

- ☹ Transaktionsgeschwindigkeit
- ☹ Privatsphäre
- ☹ Dezentralisiertes wählen

MASTERNODES



Bereitstellung eines Service



Ausgewählte bekommt Reward



Instant Send
Private Send
Voting

Stats (444)

ICO (3)

Tiers (25)

Maintenance (47)

Show 50 entries

Search:

Previous

1

2

3

4

5

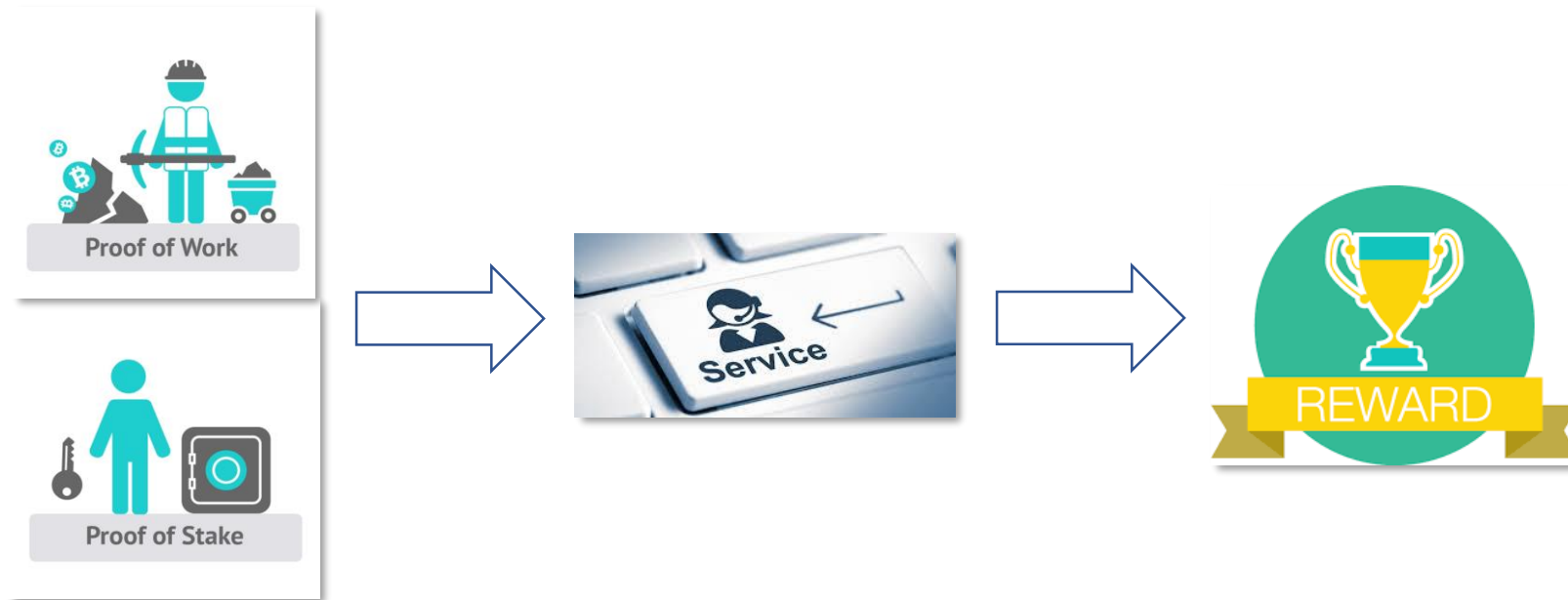
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9

Next

Coin / detail	Price	Change	Volume	Marketcap	ROI	Nodes	# required	Mn worth
 Dash (DASH)	\$177.6827	-2.81 %	\$310,951,178	\$1,486,778,029	6.73%	4,883	1,000	\$177,683
 Zcoin (XZC)	\$9.7530	-0.46 %	\$10,808,559	\$56,155,944	25.48%	3,675	1,000	\$9,753
 LogisCoin (LGS)	\$8.4710	1.53 %	\$2,759,066	\$3,735,949	710.48%	308	1,000	\$8,471
 PIVX (PIVX)	\$1.0789	-2.37 %	\$468,965	\$61,260,282	9.98%	1,358	10,000	\$10,789
 PHORE (PHR)	\$0.5380	1.28 %	\$386,499	\$7,939,536	38.03%	576	10,000	\$5,380
 SysCoin (SYS)	\$0.0945	0.86 %	\$306,253	\$51,134,065	10.46%	1,259	100,000	\$9,449
 SmartCash (SMART)	\$0.0233	-0.97 %	\$254,537	\$24,539,373	40.47%	14,741	10,000	\$233
 Horizen Securenode (ZEN-42)	\$15.9717	-2.26 %	\$230,080	\$77,928,907	33.99%	18,442	42	\$671
 Horizen Supernode (ZEN-500)	\$15.9717	-2.26 %	\$230,080	\$77,928,907	25.41%	2,072	500	\$7,986
 LightPayCoin (LPC)	\$1.1037	-6.39 %	\$200,106	\$3,412,849	357.95%	2,120	1,000	\$1,104
 ProjectCoin (PRJ-T2)	\$0.7911	2.62 %	\$179,571	\$1,115,999	1,947.54%	42	6,000	\$4,747
 ProjectCoin (PRJ-T1)	\$0.7911	2.62 %	\$179,571	\$1,115,999	1,995.04%	82	3,000	\$2,373
 ProjectCoin (PRJ-T3)	\$0.7911	2.62 %	\$179,571	\$1,115,999	2,405.78%	34	6,000	\$4,747
 Gold Poker (GPKR)	\$0.9149	-10.06 %	\$166,537	\$1,038,093	494.40%	18	33,333	\$30,496
 Crown SN (CRW-SN)	\$0.4047	-7.47 %	\$163,299	\$8,238,736	24.03%	2,297	500	\$202
 Crown (CRW)	\$0.4047	-7.47 %	\$163,299	\$8,238,736	12.21%	1,130	10,000	\$4,047
 SafeInsure (SINS)	\$2.7131	-8.55 %	\$125,075	\$2,910,551	2,194.61%	19	1,000	\$2,713
 StakeNet (XSN)	\$0.1267	-4.00 %	\$118,566	\$9,317,841	20.65%	1,494	15,000	\$1,901
 GoByte (GBX)	\$0.8921	1.00 %	\$118,173	\$2,367,399	63.74%	1,924	1,000	\$892

ZUSAMMENFASSUNG

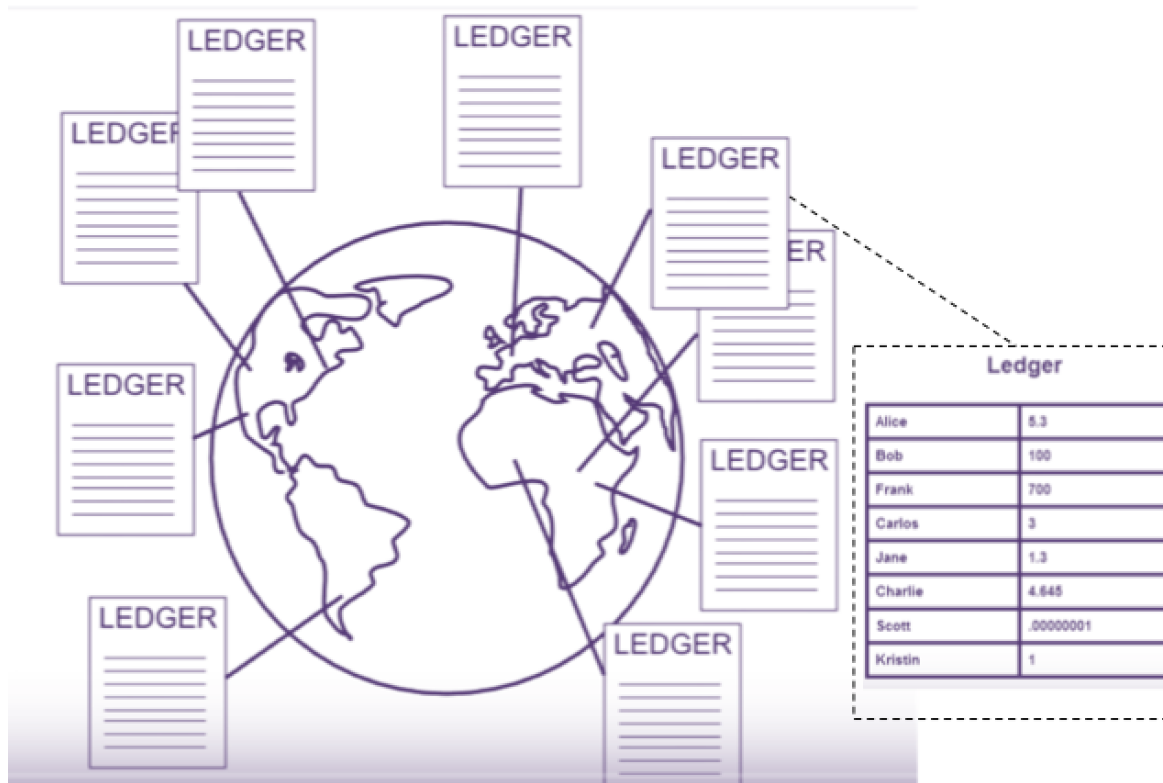


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- 2) Mining 2.0
- 3) **Blockchains: mehr als Cryptowährungen**

WIE WERDEN TRANSAKTIONEN GESPEICHERT



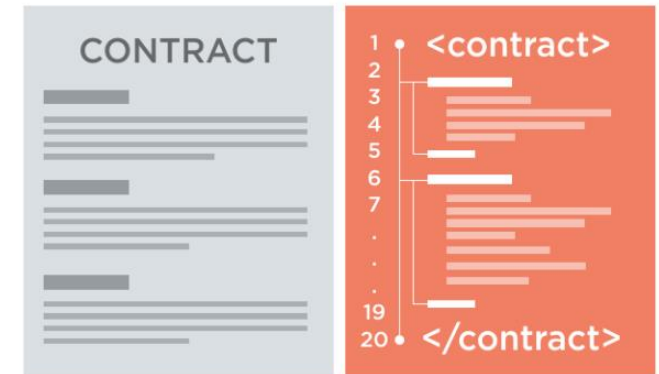
Ein Verzeichnis mit allen Transaktionen seit dem Beginn

Quelle: <https://www.linkedin.com/pulse/revolutionary-payment-p2p-decentralized-digital-cash-system-george>

SMART CONTRACTS

In the context of blockchains and cryptocurrencies, smart contracts are:

- **pre-written logic** (computer code),
- **stored and replicated on a distributed storage platform** (eg a blockchain),
- **executed/run by a network of computers** (usually the same ones running the blockchain),
- **and can result in ledger updates** (cryptocurrency payments, etc).



Quelle: <https://bitsonblocks.net/2016/02/01/a-gentle-introduction-to-smart-contracts/>

ARTEN VON TOKEN

Payment tokens

- Payment tokens (synonymous with cryptocurrencies) are tokens which are intended to be used, now or in the future, as a means of payment for acquiring goods or services

Utility tokens

- Utility tokens are tokens which are intended to provide access digitally to an application or service by means of a blockchain-based infrastructure.

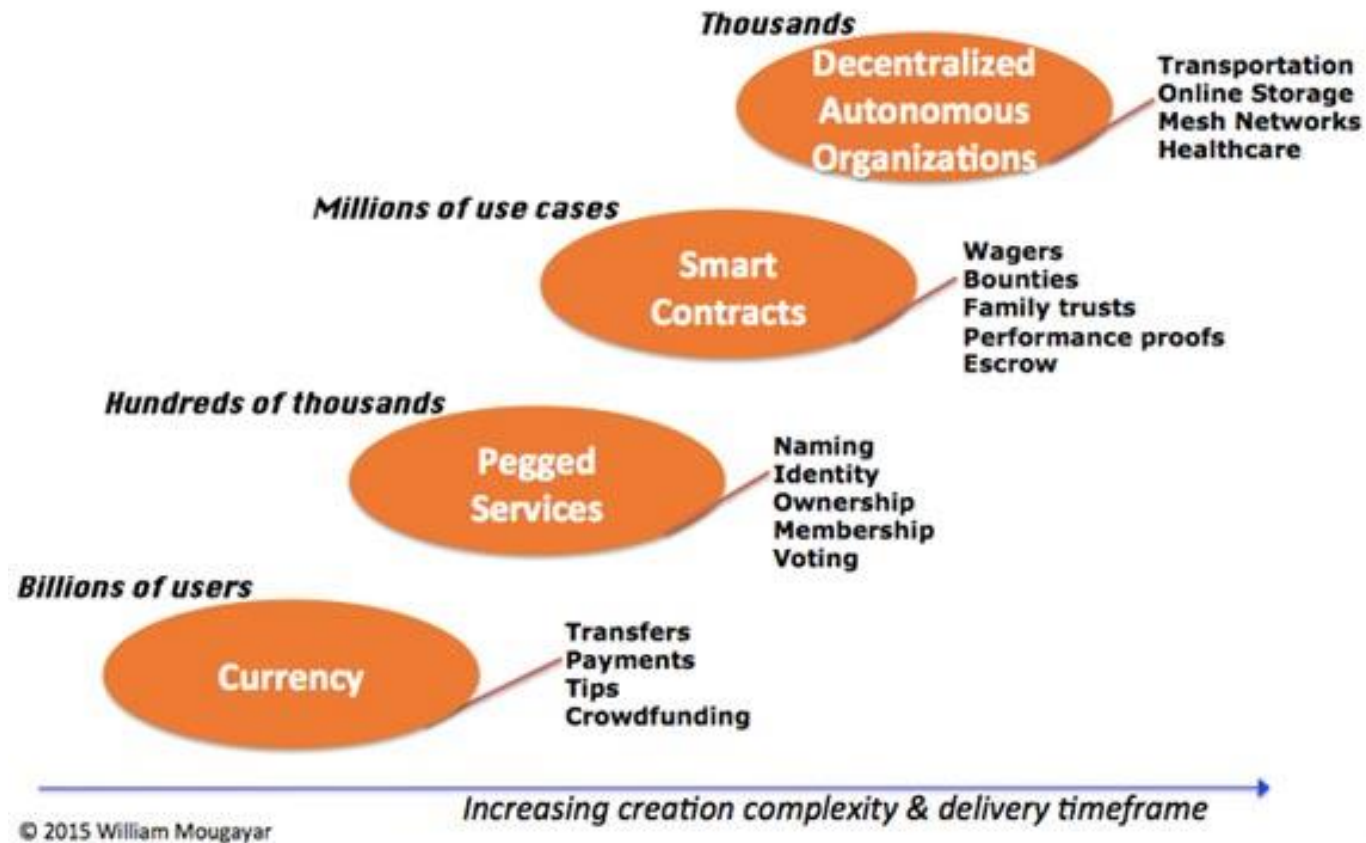
Asset tokens

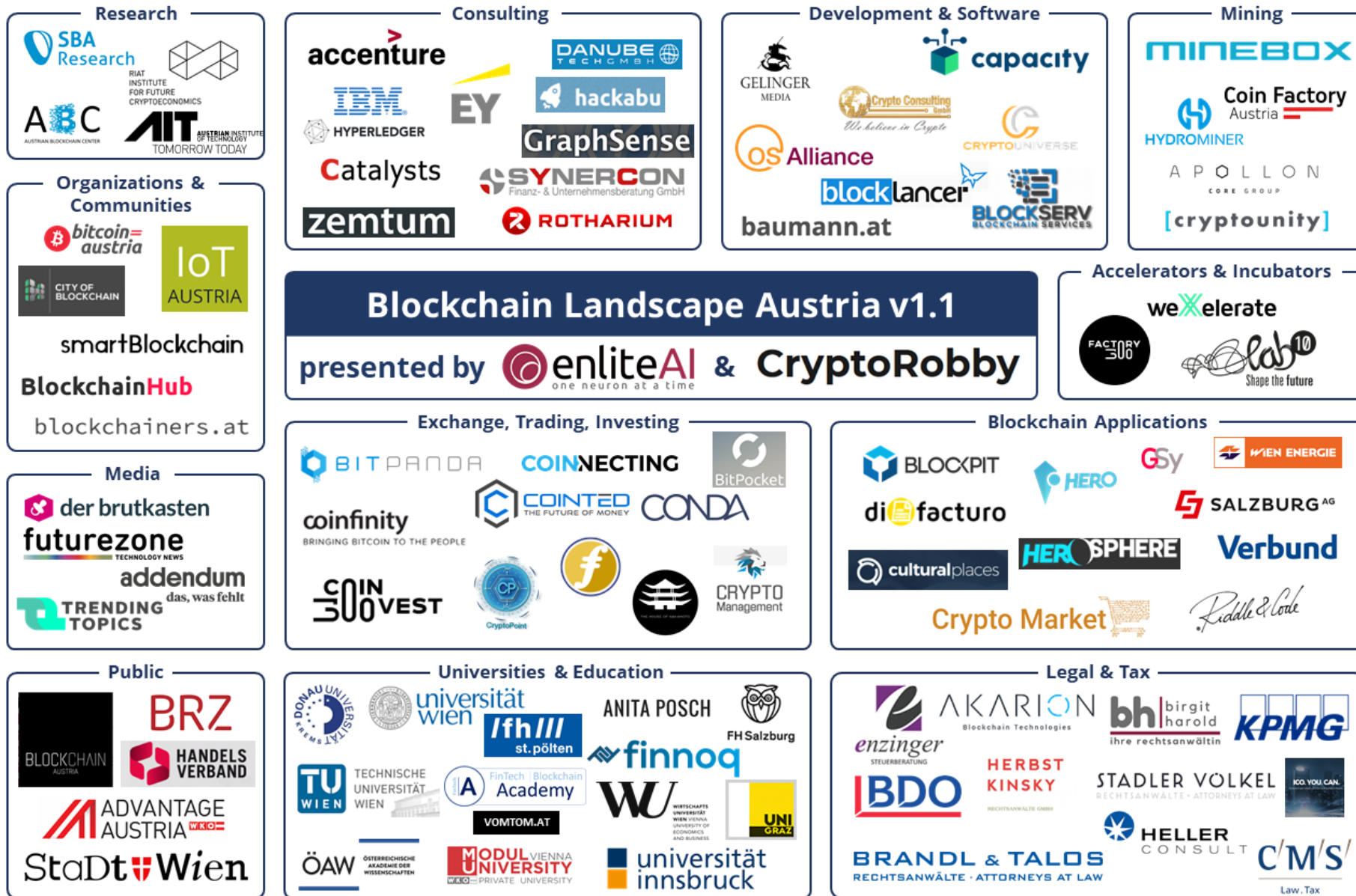
- Asset tokens represent assets such as a debt or equity claim on the issuer.

Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs) FINMA Published 16 February 2018

WO GEHT DIE REISE HIN

Blockchain Apps: End-User View





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www.enlite.ai contact: blockchain@enlite.ai

Neue Kryptoprojekte bald so effizient wie Visa

Dauer von 100.000 Transaktionen bei maximaler Kapazität



Glühlampenbetriebsdauer äquivalent zum Stromverbrauch für eine Transaktion*



CC BY ND
@Statista_com

Stand: 08.02.2018
* Schätzung basierend auf Energieverbrauch einer 60 Watt Glühlampe
Quelle: LSP Digital-Recherche

statista

BLOCKCHAIN TECHNOLOGY

Figure 1: Capital markets today



Figure 2: Capital markets in 2025



The CRWD Network

“

A decentralized, regulatory-compliant crowdfunding infrastructure protocol for issuing and trading tokenized equity offerings of SMEs, start-ups and small and medium-sized real estate projects.

Implementing a blockchain based infrastructure is the logical step to bringing crowdfunding to the next level by utilizing the most efficient technology, created by our experienced team and partners. This technology allows anyone to securely and transparently invest and sell investments in companies all around the world, in accordance with regulatory requirements.

Happy investing!
www.conda.at

LETS STAY IN TOUCH!



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