

CARDANO

VIRTUAL SUMMIT 2020
SHELLEY EDITION

STAKE POOLS AND DECENTRALISATION

Lars Brünjes

DECENTRALISATION

“

*What the internet has done is it
has decentralised power.*

- By Heather Brooks

Blockchain - A Ledger in the Sky

- **Decentralised!**
 - Everybody can participate.
 - Data is distributed.
- Write-only
 - Like writing with ink that becomes indelible once dried.
 - **Consensus** on the “dried” parts.
- All the fancy crypto is there to make this possible!



Ledger
By RaphaelQS, licensed under CC0 1.0

Decentralisation is Great!

- No "**middle man**" sapping value.
- No trusted **central authority** owning your data.
- **Empowerment:** Nobody is excluded, everyone is welcome.
- **Secure, robust** and highly **fault-tolerant**.



Empowerment

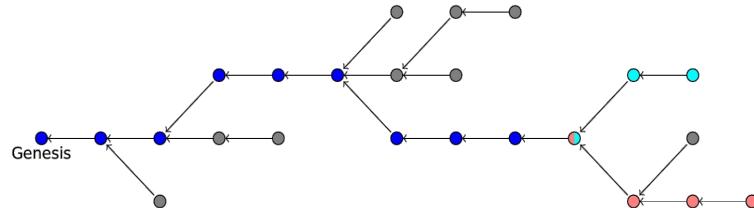
By Steve Fareham, licensed under CC BY-SA 2.0

The Price of Decentralisation



- Each node consumes **energy** and costs **money**.
- The same data is **replicated** over and over again...
- Those hard drives and processors could be put to better use: Storing and playing **cute cat videos**, for example!

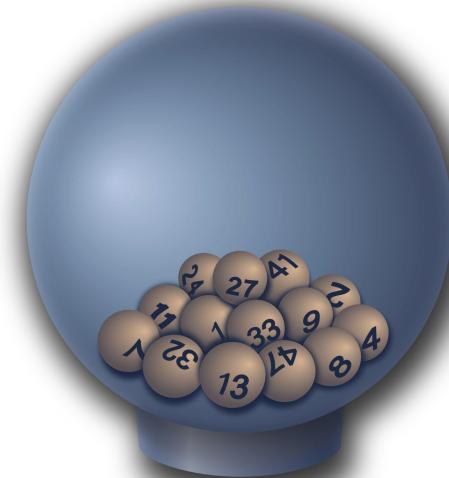
Consensus



- If everyone can write to the ledger, and entries contradict each other, who “wins”?
- How can we prevent (long) **forks**?
- This is where **consensus** comes in.
- **Consensus** determines who picks the next ledger entries.

Virtual Lotteries

- The basic idea of (most) consensus protocols is to have **virtual lotteries**.
- The winner can create the next block and receives **rewards**.
- Some “players” are more equal than others, though:
Not “one person, one vote”!
- Secure, as long as the majority is “honest”.



PROOF OF WORK - BITCOIN



“

I like work: it fascinates me. I can sit and look at it for hours.

- By Jerome K. Jerome

PoW - One CPU, One ~~Vote~~ Ticket



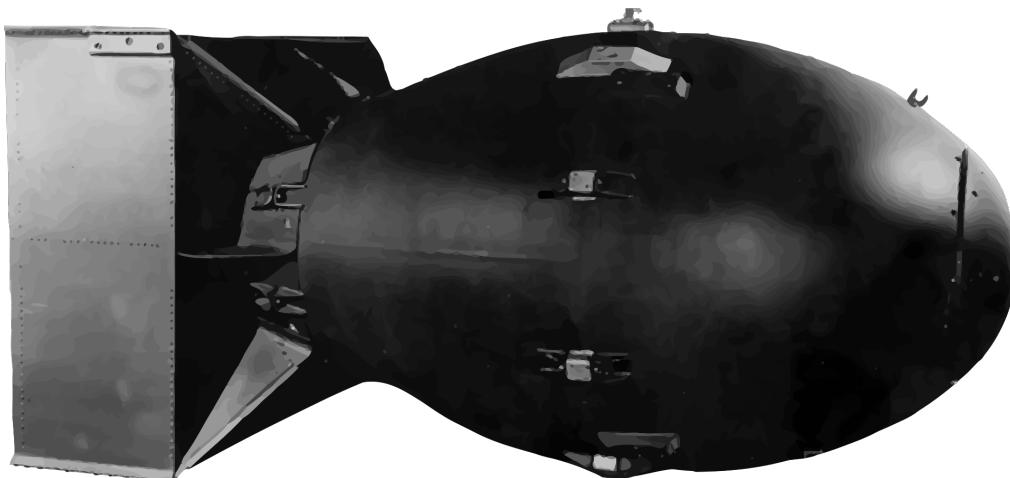
- In **Proof of Work** blockchains like Bitcoin or Ethereum, your **hashing power** determines your chances of winning the lottery.
- People compete on solving crypto puzzles.
- The person with the first solution wins.

Bitcoin is Belgium

- The **energy consumption** of Bitcoin is roughly that of Switzerland or Belgium.
- Ca. 0.2% of the world electricity.
- Several nuclear power plants' energy output.



The Bitcoin Hardware Arms Race



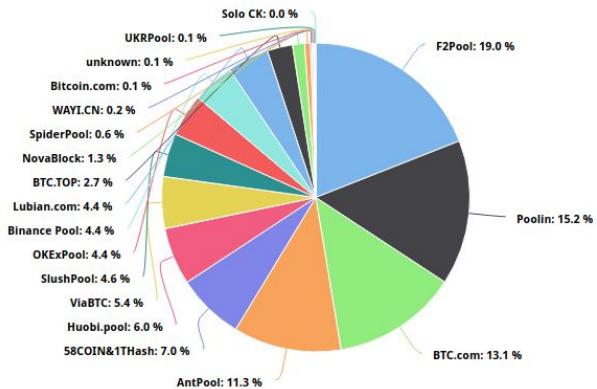
- 2009 CPU
- 2010 GPU
- 2011 FPGA
- 2013 ASIC

Geographic Exclusion

- High energy consumption for hashing and cooling.
- Drives miners to areas with cheap energy and/or cool climate.
- Many people, especially from the developing world, are excluded.



Decentralisation à la Bitcoin



- And it does not even work that well!
 - The five largest mining pools dominate the chain.

Bitcoin pool distribution

BTC.com (22/06/2020)

PROOF OF STAKE - CARDANO

“

*If you greatly desire something,
have the guts to stake
everything on obtaining it.*

- By Brendan Behan

PoS - One Lovelace, One ~~Vote~~ Ticket



- In the **Proof of Stake** blockchain Cardano, your **stake** determines your chances of winning the lottery.
- People with higher stake have proportionally higher chances of winning.

Follow the ~~Satoshi~~ Lovelace

- You can think of the PoS lottery as the drawing of a random coin.
- The owner of that coin wins.
- The more coins you have, the higher your chances.



Cardano runs on a Raspberry Pi

- No crypto puzzles have to be solved, hardware requirements are very modest.
- There is no “arms race”.
- Low energy consumption.
- Low cost.



Geographic Inclusion



- No need for nodes to be located in specific areas.
- People from all over the world can participate on equal footing.

Delegation

- What if you do not want to run your own node?
- You may lack the technical interest or the time.
- This is where **delegation** and **stake pools** come in.

“

The art of delegation is one of the key skills any entrepreneur must master.

- By Richard Branson

Staking - The Dual Role of Ada

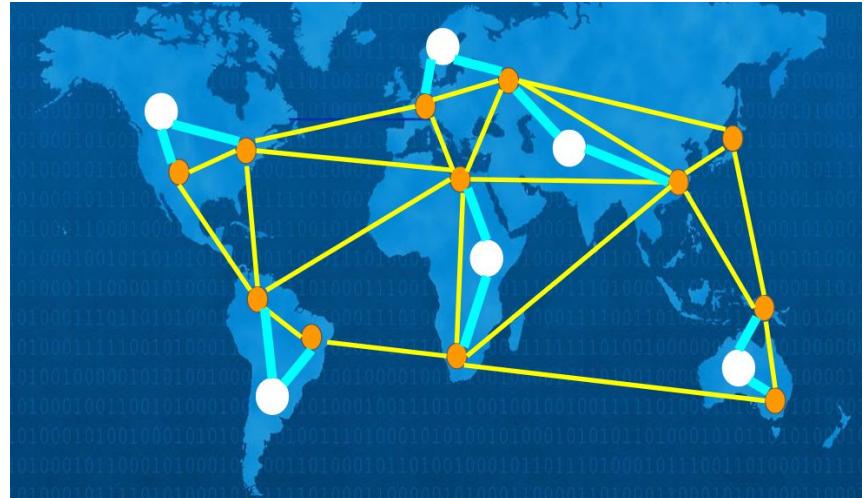


- Payment
 - Store of value
 - Pay for goods and services

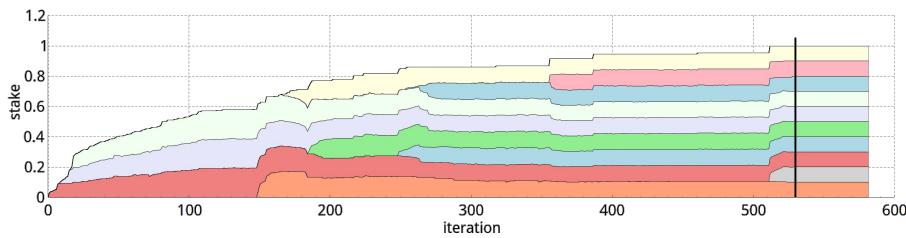
- Staking
 - Participation in the “virtual lottery”
 - Can be **delegated** to a **stake pool**.

Stake Pools

- You can delegate your “lottery ticket” to a stake pool.
- You always retain the right to use your ada for payment.
- The stake pool creates blocks on your behalf and gives you your rewards.
- It takes care of setting up the infrastructure.



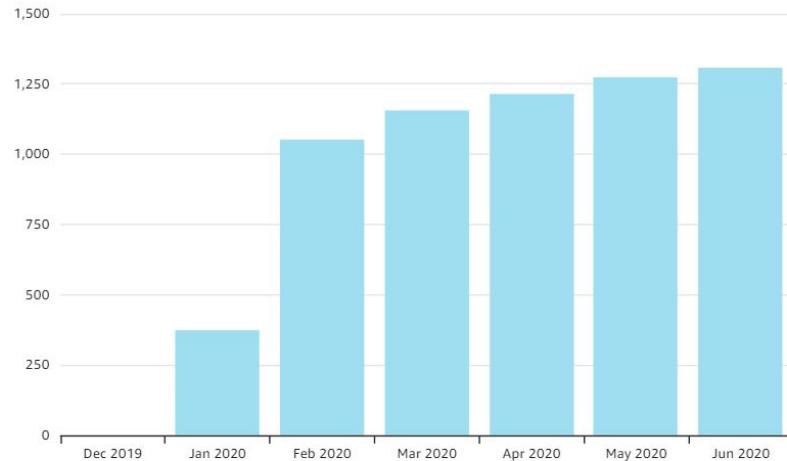
True Decentralisation



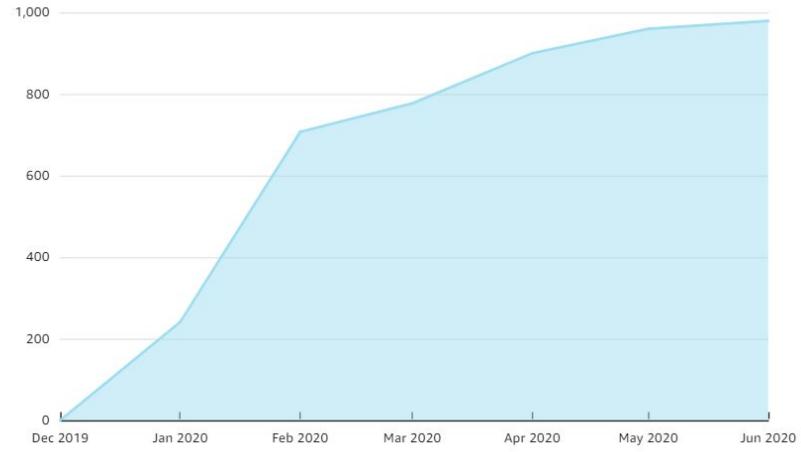
- The Cardano Incentives mechanism prevents pools from growing too large.
- Cardano will start targeting 150 pools, but the sky's the limit.

Results from the ITN

Number of Stake Pools on the Chain



Number of Active Stake Pools



SUMMARY

“

I am unable to think of any critical, complex human activity that could be safely reduced to a simple summary equation.

- By Jerome Powell

Classic Proof of Work



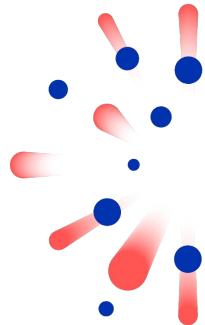
- **High energy consumption.**
- **Leads to an “arms race”.**
- **Geographically exclusive.**
- **Tending to centralisation.**

Cardano Proof of Stake

- **Low energy consumption.**
- **No “arms race”.**
- **Geographically inclusive.**
- **Robust decentralisation.**



Gray Metal Stake
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THANK YOU FOR YOUR ATTENTION!



Lars Brünjes