Evaluating the PBS Experiment

Early Insights from MEV-Boost and the Builder Market

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PBS Background

- Proposer/Builder Separation is an architecture that **separates the functions of block-building and block-proposing** within the Ethereum core protocol.

- The core philosophy behind PBS is that by separating these two functions, we **isolate MEV activity and minimise centralising forces** on the Ethereum base layer.
MEV-Boost

- Flashbots **mev-boost allows** validators to engage in an **experimental** (optional!) version of **PBS**

- We can **test PBS** and the idea of a builder market **through mev-boost**, before committing to putting it in the core protocol
Builder Market Experiment

Validator running MEV-Boost

Relays ← Builders

Public Mempool

Searchers

Users

Builder Market
How is this experiment going?
Is this abstraction realistic?

Is it possible to completely insulate the base layer using this model?

Is there something we are missing?

If things get really bad in the builder market, are there still negative effects on the base layer?
Two Families of Effects

First order effects
- Direct effects on the core protocol
- What parts of Ethereum are still affected by MEV under PBS?

Second order effects
- More game theoretic or incentive effects
- How are actors in the builder market incentivised to influence the base layer under PBS?

What might leak through?
What parts of Ethereum are still affected by MEV under PBS?

- Contents of block
- Contents of the public mempool
- Proposer control over what is in a block
How are builder market actors incentivised to influence the base layer?
Is this actually happening?
How much block content is currently decided by the builder market?

Total Slot Share (cumulative)

% of total slots

Relay Provider
- flashbots
- bloxroute (ethical)
- bloxroute (max profit)
- bloxroute (regulated)
- manifold
- eden
- blocknative
- Other/None

Credit: Toni Wahrstätter, https://mevboost.pics/
Is the public mempool changing since MEV-Boost launched?

Credit: Jochen Hoenicke, https://jochen-hoenicke.de/queue/#ETH,30d,count
Are there early indicators that builders are centralising?

Credit: Dune, ChainsightAnalytics, https://dune.com/queries/1306635/2237247
Are builders and validators making off-chain agreements?
Are these problems?
Losing control of block content

- Currently around 60% of Ethereum blocks are coming from the builder market
- Should we be worried if e.g. 90% of blocks come from the builder market?
- If block-building centralises around a few actors, it may be easier to censor at the builder level than at the network level
Public mempool getting smaller

- Transaction volume in the public mempool seems to be decreasing post-merge
- If this is a symptom of transactions being diverted to private pools, what are the implications?
- There is a family of solutions to builder centralisation that rely on “fallbacks” i.e. allowing validators to build blocks locally in certain situations
- Local block building might become difficult or economically infeasible
 Builders owning parts of the consensus layer

- Builders are likely to become more powerful and more centralised over time
- Builders can offer services based on the validators that they own
- Does decentralising the builder role help with this?
Priorities along the road to in-protocol PBS

- The things we know we need in order to make PBS as robust as possible:
  - Censorship resistance schemes
- Also:
  - Decentralising the builder role
  - Building in a mechanism so that validators can still propose their own block or augment their own block
  - Reduce incentives for validators and block builders to integrate
  - Ability to monitor builder market as a whole

How can we address these issues?
Thank you!

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