MEV Profit Distribution

Latency vs. Auction

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Agenda

1. Overview of types of MEV
2. MEV distribution by Protocol
3. Solana Roadmap

MEV Overview

What is MEV?

-   The revenue created by validators using privileged position to prioritize, reorder or censor transactions

Two Types of MEV

- Transaction Induced
    - Transactions perturb the state and create incentive for behavior
    - Types: Sandwich, atomic arb, (liquidation), nft mint (?)
    - Mostly solutions appear at the application layer (DFlow, Rook, etc.)
    - Other solutions: Encrypt transactions, FIFO
- Externally Induced
    - Time elapses between blocks creating an economic incentive for some activity
    - Individual parties bid for access to the state (on chain - off chain arbitrage)
    - This type of MEV is irreducible but can be redistributed

Current State of Protocol Design

Relevant Parties

- Users
- Apps
- Searchers/Traders
- Block Builders
- Validators

Ideal Profit Ordering

- Users/Apps
- Validators
- Searchers/Traders/Builders

Latency vs. Auction

- Latency: Order transactions by first arrival
    - Maximally rewards the searchers
    - In HFT profit accrues to landowners who sell space for RF towers/fiber
    - Large network effects with high barrier to entry
    - Incentive for party running sequencer to extract MEV
- Auction: Order transactions by who bids the most
    - Maximally rewards the validators (token holders)
    - Some scenarios can also reward the app and by proxy the user
    - Possible UX costs

Ethereum

- maximally auction (mostly)
- Block builders need to bid the highest price to propose a block
- Maximally rewards stakers
- PBS architecture solidifies this design preference

Arbitrum/Optimism

- Latency race

- Arbitrum has no intention of ever creating an auction
    - Rewards searchers and to some extent benefits users

- Optimism eventually wants to rotate the role of sequencer
    - Helps accrue value to the OP token if they can force auctions or extract themselves

App Chain (dYdX/Uniswap)

- Auction but auction fees accrue to the application layer
- This can possibly be rebated to the user
- Bad for composability

Privileged Party Intervention

- Allow the protocol to capture the state contention
- Allow a whitelisted set of individuals to bid for priority letting the app capture the profit (Rook)
- Drawbacks
  - Protocol will never be as efficient as the free market
  - Centralizing

Solana Roadmap

Current State of Solana

- Halfway in between but trending toward auction
    - Right now most validators are configured to accept the first transaction unless multiple come at the same time and then they attempt to use priority fees
    - In theory they have flexibility to move much further toward auction (Jito)
    - No real restriction in POH on how they order and auction extracts the most value
    - "De facto auction" when a validator moves a privileged parties transaction to the top
- Auctions can last max 400 millis given the block time
- Concerns
    - Solana attempts to further enshrine latency as transaction ordering
    - App chains outcompete native Solana defi because externally induced MEV can be returned to users

Allowing Apps to Increase Write Lock Fees

- https://github.com/solana-labs/solana/issues/21883
- A sophisticated application can dynamically adjust the "base fee" cost of interaction for some state
    - If spikes in externally induced MEV can be predicted then some meaningful percentage can be captured by the application
- Downsides
    - High burden for the application to anticipate
    - Not going to capture every edge case (liquidation)

Multiple Block Leaders

- For every slot multiple validators are appointed leader and create a block
- Create one aggregate block
- Removes the vast majority of the flexibility for validators to conduct an auction
    - If they hold back transactions to force an auction the other validator will just include it at a higher hash
- For state races such as on chain <-> off chain arbitrage as the leader number approaches infinity the searcher profit kept approaches 100%

Validators Implement Custom 100ms Auctions (Jito)

- As validators implement this software they will capture more money for stakers
- Level the playing field by reducing the privilege of running your own validator
- Lead to healthier environment of MEV extraction
- Eventually needs to be fully enshrined to allow proper block building competition

Conclusion

- Externally induced MEV is irreducible so long as lit exchange venues continue to exist on chain
- Auctions are the healthiest MEV extraction paradigm and some version of enshrined PBS is the best way to support this