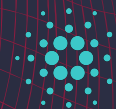




Introduction to Cardano stake pools

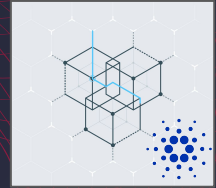


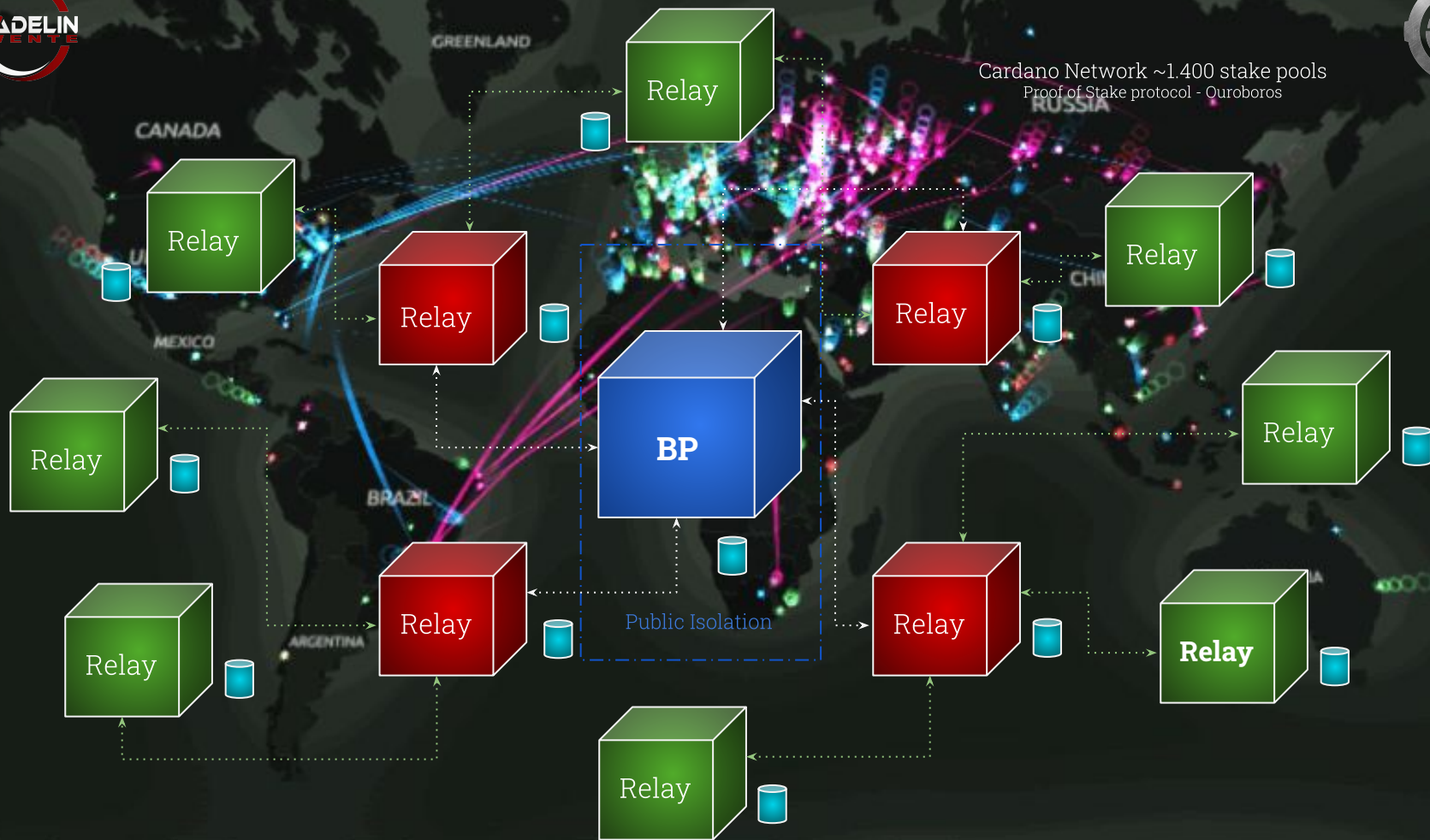
December 2020

<https://cardano.org>

— Cardano Mainnet

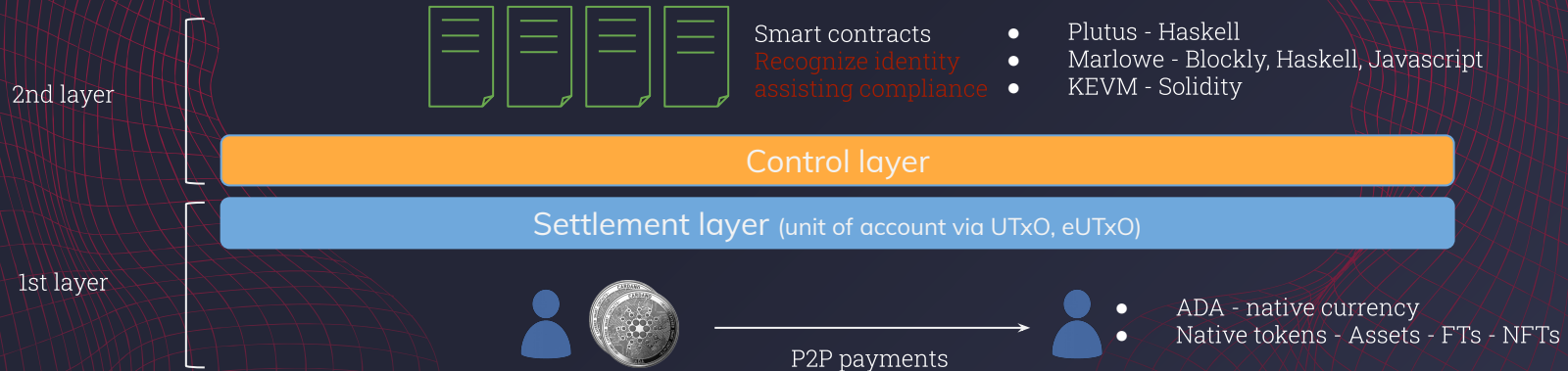
- Production version of the Cardano blockchain
 - Also known as Haskell Mainnet (HMN)
 - First genesis block was written on the ledger on August 13, 2020
- Decentralization, currently at 68%
 - Relying for 68% on community nodes to produce blocks, increasing with 2% per epoch
 - Everyone can be part of the network and validate blocks with transactions
 - Block validator/producer - also known as stake pool
 - Relay nodes - secure the block validator/producer from being exposed to the public network





2nd layer solution - 3rd generation blockchain

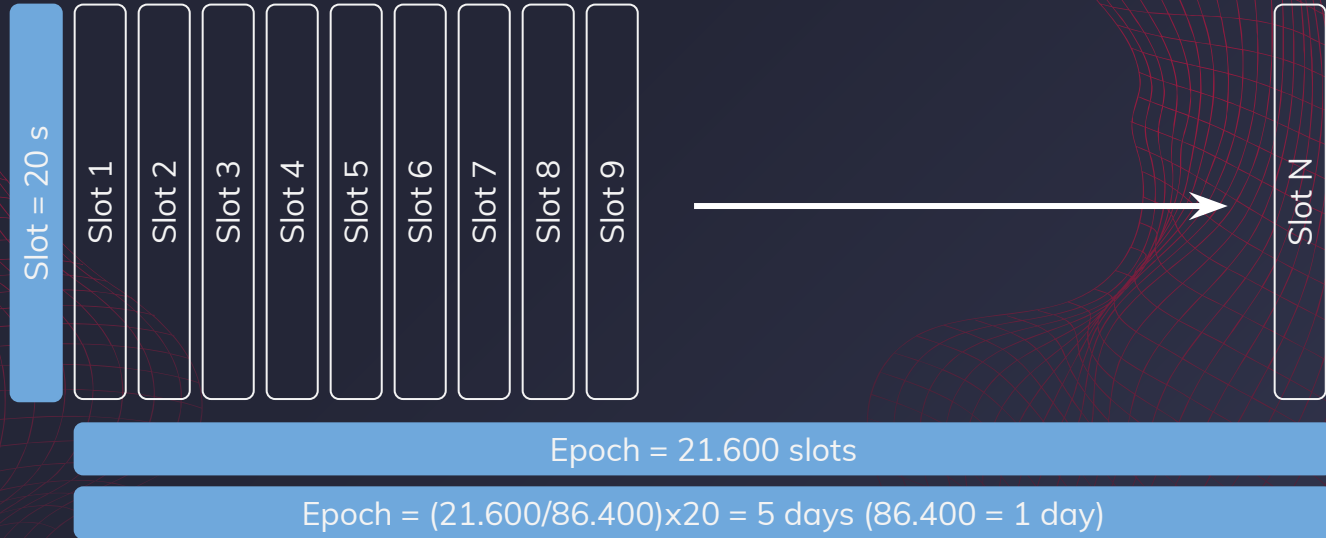
Separation of concerns



Time division in the Cardano blockchain

Time in the “settlement layer” is divided in epochs

Blocks are assigned on basis of slots via secure multiparty implementation of a coin flipping protocol





— Stake pool node and its role

- A stake pool settles the transactions made on the network. As such it is known as “settlement layer” node or block producer.
 - Keeps a copy of an immutable database “ledger” that keeps track of digital currency by maintaining address balances.
 - Transactions are stored in blocks and digitally signed and send to nodes that are competing for the validation/creation of blocks that contain multiple transactions.
 - A block contains zero or multiple transactions validated and digitally signed transactions.
- A stake pool validates and produces blocks.
- A stake pool is contributing to the decentralization and security of the blockchain.
 - decentralization by storing and maintaining an actual copy of the immutable ledger
 - security by validating the integrity of blocks and its transactions
- Since the stake pool plays a very important role in securing the network and providing decentralization it is expected to be up and running 24/7/365

— Stake pool node and its role

- Depending on the weight of the stake pool (amount of ADA delegated to it) it has higher chances to be elected as slot leader.
- Stake(ownership) in the Cardano network is expressed in the digital currency ADA lovelace
- A stake pool represents stake on behalf of delegators and is a stakeholder in the network
 - stake pool owner(s) - stake pool operator is the one that operates the stake pool infrastructure
 - delegators (participants in the network) - delegate their stake in the network to a stake pool
- The stakeholder who will form the next block is randomly elected, proportionally to the size of its stake in the network according the blockchain.
- The slot leader in the Cardano PoS protocol is elected by way of a secure multiparty implementation of a coin flipping protocol.
 - Proof - having evidence that blocks of transactions are legitimate
 - Stake - the relative value held by address on the stake pool node

— Stake pool node and its role

- Multiple stake pools (block producer nodes) in the network are competing with each other to become slot leader.
- During a time slot a block is assigned to a slot leader, a block validator/producer or stake pool.
- For the creation (adding a validated block to the chain), validation (solve the cryptographic puzzle) and digital signature of a block the stake pool receives a reward.
- Consensus is required in order for a block to be added to the chain.



— Relay node and its role

- Secure the Block validator/producer from being exposed to the public.
- Communicates with other public nodes.
- Maintain a local copy of the public ledger (chain).
- Forwards the chain to the Block validator/producer that keeps its own copy of the public ledger.
- Multiple relays are required for resilience.
- Relays should be instantiated in different geographical locations and data centers.
- Relays can run in private mode to avoid DDOS attacks.



— Delegate your ownership in the network (stake)

- Why would you delegate your ownership (stake)?
 - Participation in the network - security and decentralization
 - Investment/speculation - value appreciation of the ADA digital currency
 - ROS - return on stake - between 5 - 6 % per annum
- Delegation process
- Delegation cycle
 - When is your stake going to be active at work for you?
 - When can you expect rewards on your stake?
 - Is the stake pool owner responsible for paying your rewards?

Total ADA staked

~1.400 Stake pools

% of total ADA staked

Stake pool



% of total ADA staked

Stake pool



% of total ADA staked

Stake pool



% of total ADA staked

Stake pool



Owner(s)

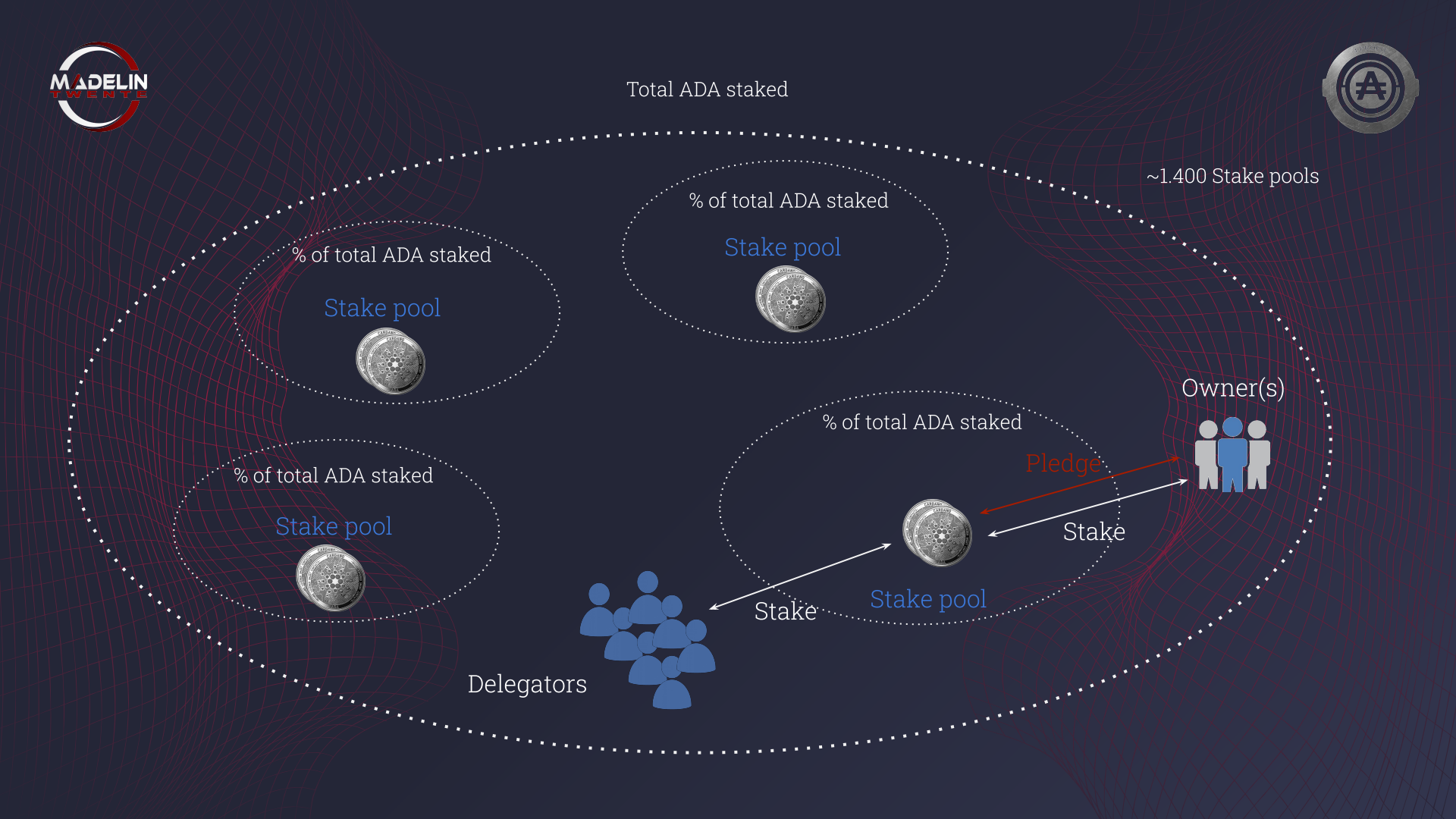


Pledge

Stake

Stake

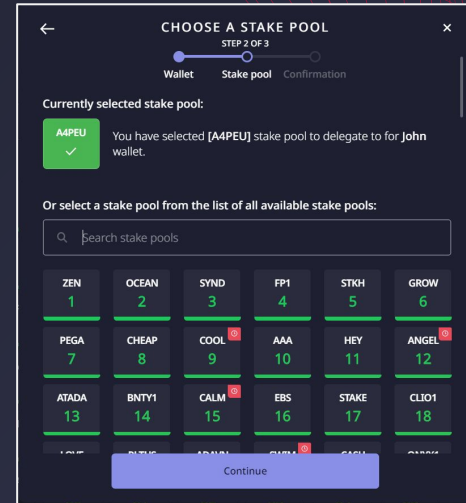
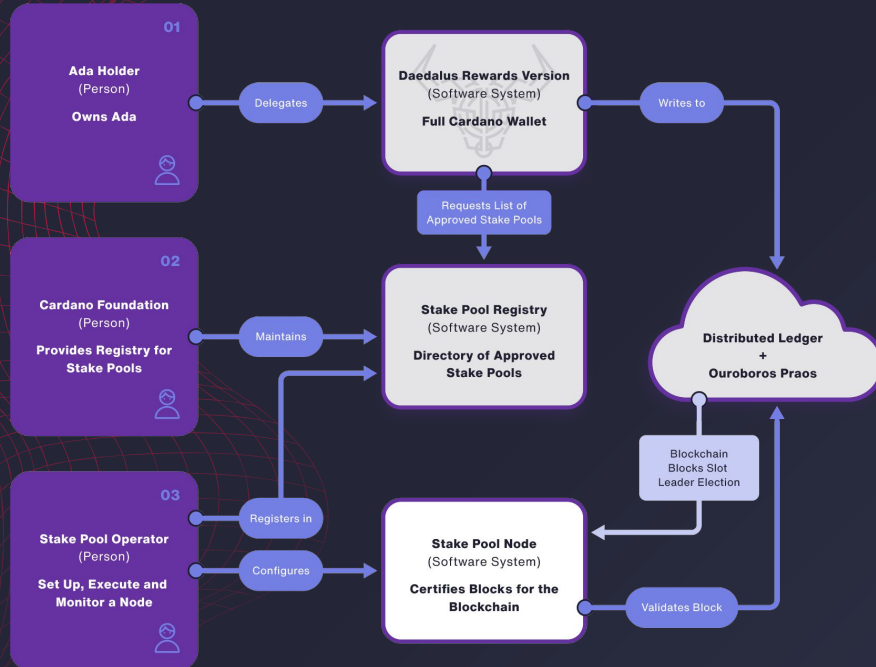
Delegators



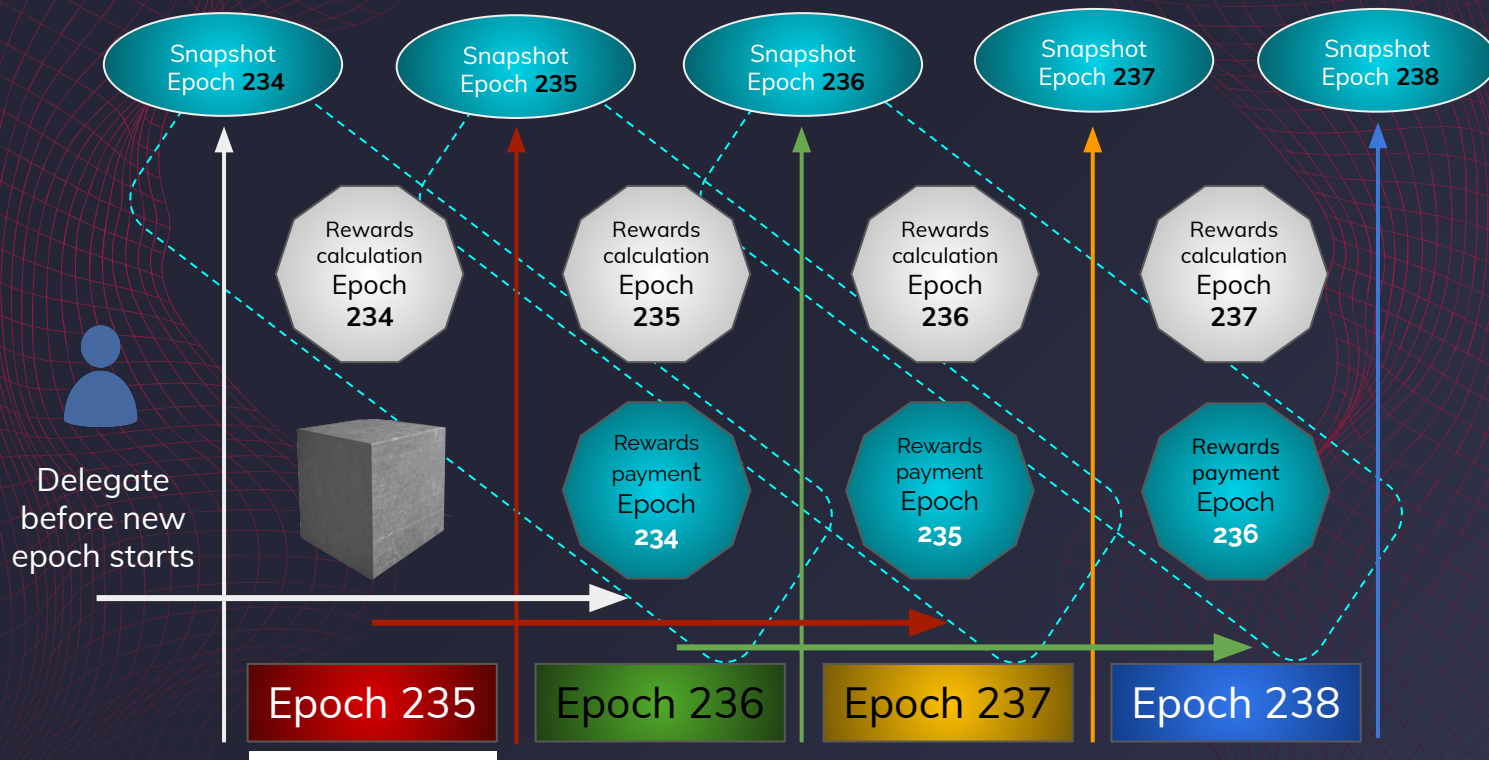
— Delegate your ownership in the network (stake)

- With what stake pool should I stake my ADA?
 - Influencing factors in making a decision for a stake pool
 - Regular creation of blocks
 - Pledge - skin in the game
 - What is the fixed fee?
 - Is the variable fee within acceptable threshold for the work done by the stake pool owner(s)
 - Single stake pool owner vs multiple stake pool owner
 - Single stake pool operator vs multiple stake pool operators
 - Can you reach out or contact the stake pool owner directly
 - Is the stake pool owner public visible or not?
 - Website, social media presence, contribution, marketing
 - Is the stake pool owner also the stake pool operator? (Stake Pool as a Service - SPaaS)
 - What are the plans of the stake pool owner related to contributing to the Cardano blockchain?

Delegation process



Delegation cycle




How to stake your ADA ?

- Ownership in the network via the digital currency ADA lovelace can be staked in a stake pool via wallets.
- Ownership of ADA always stays under your control.
- Stake can be released at any moment in time, your ADA is never locked in a stake pool.
- Wallets
 - Native Cardano wallet - Daedalus for Windows, Linux, iOS <https://daedaluswallet.io>
 - Partner wallet - Yoroi - Mobile or Web wallet <https://yoroi-wallet.com>
 - 3rd Party wallet - ADALite - Web wallet <https://adalite.io>
- Staking
 - Hot staking - using a software public/private key (recovery phrase) and password to protect your ownership
 - Cold staking - using hardware public/private key (recovery phrase) to protect your ownership


Block rewards and stake pool fees




 20 % of all block rewards go to the treasure

 **Fixed fee per epoch = 340 ADA** (adjustable by stake pool operator, 340 ADA minimum)



 **Variable fee per epoch = % of total rewards in ADA** (adjustable by stake pool operator)



 **Pledge** is meant to avoid sybil attacks, commitment and investment of the stake pool to protect the network (adjustable by stake pool operator)





— Delegator staking rewards

- Rewards are being shared between the stake pool operator and its delegators
 - $\text{delegator rewards} = (\text{total rewards} - \text{fixed fee} - \text{variable fee})$ is being shared between the delegators on basis of their percentage stake of the total stake in the stake pool and the stake pool rewards for an epoch
 - fixed fee - maintaining the network infrastructure
 - variable fee - operation, maintenance, updates, marketing
- Rewards are automatically being paid out by the protocol at the end of the next epoch



Monitoring stake pool performance

Examples

- Node-exporter, Prometheus, Grafana, alerting via Telegram bot
- gLiveView (default option provided by the Cardano-node)
- Or any of your preferred monitoring tools
 - Elasticsearch, Logstash, Kibana
 - Shell scripting

Community initiatives by stake pool owners

- pooltool.io (website & mobile app)
- adapools.org (website & mobile app)
- cardanoscan.io (website)



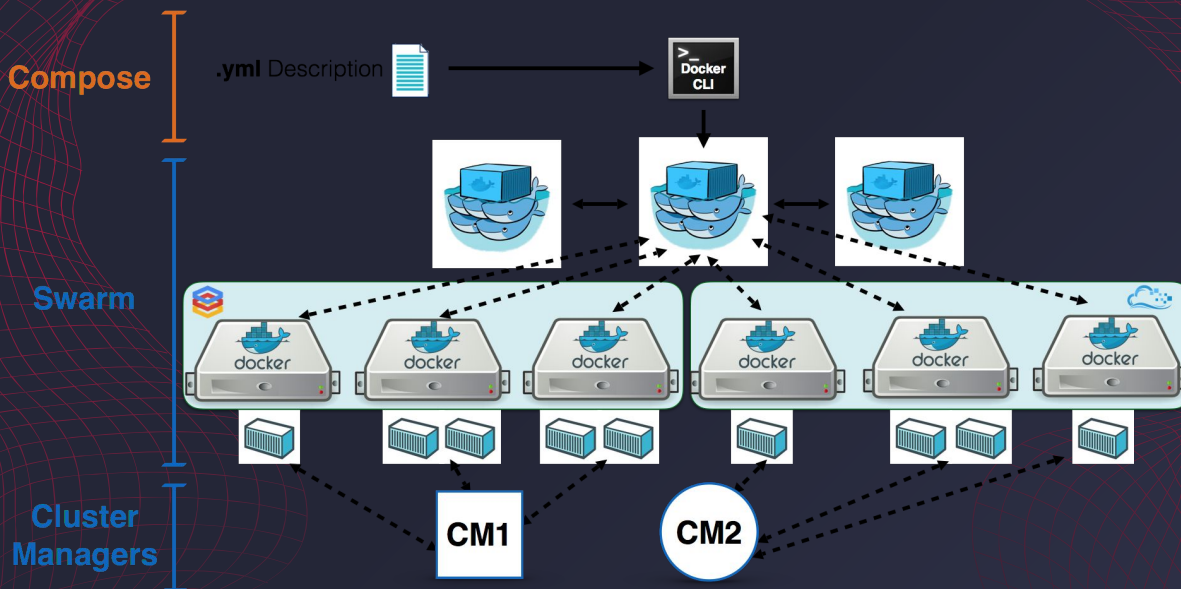
What if I want to run my own stake pool?

- Technical background
 - Linux knowledge
 - Security knowledge
- Natural interest in blockchain technology
- A server with a good internet connection (bandwidth)
 - 4 CPU cores, 4Gb memory, 50Gb SSD and ~1Gb bandwidth
 - Fixed ip address
 - Cloud provider (5-50 Euro/month per machine), Rock-Raspberry Pi, your own server
- Dedication
 - Server setup
 - Website
 - Monitoring
 - Resilience
- 510 ADA required
 - 500 ADA for registering a stakepool
 - 10 ADA for network transaction fees

What is needed to start a stakepool

- Several (D)VPS, Bare metal servers, Raspberry PI's or Rock PI's
- Haskell compiler, Cabal and Libsodium (for building the binaries cardano node & cli)
- Source code <https://github.com/input-output-hk/cardano-node/releases>
- Cardano node
 - Haskell based settlement layer node
 - mainnet-config.json
 - mainnet-byron-genesis.json
 - mainnet-shelley-genesis.json
 - mainnet-topology.json
 - signing keys: <pool>.kes-xxx.skey, <pool>.vrf.skey
 - operational certificate: <pool>.node-xxx.opcert
- Cardano CLI
 - command line tool to interact with the API of the settlement layer node

Sample architecture



Host OS: Ubuntu 20.04

Sample architecture



Firewall

Docker OS: Alpine

Stake Pool
Nodes

Relay
Nodes

Cardano Wallets

Chrony

Nginx
Reverse
Proxy

Wordpress

SSH

Fail2Ban

System
kernel
tweaks
sysctl.conf

Portainer

Grafana &
Prometheus &
Node-exporter

GlusterFS

Work in progress



— Where does ADA4Profit - JUNO differentiate?

- Our pledge is guaranteed locked for 3 years, as far as we know no other stake pool is giving you this guarantee.
- Our variable fees are automatically returned in our stake pool as delegation for the same period of 3 years, this should give us higher chances to forge blocks and generate rewards for our delegators, as far as we know no other pool is doing this.
- We have a active Telegram group with very loyal delegators, join us and talk to our delegators. Ask them why they stay loyal to us and what makes us differentiate from other stake pools.
- We have our own YouTube channel via which we are contributing to the success of Cardano
- Our roadmap, we are going to contribute to the Cardano ecosystem
 - we have a community app in development
 - we are going to building enterprise grade solutions on Cardano
 - we have our own team of experienced blockchain developers



Q&A



THANKS!

In case you have questions?

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telegram: https://t.me/ada4profit_stakepool
<https://ada4profit.com>

