

Validator incentives and Ethereum protocol philosophy

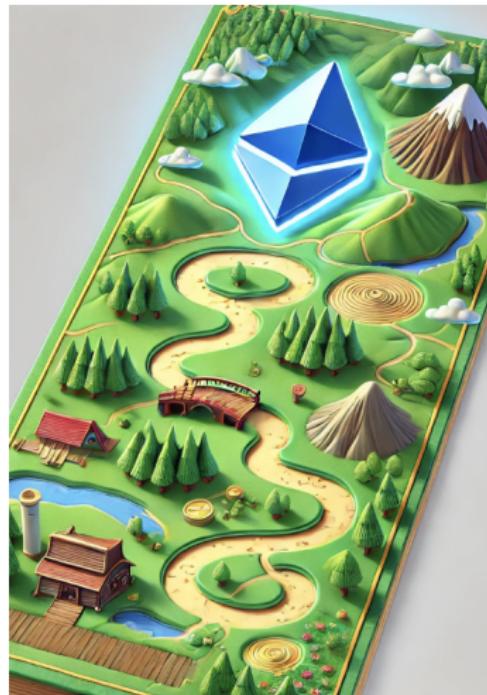


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Monday – January 20th, 2025

Oxford-Harvard Conference on Decentralised Finance and Market Microstructure

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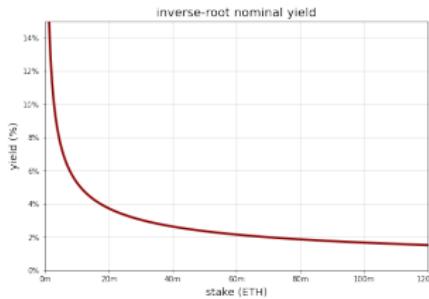


Validator rewards taxonomy

Issuance

- Issuance incentivizes validators to participate in consensus by rewarding them with new tokens (inflation).
- The amount of yield (interest) paid depends on the amount of stake,

$$\text{yield} = \frac{2.6 \cdot 64}{\sqrt{\text{staked ETH}}}.$$



- These rewards are mostly from voting for the correct block.

<https://notes.ethereum.org/@mikeneuder/subsol>.

Validator rewards taxonomy

Transaction fees

- Transaction fees are the amount users pay to interact with Ethereum.
- Fees are split into two parts (since EIP-1559).
 1. *Base fee* - dynamically updated based on current market demand.
 2. *Priority fee* – a tip to the block producer for inclusion.



- Priority fees have extreme variability block-to-block.

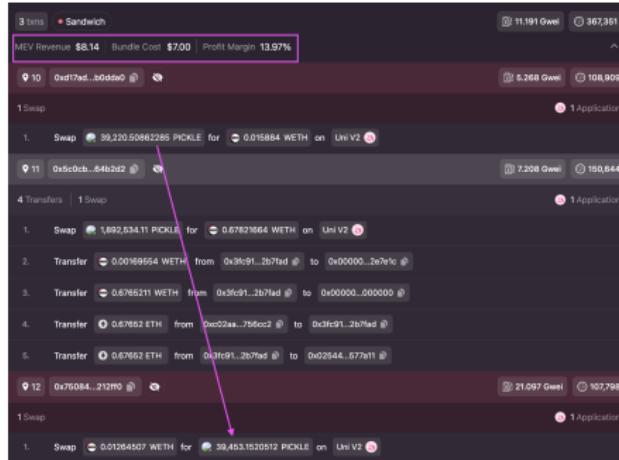
5,126,816 (17.09% -66%)	30,000,000	5.82 Gwei	0.01478 ETH
29,866,784 (99.56% +99%)	30,000,000	5.17 Gwei	0.42494 ETH

<https://www.blocknative.com/gas-estimator>.

Validator rewards taxonomy

MEV

- *Maximal Extractable Value* (abbr. MEV) is the value created from the ability to reorder, insert, and omit transactions.



- Other MEV types: atomic and non-atomic arbitrage, liquidations.
- MEV is variable in market conditions and builder sophistication.

<https://sorellalabs.xyz/dashboard>.

Validator rewards taxonomy

Summary



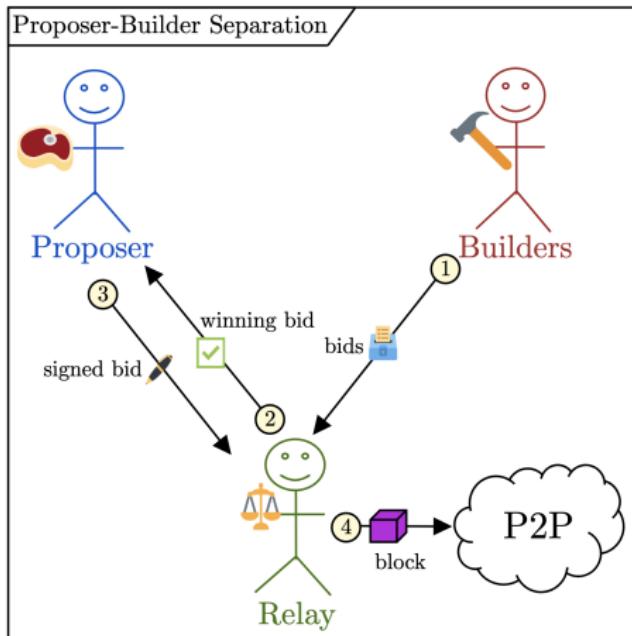
- *Issuance* is stable and not very gameable.
- *Tips* are highly variable in market conditions.
- *MEV* is variable both in market conditions and the sophistication of the block producer.

<https://ultrasound.money/>.

<https://mevboost.pics/>.

Ethereum, the protocol

Current block production pipeline

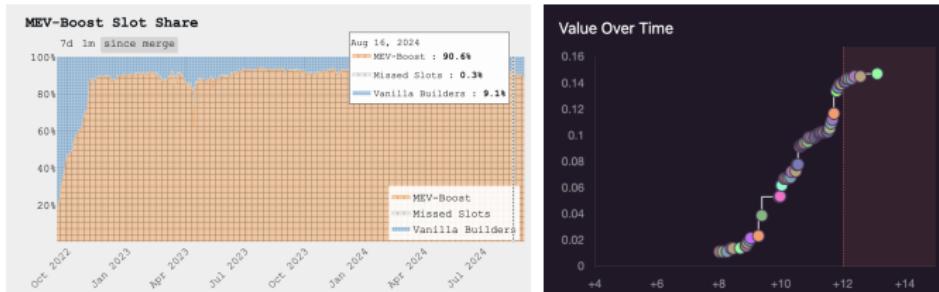


- ① **The builder bids** in the auction through the relay.

Ethereum, the protocol

Current block production pipeline

- The relay brokers the fair exchange to allow *all* validators to participate in the MEV market if they want to...
- and most want to...
- but there are still games to played...
- and the market structure gives immense power to builders.



<https://mevboost.pics/>.

<https://sorellalabs.xyz/dashboard/>.

Ethereum, the protocol

Removing arbitrary transaction exclusion



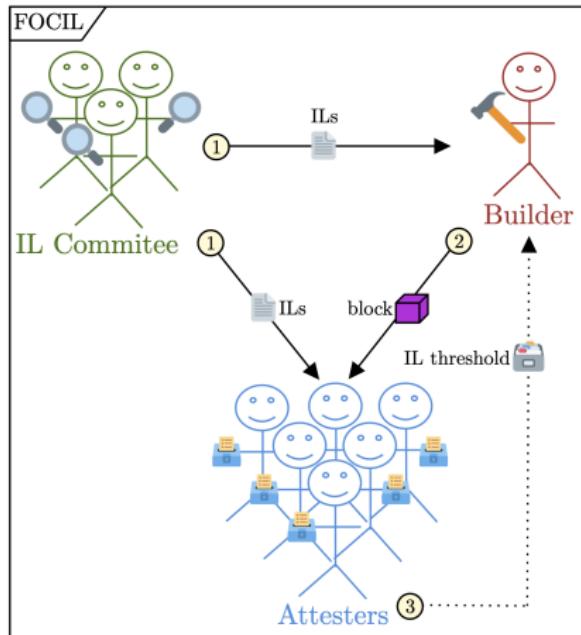
- Block builders have outsized influence in the protocol because they determine which transactions to include and in what order.
- *How can we rely on the decentralized validator set to prevent abuse of this power?*
- *Idea #1:* Can validators provide a “block template” that the builder must follow?¹
- *Idea #2:* Can multiple validators co-create this template?²

¹<https://ethresear.ch/t/no-free-lunch-a-new-inclusion-list-design/16389>

²<https://ethresear.ch/t/fork-choice-enforced-inclusion-lists-focil-a-simple-committee-based-inclusion-list-proposal/19870>

Ethereum, the protocol

Removing arbitrary transaction exclusion



- ① **The IL committee publishes** their inclusion lists to the builder and the attestors.

Ethereum, the protocol

Open questions

1. How should the protocol determine the order of transactions?
2. Should the role of block creator be separate from the role of consensus participant?
3. How do we define “block space neutrality” and how do we preserve it under the centralizing effects of MEV extraction?

ETH, the asset

Historical context

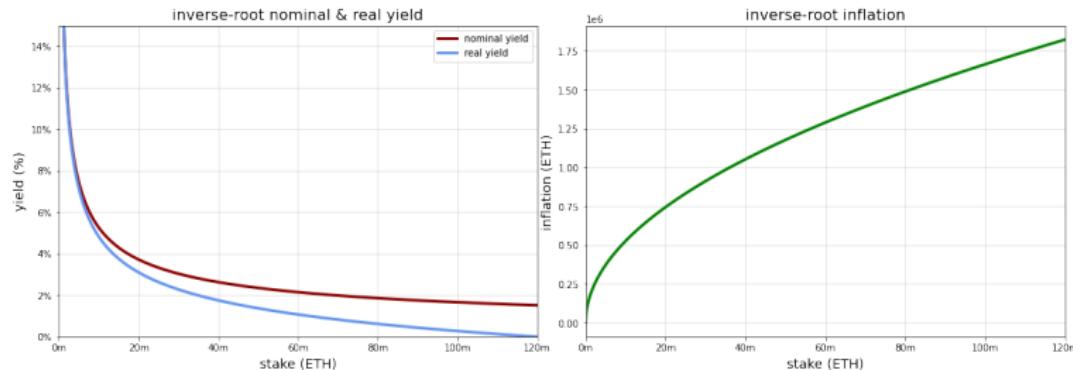


- Aug. 5, 2021 – EIP-1559 activates and starts burning the base fee.
- Sept. 15, 2022 – The Merge, no more Proof-of-Work mining.
- March 13, 2024 – EIP-4844 activates and makes data cheaper.

https://ycharts.com/indicators/ethereum_supply/chart

ETH, the asset

Yield & Inflation



- Recall: The amount of yield paid depends on the amount of stake,

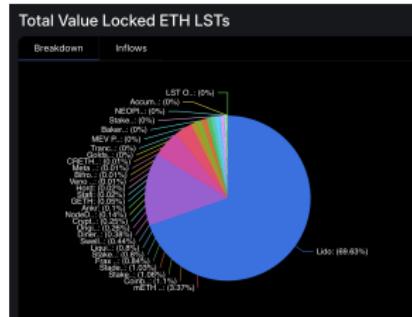
$$\text{yield} = \frac{2.6 \cdot 64}{\sqrt{\text{staked ETH}}}.$$

- Excess inflation hurts the both stakers and non-stakers:
 - Eliminates real yield from staking.
 - The native token becomes expensive to hold.

ETH, the asset

Exogenous forces

- What could increase the amount of demand for staked ETH?
 1. Interest rate adjustments.
 2. Staked ETH ETF potential.
 3. ETH price appreciating.
 4. MEV distorting validator incentives.
- Potential issues beyond inflation:



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Subscribe ...

What are we expecting today for the Ethereum ETFs?

We expect them to begin trading tomorrow. That means we should see a bunch of filings on SEC site today that say the ETFs' prospectuses have gone "effective". Likely after or around market close. Here are the race entrants:

Name	Ticker	Starting Fee	Post Waiver Fee	Waiver Length	Waiver Amount	Exchange	Custodian
Breyer's Ethereum Mini Trust	ETH	0.00%	0.15%	0 Month	\$2.5 Billion	NYSE	Cashaae
Franklin Ethereum ETF	EETH	0.00%	0.15%	Used 12/21/23	\$16.0 Billion	CBOE	Cashaae
Vanguard Ethereum ETF	ETHV	0.00%	0.20%	1 Year	\$15.5 Billion	CBOE	Gemini
State Street Ethereum Fund	ETHE	0.00%	0.20%	6 Months	\$0.5 Billion	NYSE	Cashaae
3iQ Ethereum Core Fund	ETHEM	0.00%	0.21%	3 Months	\$0.5 Billion	CBOE	Cashaae
Fidelity Ethereum Fund	FETH	0.00%	0.25%	12 Months	\$2.5 Billion	Nasdaq	Fidelity
iShares Ethereum Trust	ETHA	0.12%	0.25%	12 Months	\$2.5 Billion	Nasdaq	Cashaae
Proshares Ethereum Strategy ETF	ETHW	0.20%	0.25%	12 Months	\$2.5 Billion	Nasdaq	Cashaae
Grayscale Ethereum Trust (Conversion)	ETHG	0.00%	0.25%	None	None	NYSE	Grayscale

<https://defillama.com/lst>

<https://x.com/JSeyff/status/1815395664051818873>

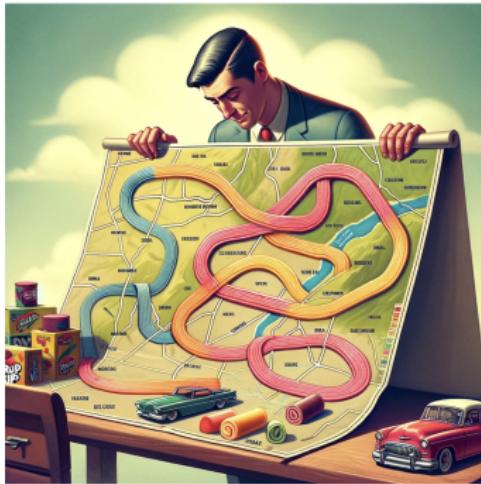
ETH, the asset

Open questions

1. How (if at all) should we think about modifying a decentralized monetary policy?
2. Is it important to cap the amount of stake? If so, what is the correct mechanism for doing so?
3. How can we factor in MEV, which changes the incentives of validating and is not “visible” to the protocol?

Ethereum protocol design

Rollup-centric roadmap & Endgame



- “*The base layer retrenches and focuses on doing a few things well – namely, consensus and data availability.*” – Vitalik¹
- “*Block production is centralized, block validation is trustless and highly decentralized, and censorship is still prevented.*” – Vitalik²

¹<https://ethereum-magicians.org/t/a-rollup-centric-ethereum-roadmap/4698>

²<https://vitalik.eth.limo/general/2021/12/06/endgame.html>

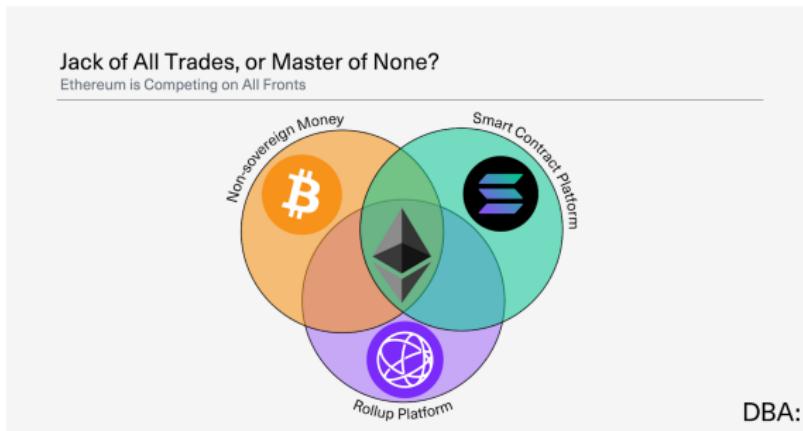
Ethereum protocol design

Digital property rights

- Personal take (*caveat emptor*): the most important feature of Ethereum is digital property rights.
- *The core promise*: anyone can store, send, and receive ETH from anywhere on earth – a permissionless store of value.
- Two conditions necessary to fulfill this promise:
 1. ETH is valuable.
 2. Censorship is prevented.
- **Punchline:** (1) relates to ETH the asset; (2) relates to Ethereum the protocol.

Ethereum protocol design

Comparison to Bitcoin & Solana



- Bitcoin as “digital gold.”
 - ▶ The 21 million promise.
 - ▶ Bitcoin rollups (DA limits).
 - ▶ Hard to compete with as a store of value.
- Solana as “NASDAQ on chain.”
 - ▶ Monolithic state.
 - ▶ Discarding decentralization.
 - ▶ Hard to compete with as a tech platform.

Ethereum protocol design

Open questions

1. Is it possible that the most decentralized protocol *is not* the most valuable and used?
2. How important is value accrual to the story of Ethereum?
3. What should the Ethereum ecosystem prioritize in the short-medium term to remain relevant?

thanks :)

questions?

