

"... It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness..."

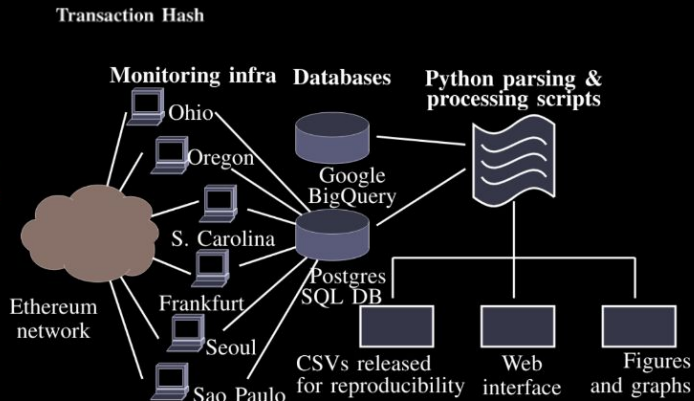
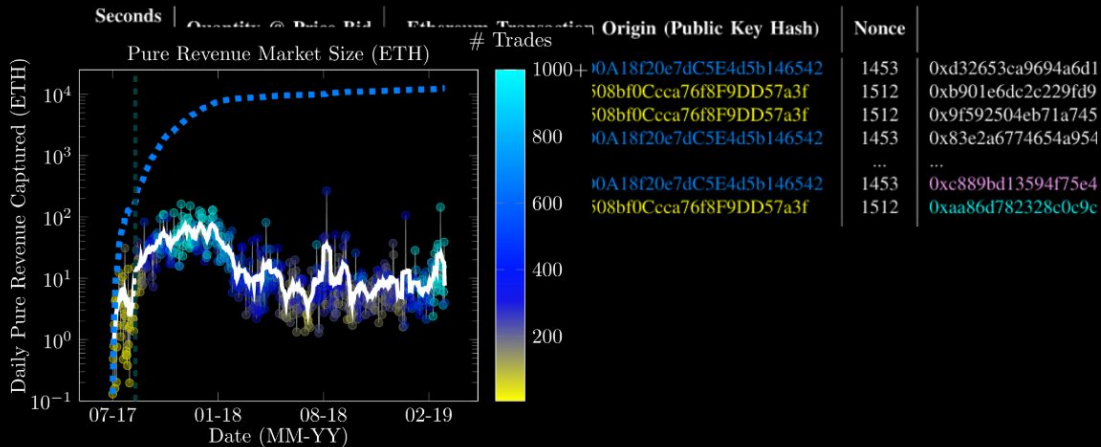
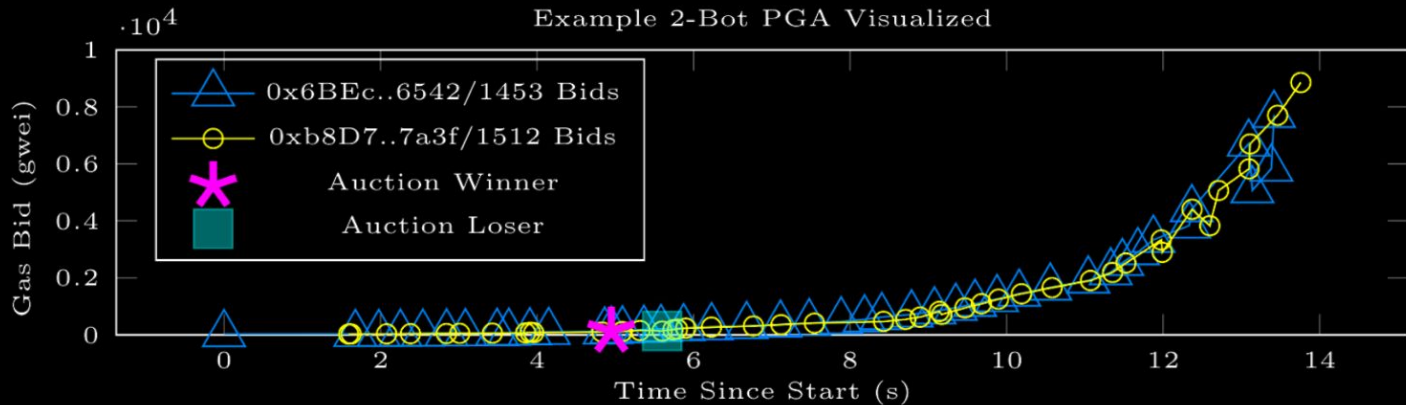
Philip Daian

⚡🤖 (& Cornell)

MEV for the next TRILLION

Flash Boys 2.0

Example 2-Bot PGA Visualized



...enter MEV

00 fees represent one case of a more general quantifiable value we call miner-extractable value (MEV).

MEV refers to the total amount of Ether miners can extract from manipulation of transactions within a given timeframe, which may include multiple blocks' worth of transactions.

The energy in MeV is released due to transformation of 1 kg mass completely into energy ($c = 3 \times 10^8$ m/s)

- (a) 7.625×10 MeV (b) 10.5×10^{29} MeV
(c) 2.8×10^{-28} MeV (d) 5.625×10^{29} MeV

$$E = \Delta mc^2 = 1 \times (3 \times 10^8)^2 \\ = 9 \times 10^{16} \text{ J}$$

"What we call miner extractable value (MEV) ... poses concrete, measurable, consensus-layer security risks. We show empirically that MEV poses a realistic threat to Ethereum today."

(Flash Boys 2.0, Philip Daian, Steven Goldfeder, Tyler Kell, Yunqi Li, Xueyuan Zhao, Iddo Bentov, Lorenz Breidenbach, Ari Juels)



play the
long game

... the birth of the bot ~~#flashbots~~^t



- > illuminate the dark forest
- > democratize MEV extraction
- > distribute MEV benefits

where are we?



Network participation (24h)

56.28%

% of MEV-Boost blocks relayed in last 24h.

Flashbots dominance

81.30%

% of MEV-Boost blocks relayed by Flashbots.

Active relays

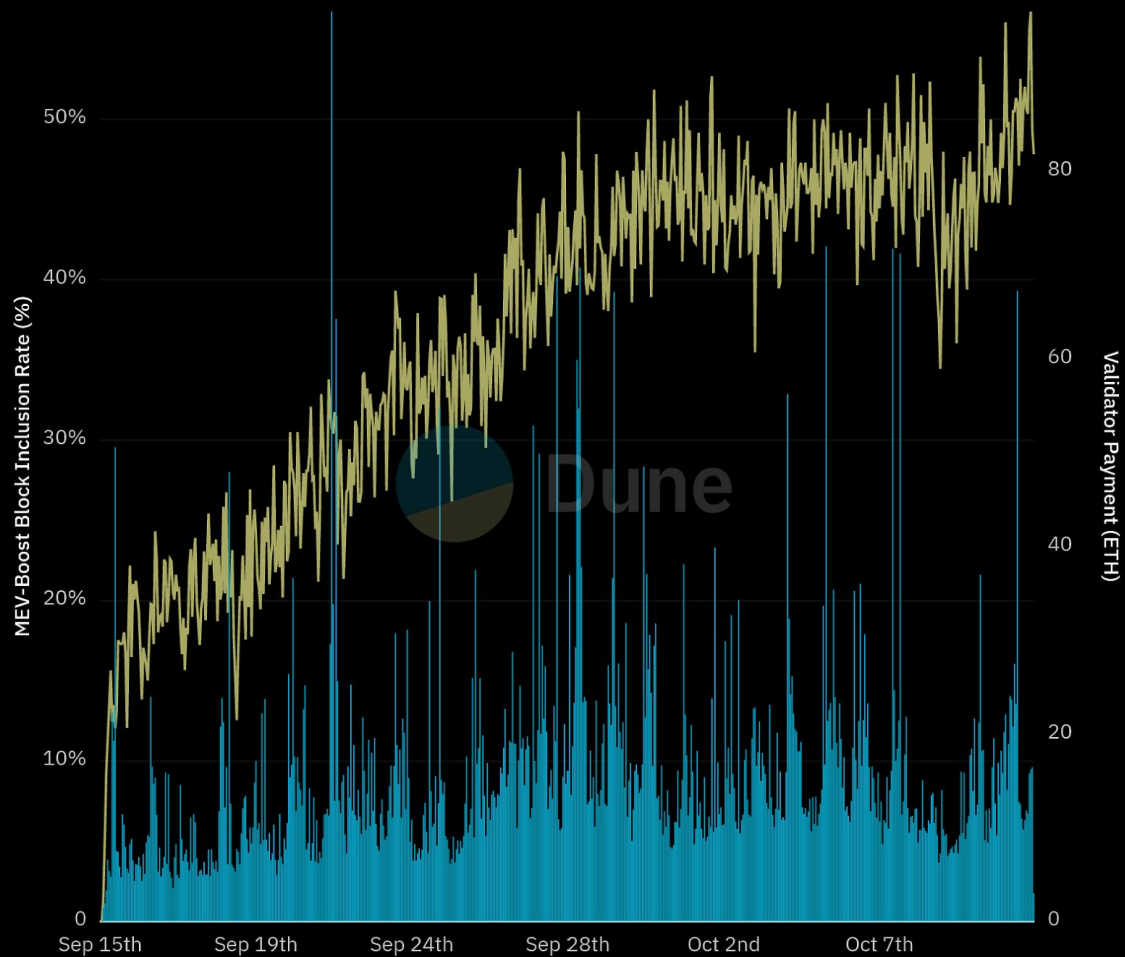
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Relays that relayed at least one block (Flashbots, BloXroute Max Profit, Blocknative, BloXroute Ethical, Manifold, BloXroute Regulated, Eden).

Top relays

Relays sorted by number of relayed blocks.

RELAY	# BLOCKS	TOTAL VALUE (ETH)	AVERAGE BLOCK VALUE (ETH)
Flashbots	65,507	9,659.835	0.147
BloXroute Max Profit	6,302	787.614	0.125
Blocknative	2,313	196.949	0.085
BloXroute Ethical	2,164	192.079	0.089
Manifold	1,545	151.8	0.098
BloXroute Regulated	1,391	197.112	0.142
Eden	1,349	186.18	0.138



illuminate

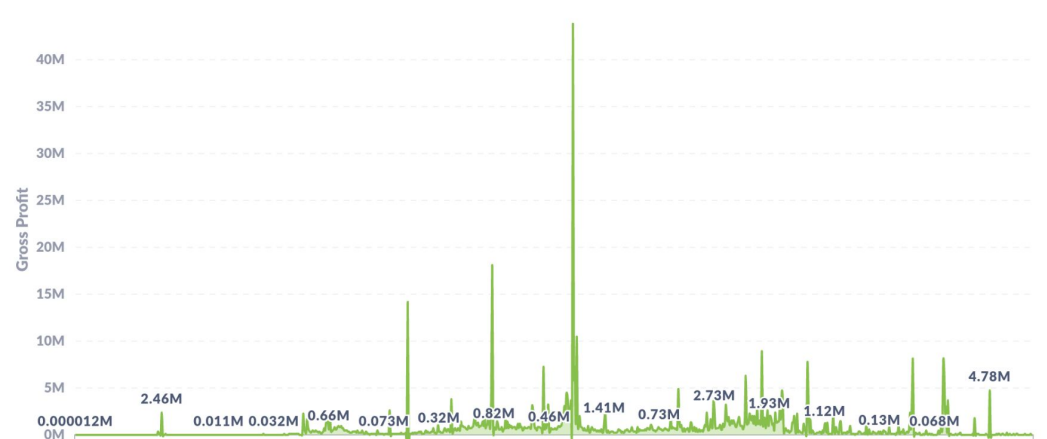




Cumulative Extracted MEV - Gross Profit



Daily Extracted MEV - Gross Profit



Westerngate,
Jump,
Skip,
ZeroMEV,
many more

inspired by
illumination
culture of
Explore

Block Reward

Daily ETH paid to validators from Flashbots MEV-Boost Relay



Cumulative daily ETH paid to validators from Flashbots MEV-Bo...



Daily average block reward from Flashbots MEV-Boost Relay



rich, public relay data

we continue the culture of illumination through PoS, and any future developments.

You cannot
illuminate
without
research.

democratize



we are still a long way from home.



Post-Merge Daily OFAC Compliant Blocks

OFAC Compliant Not OFAC Compliant Non-MEV-Boost

100%

democratize?



 49% enforced OFAC compliance

INCLUDE ALL BLOCKS

democratize?

mevWatch.info

OFAC Compliant Block Visualisation - Last 100 blocks (20 minutes)

■ Enforcing OFAC Censorship ■ Not Enforcing OFAC Censorship ■ Non-MEV-Boost



 44 / 100 blocks enforcing OFAC compliance

INCLUDE ALL BLOCKS

democratize.

Open sourcing the Flashbots Relay

16.09.22 · 2 min read

Flashbots

In response to recent developments around legal requirements for relay providers in their home jurisdictions, we have decided to accelerate the release of our **relay code** as open source.

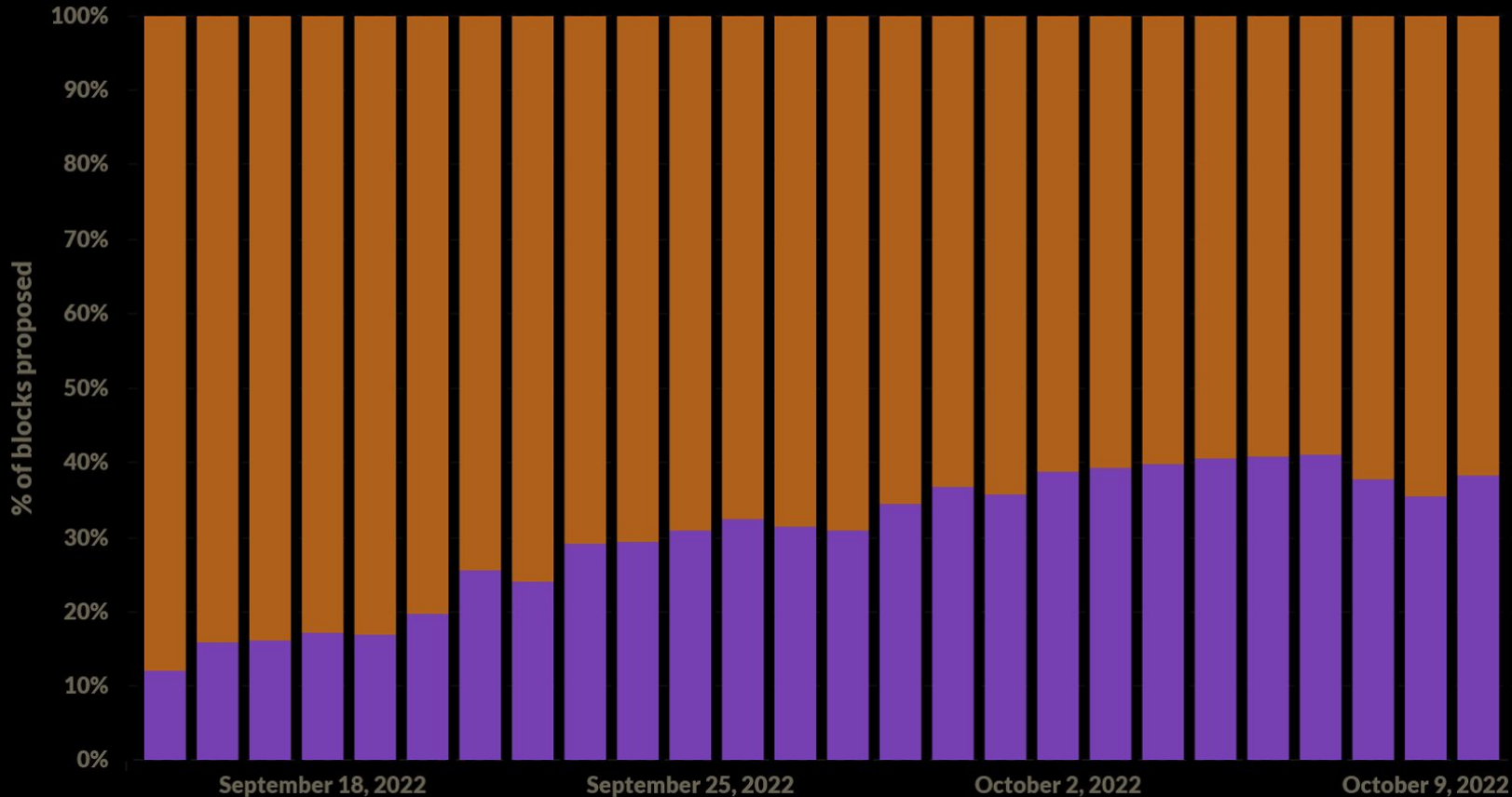
MEV-Boost is open source middleware for validators to access a competitive block market. Multiple relays at the merge—rather than a single default—is key to Ethereum's health. Open sourcing our relay code will encourage competition and eschew monopoly and single points of failure.

This is an accelerated release, and has been frontloaded on our roadmap, so please be aware that the relay code is under active development and is subject to significant changes

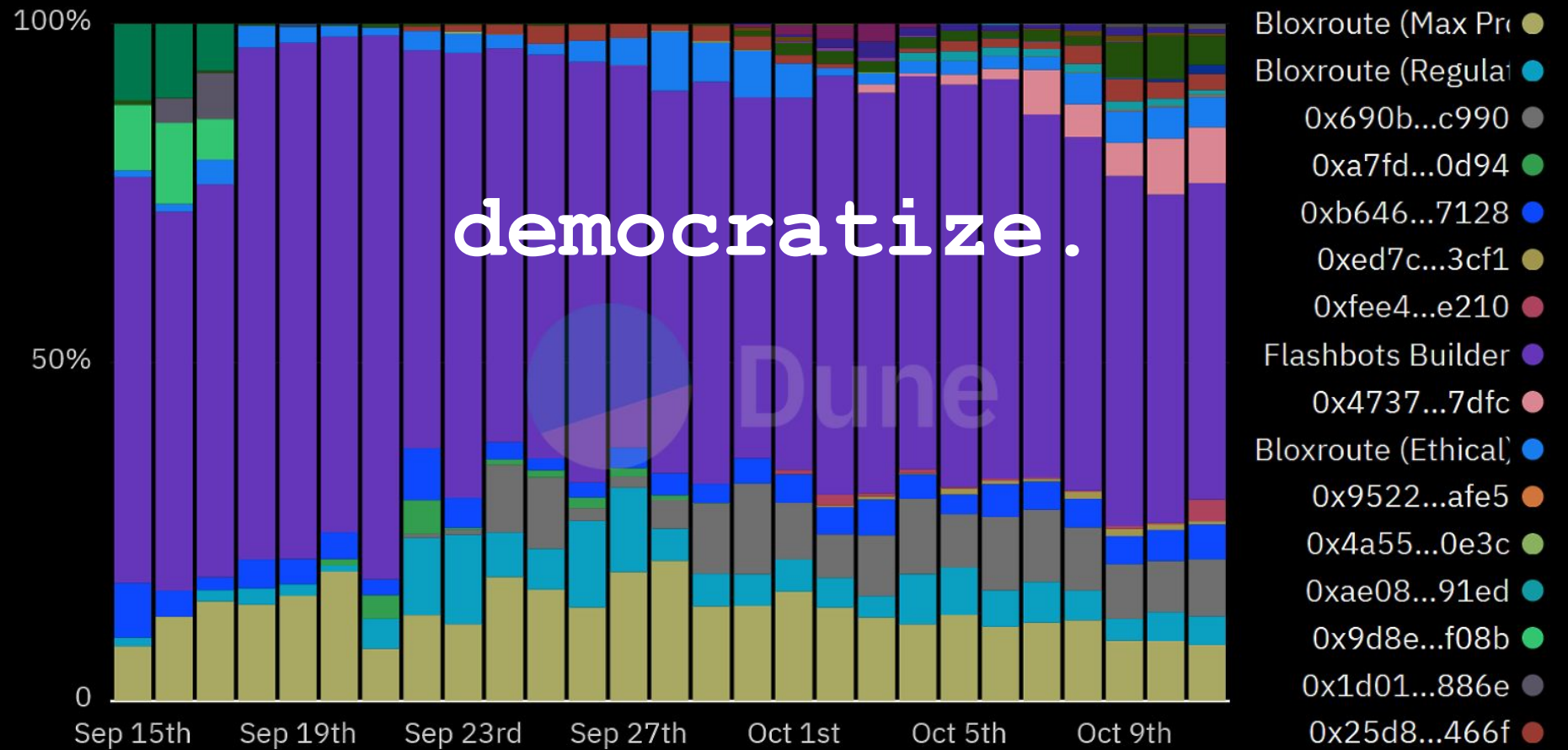
Percentage of blocks proposed by Flashbots MEV-Boost Relay vs. other by day

democratize.

● Flashbots MEV-Boost Relay ● Other



Block Builder Success Rate (% Daily)



the only
way out is
through



Base Layer Neutrality

Sep 08, 2022 | Rodrigo Seira, Amy Aixi Zhang, Dan Robinson

Sanctions and Censorship Implications for Blockchain Infrastructure¹

Crypto
Council for
Innovation



Executive Summary

On August 8, 2022, the U.S. Treasury Department's Office of Foreign Assets Control (OFAC) added certain Ethereum addresses associated with Tornado Cash, an open-source privacy protocol on Ethereum, to the Specially Designated Nationals and Blocked Persons List (SDN List).² Since the announcement, many participants in crypto's base layer have expressed concern that they could be required to monitor or censor³ blocks involving SDN List addresses to comply with



@phildaian · Oct 12

AKA, if you want to achieve censorship resistance in crypto, it has to be at the *system* level, not the individual validator/builder/whatever level.

The meta-properties come from diverse validator preferences, in crypto's case from *geographic diversity*.



1



2



12



How much can we constrain builders without bringing back heavy burdens to proposers?

Proof-of-Stake



vbuterin

13d

One natural response to the risks of builder centralization (mainly censorship, but also various forms of economic exploitation) is to try to constrain the power that builders have. Instead of builders having full rein to construct the *entire* block if they win an auction, builders would have a more limited amount of power. This power should still be enough to capture almost all MEV that could be captured, and it should ideally still be enough to capture other benefits of PBS, but it should be weakened to limit opportunities for abuse.

This idea is sometimes called **partial block auctions**: instead of auctioning off the right to decide everything in a block, auction off the right to decide *some things*, where those "some things" could be much more nuanced than eg. "the builder chooses the first half of the block and not the second": you could give the builder the right to reorder, prepend, append, and you could even constrain the proposer. This post gets into some possible ways of doing this, and some of the tradeoffs that result.

Oct 1

1 / 15

Sep 30

Back



bertmiller

8d

Brainstorming a bit with research folks and here is an early idea for how inclusion lists could apply to mev-boost:

1. Proposer can send a list of transactions to mev-boost relays that specifies which transactions *must* be included in a block for that to be considered valid by mev-boost. This likely needs to be done with a new API call that's signed by the proposer.
2. Then when the proposer asks relays for a block header the relay responds with a header along with merkle proofs proving that the transactions from the proposer's inclusion list are present in the block.
3. For each block header that is returned mev-boost validates the proofs to ensure each transaction



distributed



Robert Miller

Oct 6, 2021 · 5 min read · Listen



Announcing Flashbots Protect



... with
much more
to come

Today Flashbots and our community are excited to launch a *public beta* of **Flashbots Protect**, a new product line focused on allowing everyday users and developers to easily submit transactions to Flashbots.

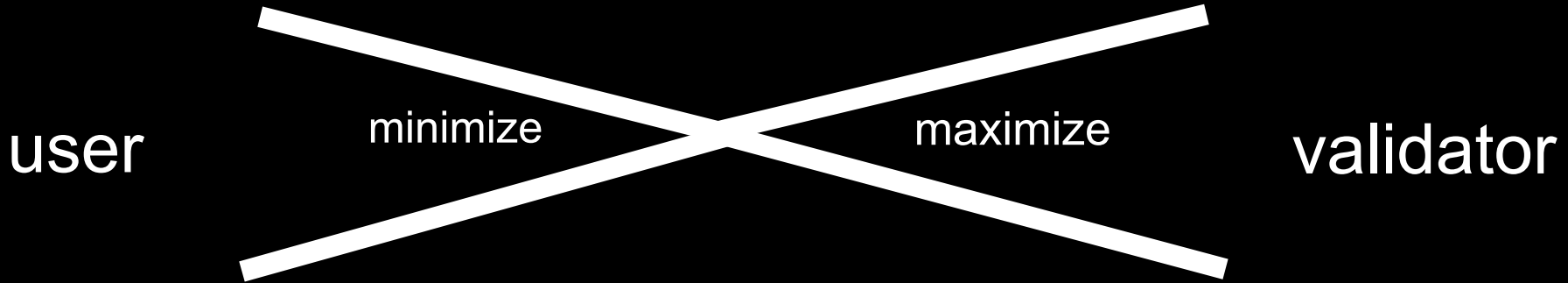
Since launch anyone has been able to submit transactions to Flashbots, but Flashbots Protect expands access by providing simple ways for users and developers to integrate. In turn the benefits of the Flashbots Auction, like frontrunning protection, no cost for failed transactions, and priority in blocks, will be accessible by a much wider set of stakeholders.

distribute

we must
do more



where is mev going?



- more private
- more decentralized
- more competitive
- more transparent
- more user tooling

- more robust
- more efficient
- more geographically diverse
- fewer network externalities
- (still) fewer first-party deals



WTF?

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We are here to avoid entrenching centralization at every step. We will decentralize power in MEV.

We expect **YOU** to hold us to account.

That is why we are here.

Announcing (codename) SUAVE

... the next step for Flashbots

*The **S**ingle **U**nifying **A**uction for **V**alue **E**xpression*

- an mev-aware, encrypted mempool for users and wallets
- progressive decentralization
- a turnkey decentralized block builder for rollups

Full spec coming (very) soon; discuss and build with us today.

What is SUAVE?


- Fully decentralized block-builder
- Fully open source, open development
- ETH-Native / EVM-compatible
- Optimal user execution, harnessing MEV
- Full compatibility with Flashbots today
- Cross/multi-chain support
- **Maximizes competition and geographic diversity**
- Enabling open orderflow for Ethereum's future
- Programmable privacy

Full spec coming (very) soon; discuss and build with us today.

[genesis]

We need your help.





let's reach
the
mountaintop
together <3

Users
Wallets
Rollups

*this is
a call
to action!*

collective.flashbots.net