

# CryptoSuper-30

## Top Cryptocurrency Supercomputers

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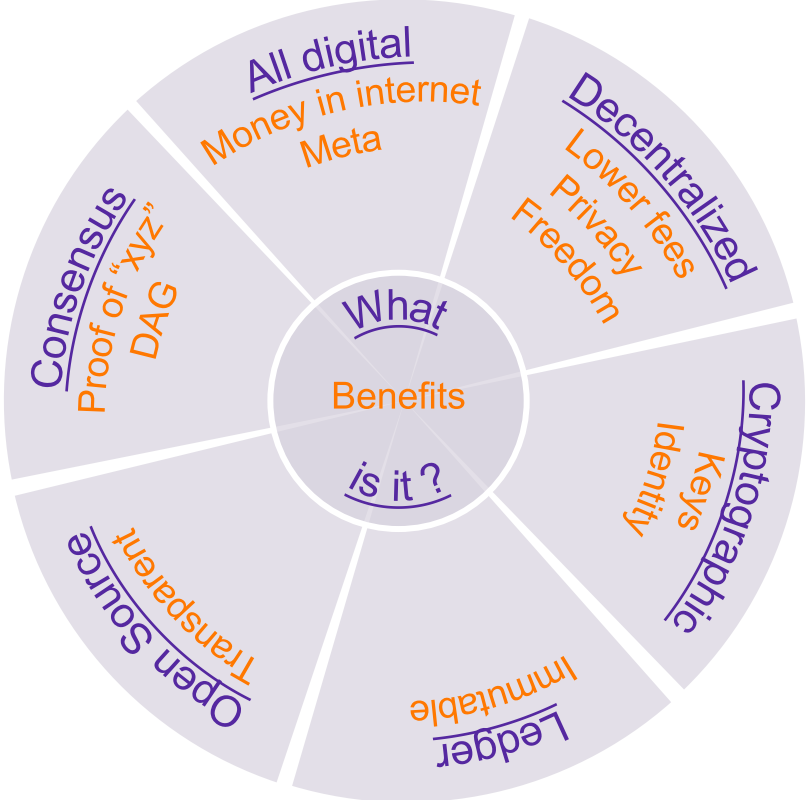
# What is it?

Digital Money

Store of value  
Safe?

Unit of account  
Supply?

Medium of exchange  
Stable?



## OrionX position

- ✦ Cryptocurrencies (at least Bitcoin) represent Money 3.0
  - 0.x – shells, beads
  - 1.0 – gold and silver coins
  - 2.0 – national fiat currencies
  - 3.0 – Decentralized digital Money stored in the Internet
  - Others might say they are simply digital assets
- ✦ Many or most of the current 2000+ coins will prove to be worthless in the long run
- ✦ There may be many created to represent shares of real estate, companies, other paper assets (security tokens)
- ✦ Surprise: your Bitcoin is not in your hardware wallet or paper wallet. That just holds the keys.

Money 3.0

# Blockchain or Bitcoin?

- ✦ It's not either/or, it's both
- ✦ They are each layers in a stack
- ✦ Blockchain is the triple entry ledger of chained transaction blocks: sender wallet, blockchain, receiver wallet
- ✦ A consensus algorithm (e.g. Nakamoto) that enforces security and prevents double spending is required: Mining
- ✦ An incentive is required to cause the algorithm to be computed and transactions added to the chain: Cryptocurrency/Coin
- ✦ Smart contracts and second layer chains extend the functionality

Purpose	Layer
Extensibility	Smart Contracts, Second Layer channels
Economic Incentive for recording Transactions	Crypto Coin
Security & Anti-Counterfeiting	Consensus Algorithm (Proof of Work)
Immutable Record of Transactions	Blockchain

## Supercomputing for decentralized Money

- ✦ How big is the Crypto Mining Market?
- ✦ Bitcoin market cap about \$111 billion (October 30, 2018)
- ✦ Bitcoin daily production = \$11.4 million
  - money supply inflation ~ 4% will cut in half in 2020
  - 24 hours x 6 blocks per hour x 12.5 coins x \$6330 (as of 10/30/18)
- ✦ Annual production run rate, Bitcoin, \$4.16 billion
- ✦ Although Bitcoin is just over half of the market cap of some 2,090 coins, it dominates the Mined (Proof of Work) coin category
- ✦ Ethereum #2 daily production 17,280 coins x \$198 = \$3.42 million (10/30/18) or \$1.25 billion per annum

## Cryptocurrency Mining

- ✦ Take the top dozen coins by market cap (supply x price), throw out the non-mined coins
  - We are left with six: Bitcoin, Ethereum, Bitcoin Cash, Litecoin, Monero, Dash
  - Non-mined coins usually use Proof of Stake, Premining (“air drop”), or some Byzantine Fault Tolerance algorithm. They either have to start with mining or air drop (worse than fiat!)
- ✦ Then look at the statistics for the top mining pools for each coin
- ✦ The mining protocols and hash rates vary in very large degree between coins
  - e.g. top pool for Bitcoin is in the Exahash/s and the top pool for Monero is in the Megahash/s (almost 12 orders of magnitude lower)
- ✦ Many coins (Bitcoin, Ethereum) require ASICs to be profitably mined, others (including Monero) can run on GPUs
- ✦ We compare mining pools by using the economic value of coins produced per day = number of blocks mined x number of coins per block x price per coin

## CryptoSuper Methodology



## Summary Tables

Top Coins  
Top Host Countries  
Top Pool Operators

# Top Coins

- ✦ Daily value of mined coins is based on a 7 day average of winning block production
- ✦ Except for Bitcoin and Bitcoin Cash we had 30 day averages available
- ✦ Annualized column is the annual run rate extrapolated from recent daily average
- ✦ Dash had no pools in top 30
- ✦ Over \$5 billion of economic value is created per year (some \$15 million per day)
  - 99% of the Bitcoin production is in the top 17 pools; 80% of Ethereum is produced in the top 5 pools

Coin	Number of Top Pools	Daily Value M\$	Annualized M\$
Bitcoin	17	11.31	4,129
Ethereum	5	2.77	1,010
Litecoin	5	0.64	234
Bitcoin Cash	2	0.38	140
Monero	1	0.10	37
Totals	30	15.21	5,551



# Top Host Countries

- ✦ We ranked the pools for each of the 5 top coins per coin
- ✦ Pools are multinational since anyone can contribute compute power to any pool
- ✦ We list by host country, the country that hosts the pool
- ✦ We then interleaved the list to get the top pools by \$ value of production
- ✦ China has almost half, and the USA has almost one third of the top pools

Host Country	Number of Top Pools	Daily Value M\$	Annualized M\$
China	14	7.18	2,621
USA	9	4.53	1,653
Hong Kong	2	1.75	638
Georgia Republic	1	0.20	71
Antigua	1	0.19	69
Other	3	1.36	497
Totals	30	15.21	5,550

# Top Pool Operators

- ✦ Often the same pool is mining multiple coins
- ✦ We aggregate the coins under a particular operator
- ✦ We also list the host country
- ✦ These are the Top 6, responsible for ~ 60% of the Top 30 economic value creation
- ✦ China has 3, USA 2, Hong Kong 1

Pool Operator	Host Country	Number of Top Pools	Daily Value M\$	Annualized M\$
BTC.com	China	1	1.901	694
Antpool	Hong Kong	2	1.747	638
F2Pool	China	3	1.585	579
ViaBTC	USA	2	1.329	485
BTC.Top	China	2	1.222	446
Slushpool	USA	1	1.215	444
	Totals	11	9.000	3,285



## Top 30 Crypto Super List

## Top 10 List of Cryptocurrency Supercomputers

Pool, coin,  
value, host  
country

Rank	Pool	Host Country	Coin	Daily M\$	Annual M\$
1	BTC.com	China	Bitcoin	1.901	694
2	Antpool	Hong Kong	Bitcoin	1.611	582
3	SlushPool	USA	Bitcoin	1.215	444
4	ViaBTC	USA	Bitcoin	1.215	444
5	BTC.Top	China	Bitcoin	1.096	400
6	unknown	n/a	Bitcoin	1.033	377
7	F2Pool	China	Bitcoin	1.008	368
8	Ethermine	USA	Ethereum	0.906	331
9	Poolin	China	Bitcoin	0.792	289
10	SparkPool	China	Ethereum	0.763	278

Rank	Pool	Host Country	Coin	Daily M\$	Annual M\$
11	F2Pool	China	Ethereum	0.446	163
12	Nanopool	USA	Ethereum	0.351	128
13	Miningpoolhub	USA	Ethereum	0.303	111
14	BitClub	USA	Bitcoin	0.239	87
15	unknown	n/a	Bitcoin Cash	0.233	85
16	DPool	China	Bitcoin	0.233	85
17	Huobi.pool	China	Bitcoin	0.219	80
18	BitFury	Georgia	Bitcoin	0.195	71
19	Coingeek	Antigua	Bitcoin Cash	0.188	69
20	Bixin	China	Bitcoin	0.152	55

## Top 11-20 List

Rank	Pool	Host Country	Coin	Daily M\$	Annual M\$
21	Antpool	Hong Kong	Litecoin	0.135	49
22	F2Pool	China	Litecoin	0.131	48
23	BTC.Top	China	Litecoin	0.126	46
24	wayi.cn	China	Bitcoin	0.114	42
25	ViaBTC	USA	Litecoin	0.114	42
26	BWPool	China	Bitcoin	0.103	38
27	nanopool	USA	Monero	0.101	37
28	58Coin	China	Bitcoin	0.098	36
29	litecoinpool	Canada	Litecoin	0.097	35
30	bitcoin.com	USA	Bitcoin	0.087	32

## Top 21-30 List



Thank you!

[orionx.net/blog](http://orionx.net/blog)

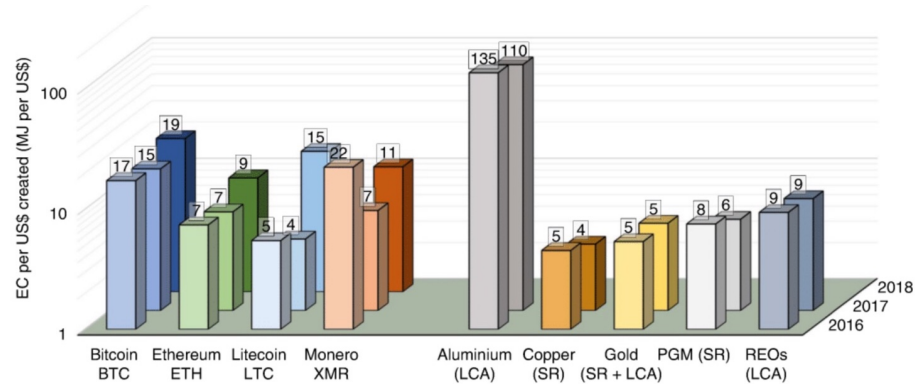
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# Energy Costs: Direct costs only, Energy per \$ value mined

Krause, M.J. and Tolaymat, T. 2018 "Quantification of energy and carbon costs for mining cryptocurrencies" Nature Sustainability

Key:  
 4 cryptos on left  
 Aluminum, Copper, Gold on right,  
 also  
 PGM - platinum group  
 REO - rare earths



**Fig. 2 | Mining cryptocurrencies generally requires more energy to generate an equivalent value in US\$ than copper, gold, PGMs and REOs.** Aluminium requires substantially more energy per US\$ generated than all other assets. The cryptocurrency annual energy costs (MJ per US\$) are averages of daily values. The mineral ECs are based on peer-reviewed literature and USGS commodity reports. The increase in cryptomining ECs from 2017 to 2018 is linked to the rapid decline in market prices in early 2018. As the EC is normalized to the value of US\$, decreases in market price of cryptocurrencies will increase the EC value. SR, sustainability reports.

*However, annual Gold mined is \$122 billion, much greater than \$4 billion of Bitcoin or \$1 billion of Ethereum, Aluminum 63 megatons at \$2000 = \$126 billion annual production*