

# Neutrality in Ethereum's Block Creation Process



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## Ethereum's main export: property rights

- Personal take (caveat emptor): the most important and differentiating element of Ethereum is the digital property rights it exports.
- *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.

# The bigger picture of Ethereum design



- “*Block production is centralized, block validation is trustless and highly decentralized, and censorship is still prevented.*” – Vitalik<sup>1</sup>
  - *block production is centralized*
    - ⇒ **design goal #1: encourage builder competition.**
  - *block validation is trustless and highly decentralized*
    - ⇒ **design goal #2: limit the value of validator<sup>2</sup> sophistication.**
  - *censorship is prevented*
    - ⇒ **design goal #3: preserve the neutrality of block space.**

<sup>1</sup><https://vitalik.eth.limo/general/2021/12/06/endgame.html>

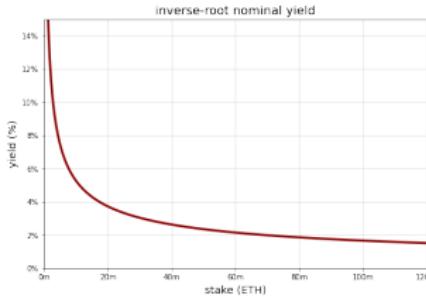
<sup>2</sup>N.B., I notationally abuse the word validator.

# Validator rewards taxonomy

## Issuance

- Issuance rewards incentivize validators to participate in consensus by creating 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.
  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.

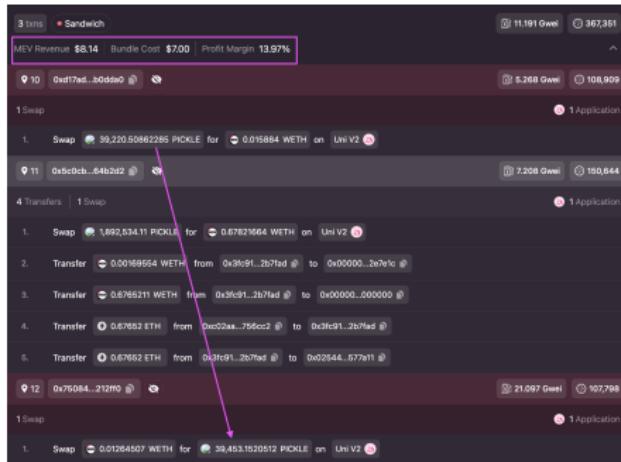
5,126,816 (17.09%   -66%)	30,000,000	5.82 Gwei	0.01478 ETH
29,866,784 (99.56%   +99%)	30,000,000	5.17 Gwei	0.42494 ETH

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

# Validator rewards taxonomy

## MEV

- *Maximal Extractable Value* (abbr. MEV) is the value created from the ability to reorder and insert 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 both in market conditions. *MEV* is variable both in market conditions and the sophistication of the block producer.

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<https://ultrasound.money/>.

<https://mevboost.pics/>.

# ETH, the asset

## Historical context

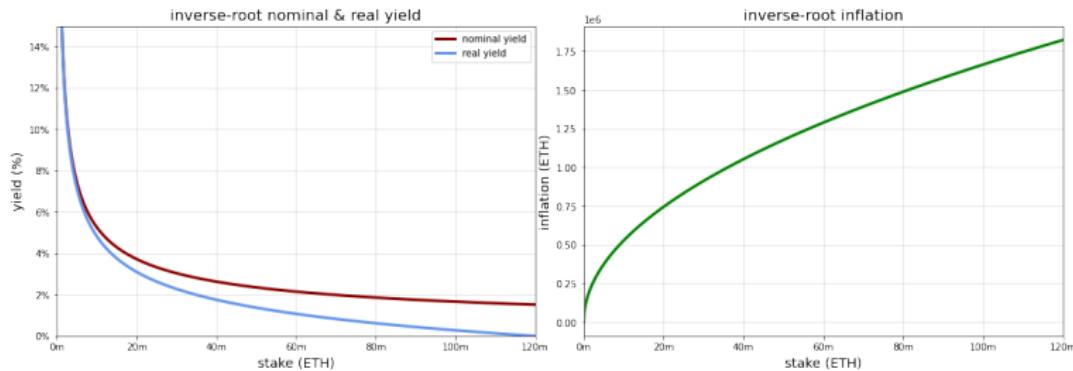


- *Aug. 5, 2021* – EIP-1559 activates and starts burning the base fee.
- *Sept. 15, 2023* – The Merge, no more Proof-of-Work mining.
- *March 13, 2024* – EIP-4844 activates and makes data cheaper.

[https://ycharts.com/indicators/ethereum\\_supply/chart](https://ycharts.com/indicators/ethereum_supply/chart)

# ETH, the asset

## Yield & inflation



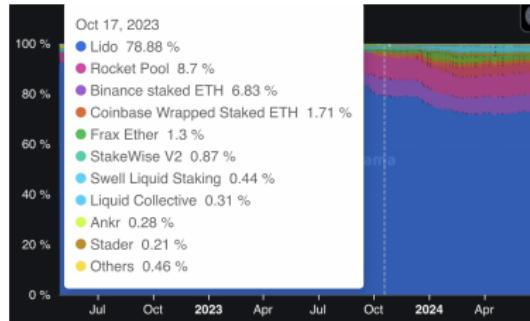
- Inflation hurts the monetary properties of the asset:
  1. Constant re-denomination in dollar terms.
  2. Eliminates real yield.
  3. The native token becomes expensive to hold.

# 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:



James Seyffart (@JSeyff) posted a screenshot of a Twitter thread. The first tweet asks, "What are we expecting today for the Ethereum ETFs?" The second tweet says, "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:"

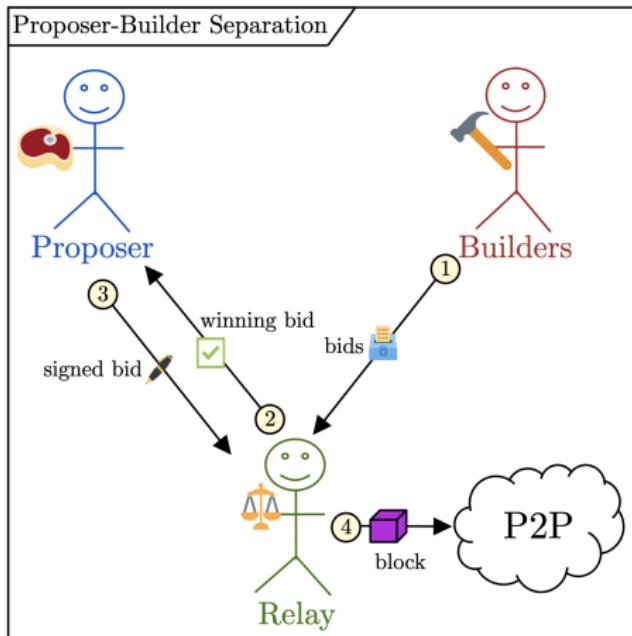
Name	Ticker	Starting Fee	Post Waiver Fee	Waiver Length	Waiver Amount	Exchange	Custodian
Grayscale Ethereum Mini Trust	ETH	0.05%	0.15%	6 Months	\$2.0 Billion	NYSE	Citibank
Franklin Ethereum ETF	EZET	0.05%	0.15%	Until 01/31/25	\$16.0 Billion	CBSE	Citibank
Vanda Ethereum ETF	ETHV	0.05%	0.20%	1 Year	\$3.5 Billion	CBSE	StateStreet
Van Eck Ethereum Trust	ETHX	0.05%	0.25%	12 Months	\$1.5 Billion	CBSE	StateStreet
21Shares Core Ethereum ETF	CETH	0.05%	0.21%	6 Months	\$0.5 Billion	CBSE	Citibank
Fidelity Ethereum Fund	FETH	0.05%	0.25%	Until 12/31/24	UNLIMITED	CBSE	Fidelity
Proshares Ethereum Fund	ETHM	0.05%	0.25%	12 Months	\$0.5 Billion	CBSE	Proshares
Invesco Galaxy Ethereum ETF	QETH	0.25%	0.25%	None	None	CBOW	Citibank
Grayscale Ethereum Trust Conversion	ETHG	0.35%	0.45%	None	None	NYSE	StateStreet

<https://defillama.com/lst>

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

# Ethereum, the protocol

## Current block production pipeline

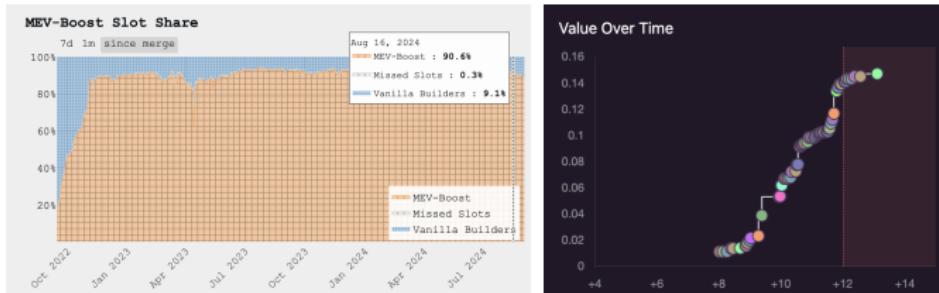


- ① **The builder bids** in the auction through the relay.

# 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?*
- *Idea #1:* Can validators provide a “block template” that the builder must follow?<sup>1</sup>
- *Idea #2:* Can multiple validators co-create this template?<sup>2</sup>

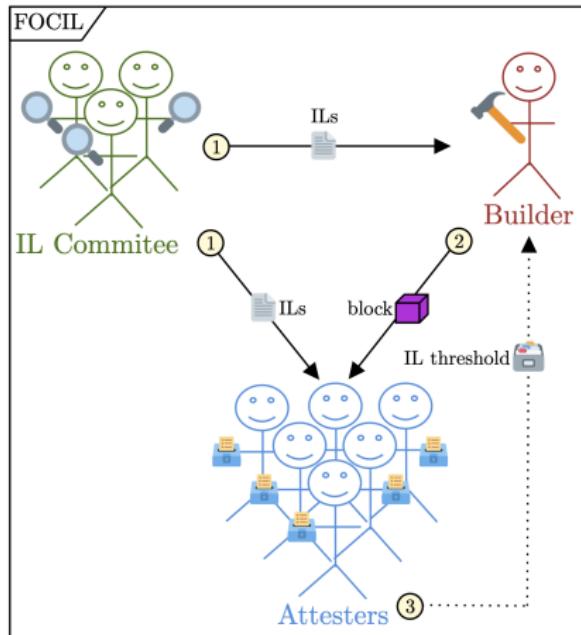
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<sup>1</sup><https://ethresear.ch/t/no-free-lunch-a-new-inclusion-list-design/16389>

<sup>2</sup><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.

thanks :)

