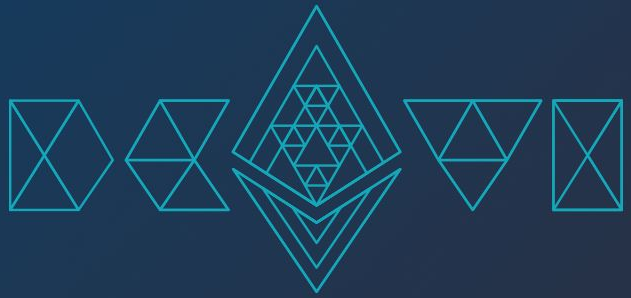


How to build a decentralized Ethereum liquid staking protocol

Darren Langley

Rocket Pool

Liquid staking

Ethereum Proof-of-Stake

When you stake, you are participating in Ethereum's proof-of-stake consensus.

- Requires technical experience
- Requires 32 ETH per validator
- Staked ETH effectively out of circulation
- Withdrawals coming soon

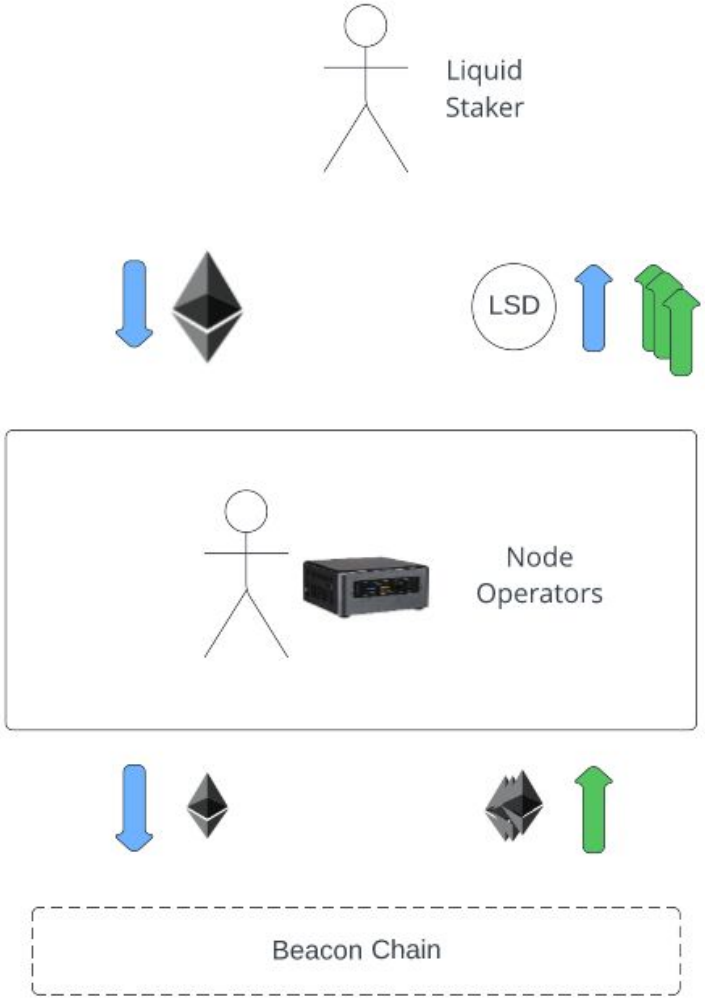
Reward breakdown.

Consensus rewards

- From ETH inflation
- Attesting, sync committees, block proposals
- Available after Shanghai hard fork

Execution rewards

- From Ethereum users
- Priority fees and potentially MEV
- Available now and in real-time



How does liquid staking work?

- Deposit ETH
- Returns staked ETH token
- ETH is matched to a node operator
- They deposit into deposit contract
- Node operators earn rewards
- Staked ETH token accrues value
- Burn staked ETH token for ETH

Why liquid staking?

Liquid staking has the following benefits:

- Increases security and decentralisation*
- Reduces validator churn
- Fosters innovation and capital efficiency

*only with permissionless validator set

Liquid Token Design

Fungibility

Node operators earn rewards at different rates and may be penalised.

- **Fungible** - shared rewards and losses
- **Non-fungible** - rewards and losses specific to each node/validator
- **Hybrid** - combination of both

Safety

How is the value of the token backed and protected?

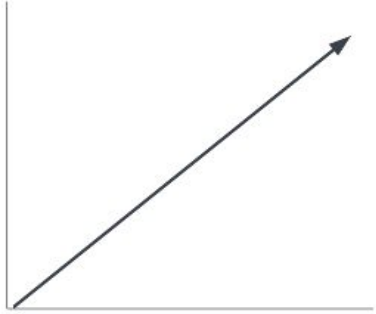
- ETH collateral
- Slashing protection
- Incentive alignment
- Risk management

Rewards

- Rebasing
  - Simple to understand
  - Hard to integrate
- Non-rebasing
  - Harder to understand
  - Easy to integrate
  - Tax efficient

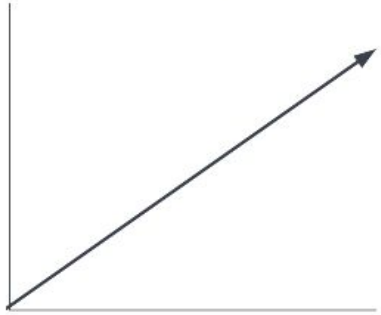
Rebasing

Exchange Rate 1:1



Quantity++

Non-rebasing



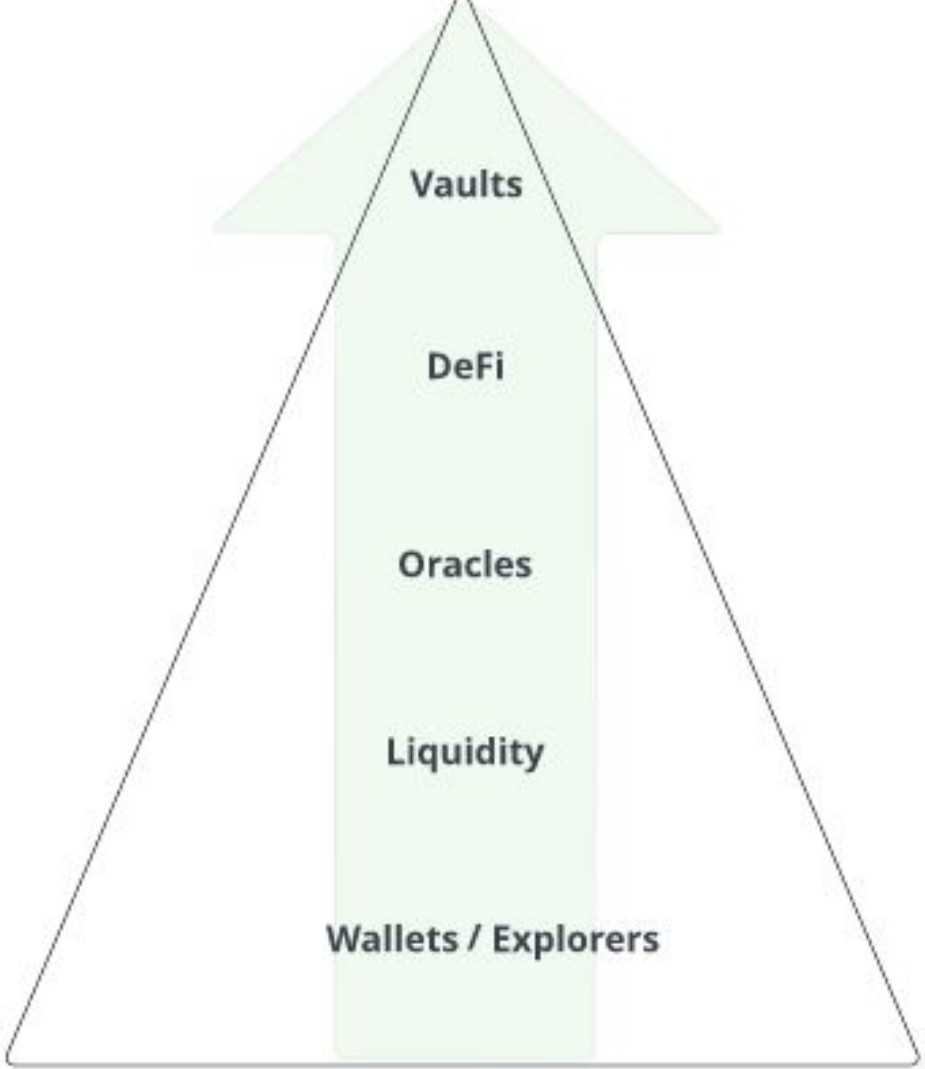
Exchange Rate ++

Quantity

Liquidity

Provide liquidity for staking and unstaking ETH.

- Tradable on secondary markets
- Secondary markets may present a liquidity discount and slippage
- Primary mechanisms allowing direct staking / unstaking allowing holders to unstake without slippage



Utility

- Liquidity platforms
- Oracles
- Lending protocols
- Yield strategies / vaults

Withdrawals

Withdrawals

Consensus rewards generated by the node operator duties can be:

- **Fully withdrawn**
  - Node operator initiated
  - Returns collateral to withdrawal credential
- **Partially withdrawn**
  - Automatic and ongoing
  - Skim rewards above 32 ETH

Withdrawal credentials

Defines a destination for withdrawn consensus rewards.

- **0x0** = BLS signature credential
- **0x01** = Ethereum address

Facilitates development of smart contract protocols for non-custodial staking.

Challenges

Permissionless

Being an open and public piece of infrastructure is key to a protocol's success and its alignment with Ethereum.

- Critical to Ethereum retaining its credible neutrality
- Leads to trustless designs
- Rely on combination of cryptography and cryptoeconomics to balance incentives, ensuring participants have aligned interests

Scaling

Being a competitive market participant is important to ensure Ethereum remains decentralised.

- Much harder than scaling a centralised provider
- Rely on ingenuity to scale
- Never lose sight of its values
- Passionate community of node operators

Reliance on oracles

Semi-trusted oracles are essential for a decentralised staking protocol today.

- Consensus and Execution layer separate concepts
- Oracles are required to aggregate and report validator performance information to smart contracts

EIP-4788 is key to supporting innovation that uses validator status and finality on the Execution layer.

Opportunities

Ethereum doesn’t need more stake, it needs more individual node operators.

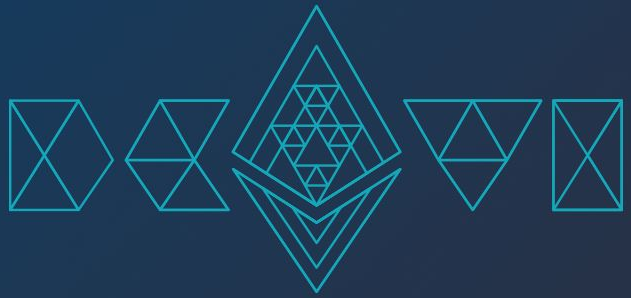
Lowering barriers

- Lowering the collateral requirement for node operators
- Streamlining setting up and running a node
- Nurture ecosystem of niche staking businesses

Execution reward smoothing

Participants of a reward smoothing pool earn a consistent return despite the variability of execution rewards.

- Execution rewards are extremely variable
- Particularly for node operators with a small number of validators
- Levels the playing field for small-scale node operators



Thank you!

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