

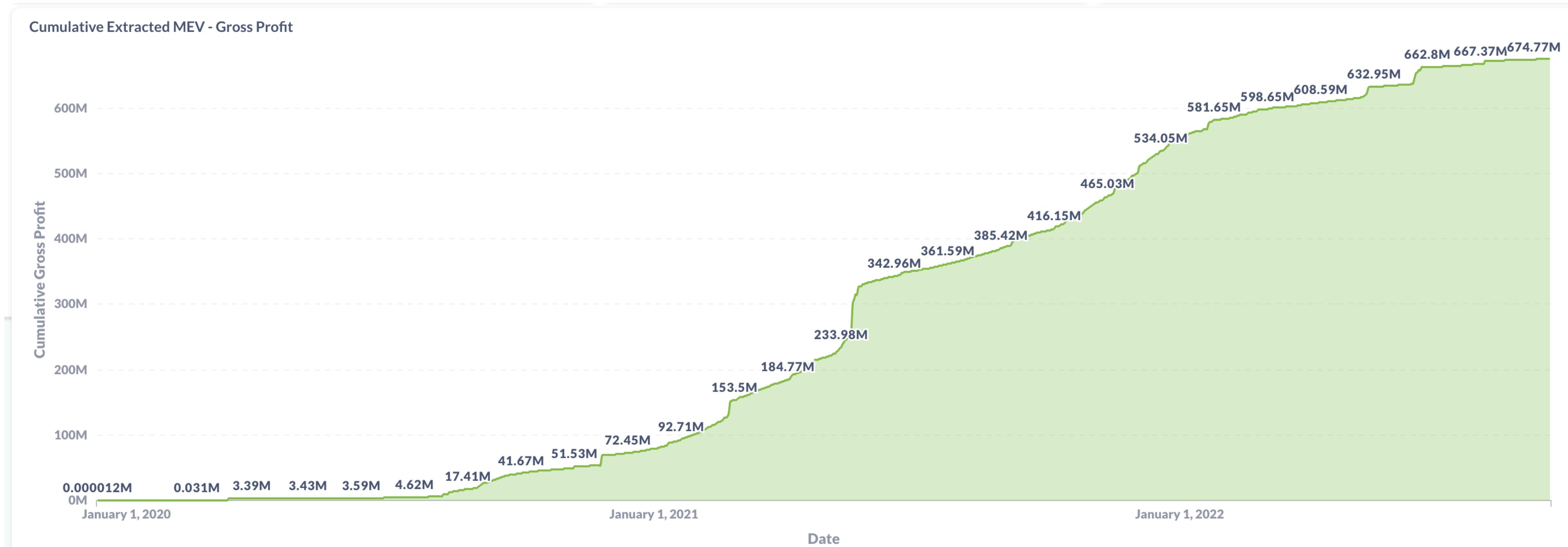
PBS brings Centralization

Combo DeFi



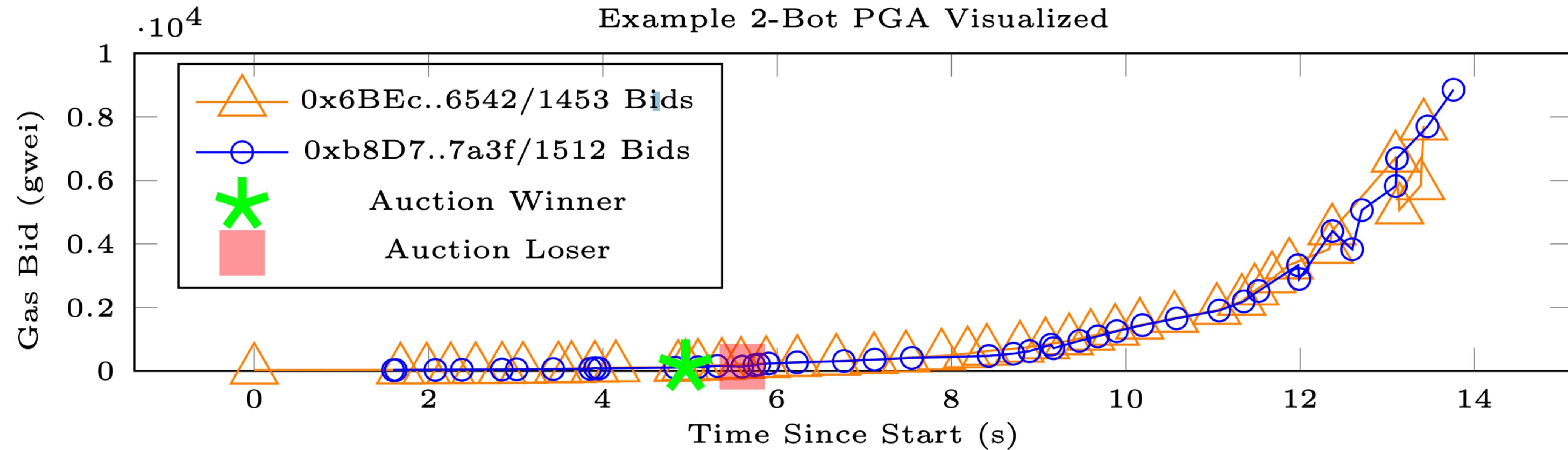
ETH BEIJING
HACKATHON

MEV is eating Ethereum



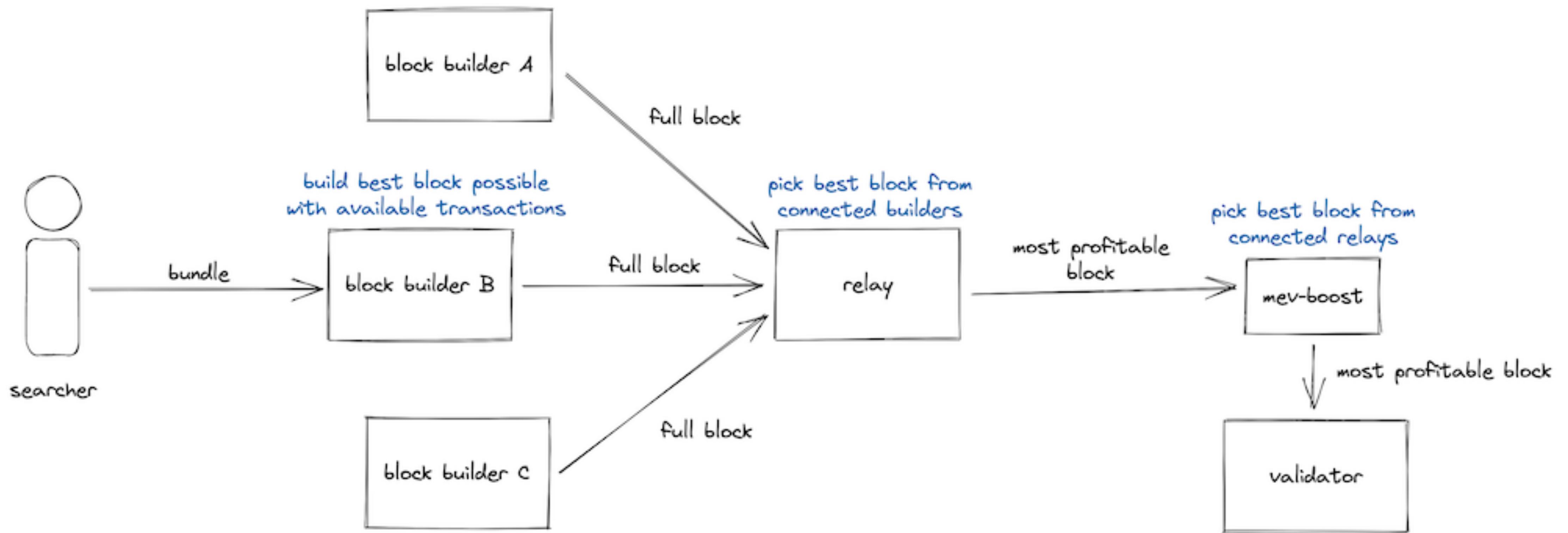
- >674M profit derived by on-chain bots

Why ethereum needs PBS?



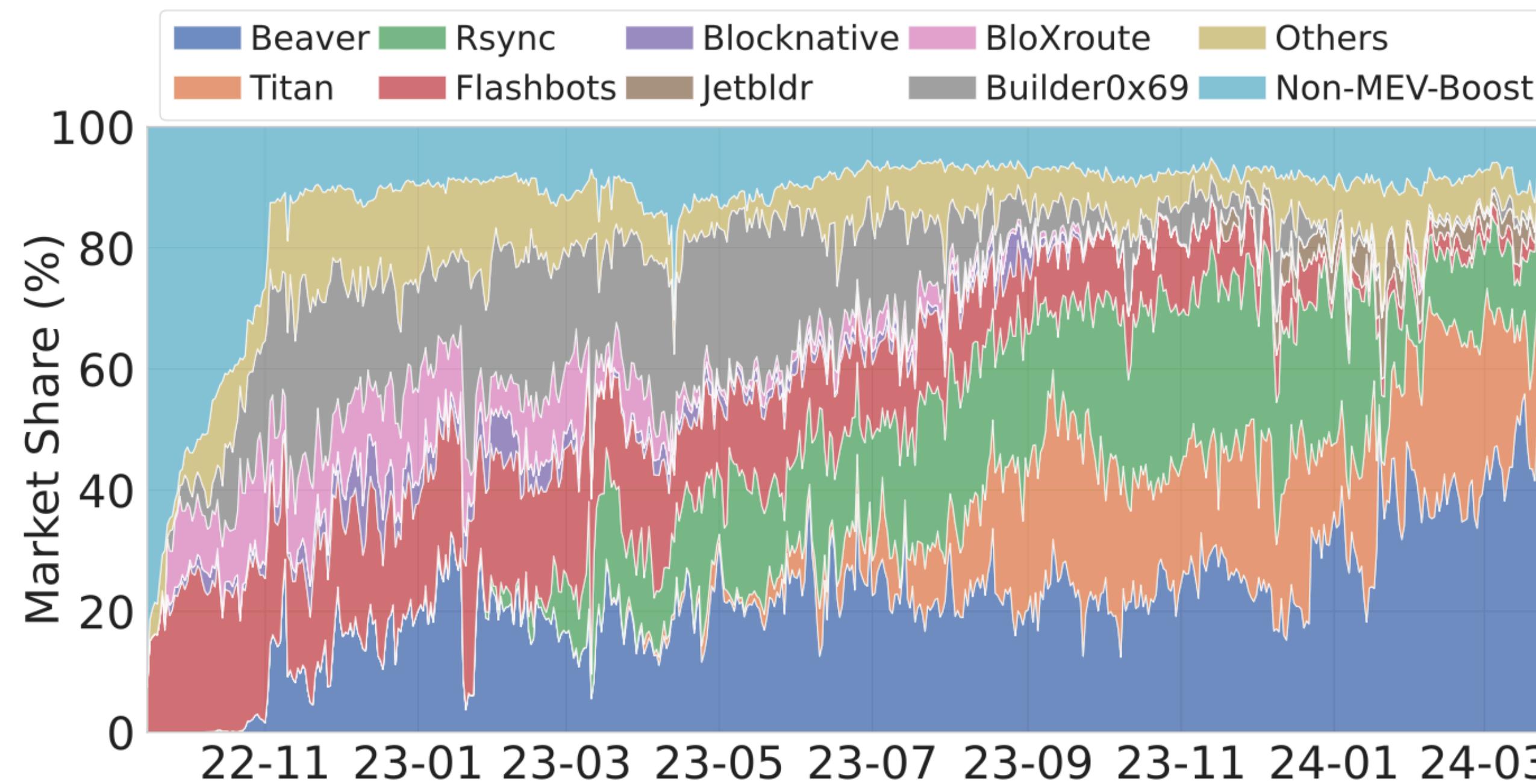
- Priority-Gas-Auction causes network congestion and block space waste.
- High gas price for normal users.

What is PBS ? (Proposer-Builder-Separation)

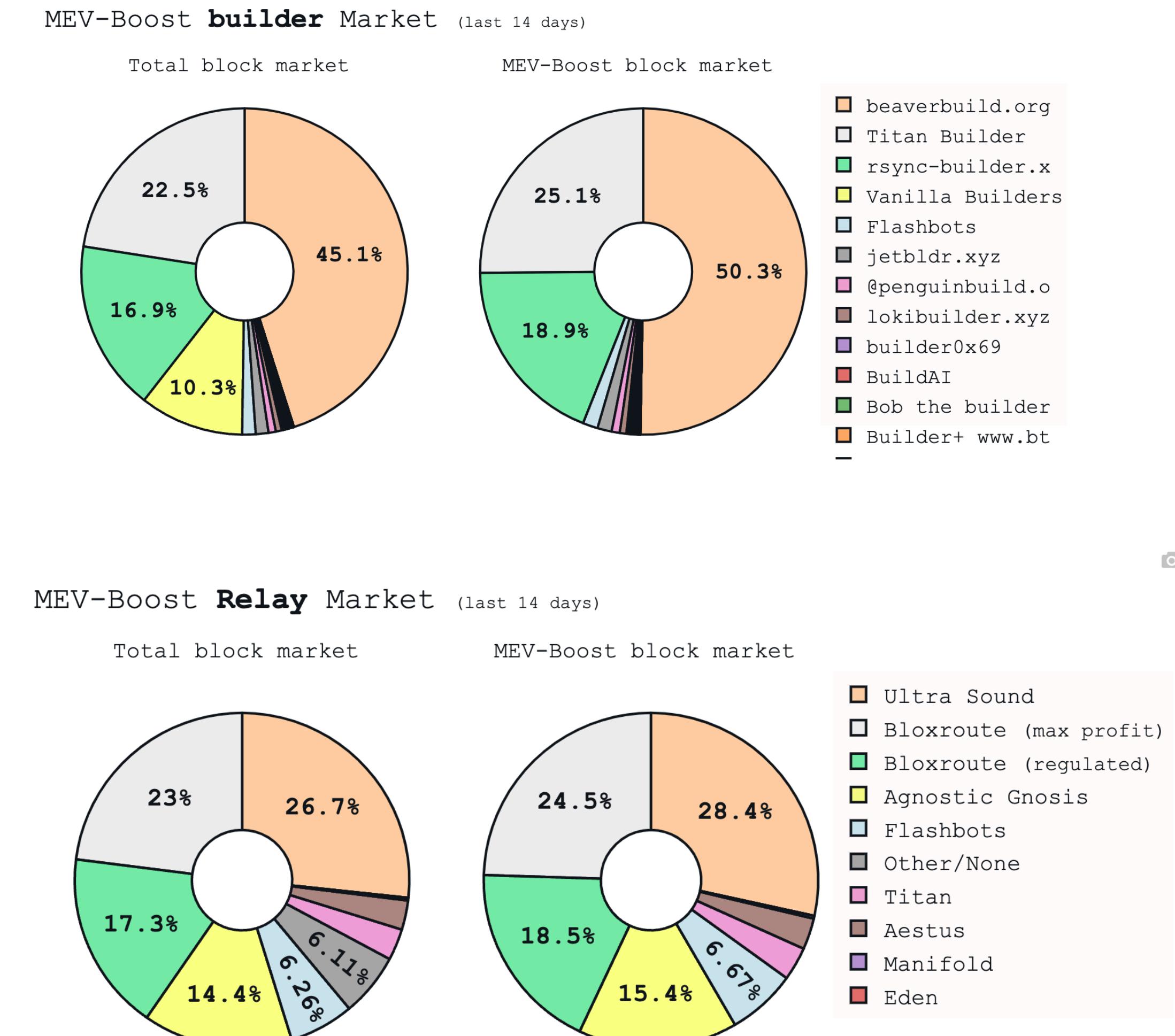


- Only txs with the largest profit will be stored on chain. These txs is private for P2P network.
- Any one can play any role without permission, and compete with others to keep decentralization.

Centralization of PBS



- More than 80% blocks built by only 3 builders.
- More than 80% blocks relayed by 4 relayers.



Why some builders always win?

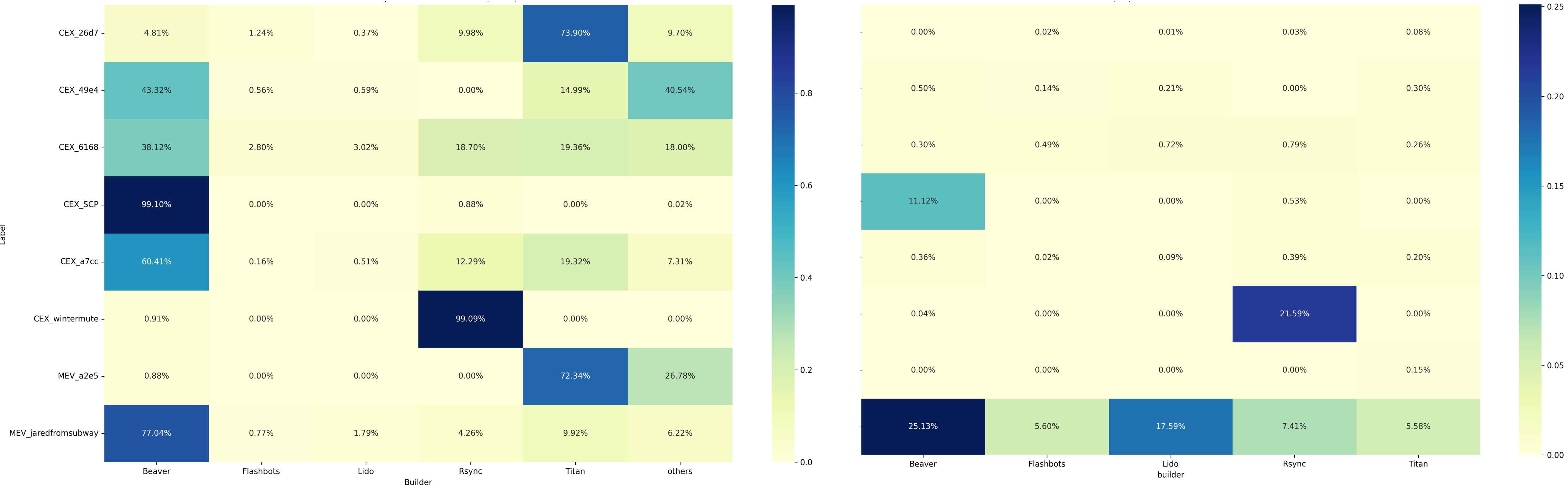
	build blocks	bribe_b per block	bribe_p per block	profit_ratio
Beaverbuild	2985	0.115259	0.103591	10.23%
Titan	1193	0.18043	0.126123	30.1%
Rsync	612	0.1232051	0.112009	9.09%
Illuminate	139	0.129506	0.129493	0.02%
<u>www.btcs.com/</u>	11	0.034232	0.043131	-25.99%

- searchers -> **bribe_b** -> builder -> **bribe_p** -> proposer
- top 3 builders bribe less ratio but win more blocks
- small builders provide subsidy for market share

Private transactions matter

- Searchers only send bundles to trusted builders
- Wallets & TG bots sell users transactions for profits.
- Flashbots share private transactions with builders with >1% market share

Searcher-Builder Cooperation

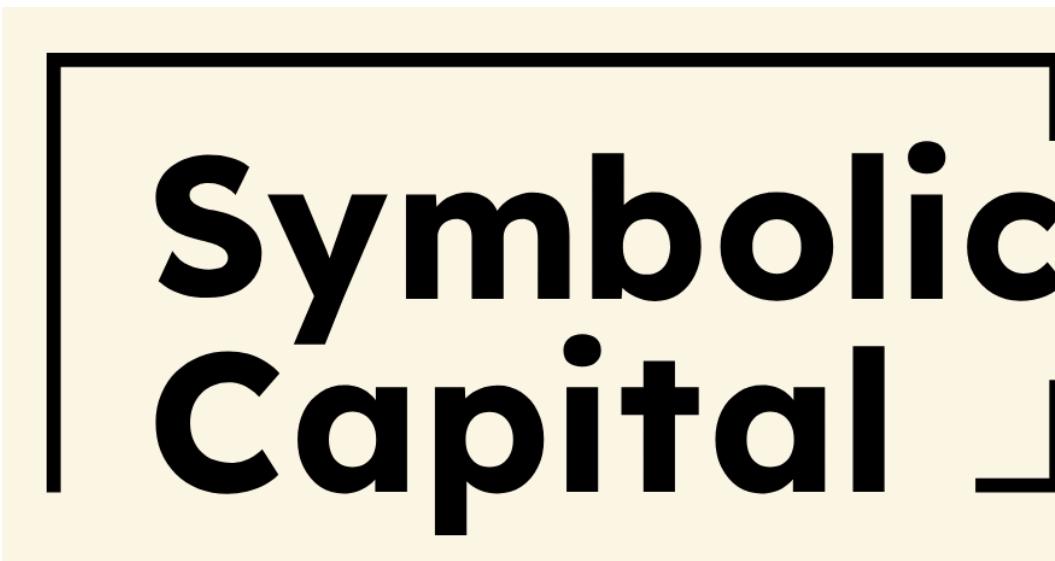


Bribe distribution for searchers

Bribe distribution for builders

CEX-DEX arbitrager

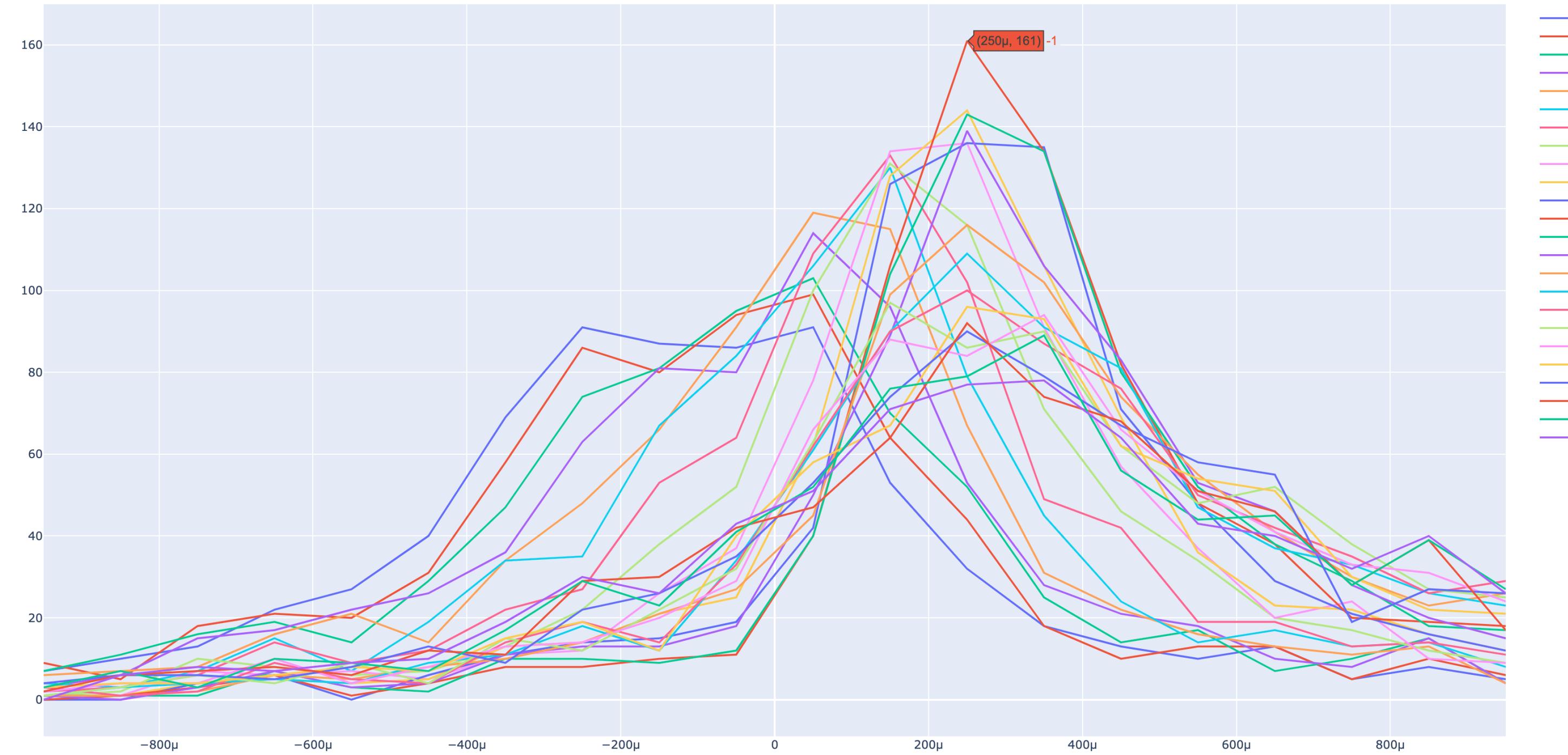
- Symbolic Capital Partners - Beaverbuild
- Winternmute - Rsync
- This transactions driven by off-chain information especially cex.
- More profit -> more cooperation -> more bribe -> more blocks -> more profit



Difficulty to analysis CEX-DEX arbitrage

- Profit of atomic arbitrage is total on-chain and transparent.
- Impossible to find corresponding cex-swap for specific dex-swap.
- Related analysis are different with each other and there is no conviction.

Estimation of profit for arbitrage



Transcation profit distribution for SCP

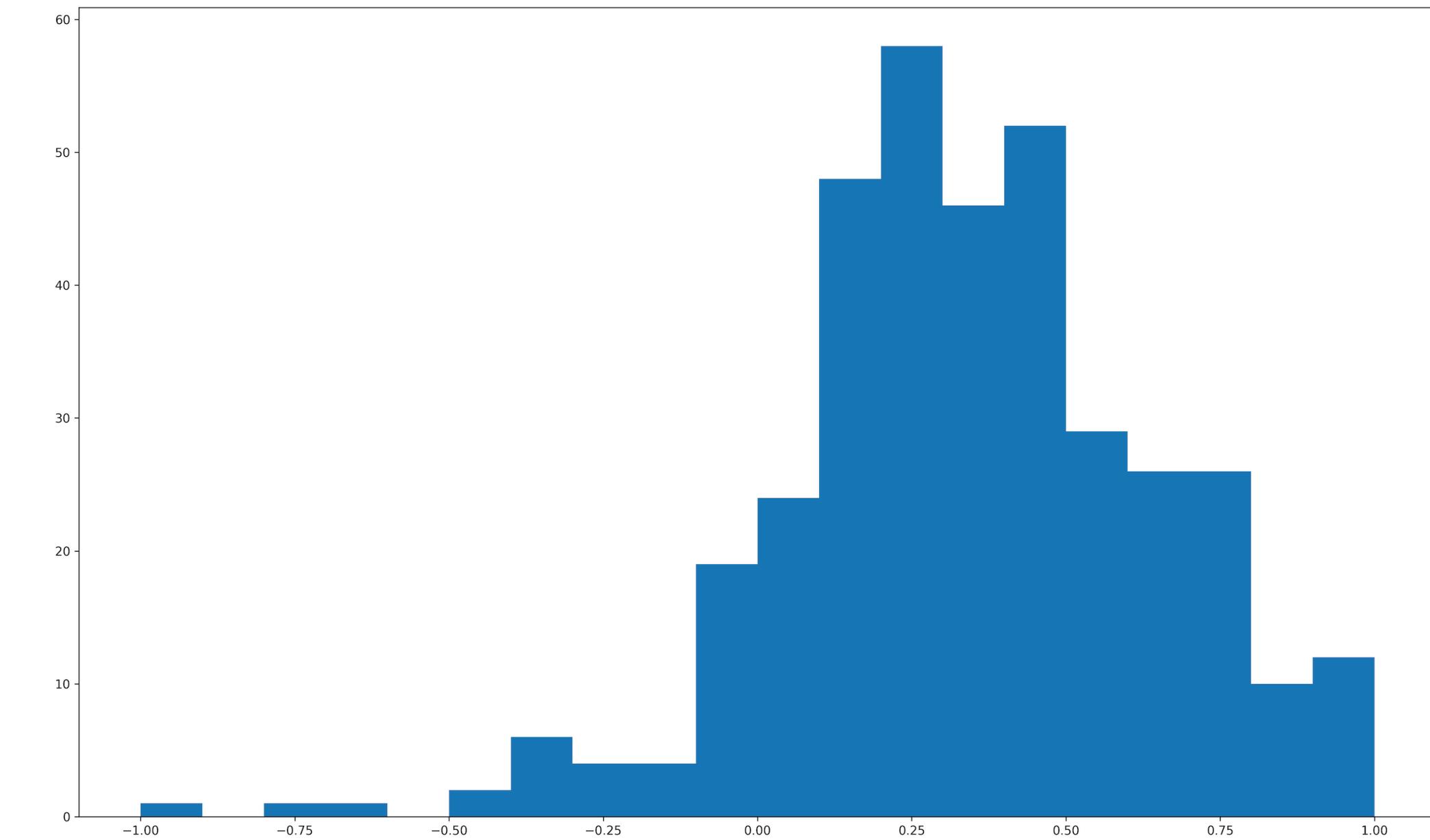
- **Hypothesis**

- The profits of arbitrages for one bot should distribute around a positive profit rate.
- The distribution should be similar to Normal Distribution
- Cex bots with builder may have lower latency.

Bots	cex offset
CEX_SC	-1
CEX_wintermute	0
CEX_26d7	2
CEX_6168	1
CEX_49e4	1
CEX_a7cc	0

How much profit of CEX-DEX arbitrages

Bots	revenue(ETH)	bribe(ETH)	profit ratio
CEX SCP	27.79	22.13	20.36%
CEX_wintermute	9.217	6.833	25.86%
CEX_a7cc	3.316	1.477	55.43%
CEX_26d7	0.3574	0.2003	43.95%
CEX_6168	2.578	1.321	48.76%
CEX_49e4	1.3754	0.7453	45.80%



Profit ratio distribution for Wintermute

- cex-dex bots have a much larger profit ratio than dex-dex bots (<5%)
- Wintermute & SCP have lower profit ratio but larger market share.

Conclusion

- Huge MEV profits on Ethereum attract a lot of duplicated arbitrage transactions, which causes network congestion and block space waste.
- PBS framework can solve these problems, but the cost is centralization of Ethereum network.
- More than **80%** blocks built by only **3** builders. These top builders gain 10-30% profit ratio.
- Small builders get 1% or even negative profit ratio for market share.
- Top builders have private txs, while 10%-20% of total bribe comes from exclusive CEX-DEX bots.
- We propose a new method to estimate the profit of cex-dex bots.
- These bots gain around 20% - 50% profit ratio which is larger than dex-dex bots with 5%.
- PBS causes centralization, and the trend is hard to stop in current framework.

Hackthon workflow

- previous
 - Erigon node
- 05-17
 - Decide Topic & Related work survey
- 05-18 am
 - Crawl cex price data from Binance API
 - Crawl dex swap data / block builder from ethereum node
- 05-18 pm
 - Builder block data analysis
 - Searcber data analysis
 - CEX bots profit analysis
- 05-19
 - Data debug
 - Prepare Presentation

Reference

- <https://www.binance.com/zh-CN/landing/data>
- <https://explore.flashbots.net/>
- <https://mevboost.pics/>
- <https://docs.flashbots.net/flashbots-auction/overview>
- Flash Boys 2.0: Frontrunning, Transaction Reordering, and Consensus Instability in Decentralized Exchanges
- <https://eigenphi.io/>