During SBC '23 week, we hosted a multi-stageMEV researchathon at a Flashbots Airbnb during the afternoons and evenings of August 30th, August 31st, and September 1st.

We invited over 40 researchers and builders to collaborate on 4 research challenges critical to the ecosystem moving forward. The goal is to accelerate the collaborative r&d process across different teams within the ecosystem, and to invite contributors across the wider ecosystem.

Below is a brief recap of the progress and future plans of the 4 challenges.

Harden the MEV-Boost Band-aid: SGX-reth Relay

- Navigators: @socrates1024 @gakonst @ralexstokes

One of the thorniest problem with today's PBS ecosystem is the dependencies on the trusted relays to not break the guarantees of MEV-Boost. Can we spec out and improve on relay trust assumptions with privacy-preserving techniques without sacrificing high degrees of efficiency?

The overarching goal of this challenge was to bolster Ethereum Relays' trustworthiness, particularly minimizing the trust required between the Builders and the relay. One significant concern is the potential risk of Relay operators dismantling a block, which could lead to unauthorized exposure of private strategies or order flows. To combat this, the use of SGX aims to ensure these operations remain confidential.

Our team's approach was to focus on a minimalistic enclave design, beginning with a compact revm process within SGX, contrasting the typical full system port. This design involves a single stateless process tasked with block processing, where each block is accompanied by storage proofs, ensuring there's no storage issue. The work also included aspects related to attestation and the reproducibility of MRENCLAVE. We leveraged Fortanix Rust EDP for the SGX platform due to its open-source nature, low-level capabilities, and a minimal TCB. Our prototype, found here, experienced seamless porting of Revm, with I/O operations streamlined through sockets, optionally secured with TLS.

However, some unresolved questions remain, such as the optimal encryption method choice and the intricacies of the light client portion. Additionally, concerns about potential collusion between validators and relays were raised. Our ongoing efforts aim to address these questions, further solidifying the trustworthiness of the Ethereum Relays and advancing the Reth SGX Relay initiative.

MEVconomics of Searcher-Builders bundle distribution

- Navigators: @Quintus @MaxR @phil + Dan Robinson
- Tarun Chitra

The number of integrated searcher-builders is increasing. While there are empirical studies examining their behavior within the current system, it's also crucial to theoretically understand the economic drivers that determine when these integrated searcher-builders will distribute bundles to multiple builders. This can shed new light on how to better design the mechanism for a new reality where powerful integrated searcher-builder is on the rise.

The Model:

- We're working with n

searcher-builders

and just one proposer.

- The game involves two phases

: * Phase 1

: Builders decide on whether to submit bundles to other builders. To keep it neat, we considered two primary choices: either participating solely in one's auction

or participating in all auctions

. Depending on the auction formats we know, the content and payments of each builder block are then decided.

- Phase 2

: Builders pitch bids to the proposer for their block inclusion. Here, we factored in bundle payments depending on block inclusion.

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: Builders pitch bids to the proposer for their block inclusion. Here, we factored in bundle payments depending on block inclusion.

To simplify, we’re initially assuming:

- Unlimited block sizes

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- Only m

distinct opportunities

(meaning these opportunities don’t overlap or interact with the same state).

Ponder Points:

- On Auction Strategies

: * Is sharing a dominant strategy when both the bundle and block auctions are priced second? If so, what’s the proposer’s revenue? Our hypothesis: sharing might be weakly dominant, with the proposer’s revenue mirroring the revenue under a direct searcher-proposer VCG auction.

- Can we achieve truthful bidding in the bundle auction and honest revelation of block value in the block auction? Initial thoughts: probably not.
- What if the block auction has a first price and the bundle auction a second (or vice versa)? Will bundle sharing remain in equilibrium?
- If we gave builders the liberty to pick from various bundle auction formats (based on a fixed block auction format), would they all opt for 2nd price auctions?
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Co-create a Transaction Supply Map: orderflow.pics

- Navigator(s): @angelfish @sui414 @Nerolation

Inspired by mevboost.pics , let’s visualize the complex and dynamically evolving transaction supply map, and create a dashboard that analyses the dynamic impact of order flow on the PBS market structure.

Key Accomplishments:

- Dashboard Display

: We unveiled the orderflow metrics dashboard

for community feedback. It not only provided insights but validated our methodology as well.

- MEV Data Mapping

: We meticulously mapped out data sources along the MEV supply chain

, discerned the differences, and pinpointed any gaps.

- Product Launch

: Proudly shipped the PRD for orderflow.pics.

- Further Development

: We're looking to amp up dashboard accuracy, launch a frontend reminiscent of mevboost.pics with a Dune embed, and pen down a blog post for the community.

Next on the Horizon:

- Enlightening the Community

: @angelfish is gearing up to distill our project's insights into a captivating blog post, set to go live mid-September.

- Dashboard Enhancement

: @angelfish is spearheading the Orderflow.pics PRD, aiming to give it a vibe similar to mevboost.pics, and accentuate it with an orderflow sankey diagram.

If these developments intrigue you as much as they do us, then it's time to dive in and contribute! Let's collectively push the boundaries of MEV understanding!

Sharded Inclusion Lists / Heterogenous DA

Navigator(s): @Dmarz @_sw

How to provide different censorship resistance guarantees for different types of order flow?

Check out @dmarz's awesome HackMD doc for a detailed update!