The MEV Letter

is a weekly collection of papers, articles and resources related to MEV. The intention of this letter is to provide a comprehensive summary of the latest research, discussions, and developments in the space, with links for further reading.

See our Transparency Reports for deeper dives into updates related to Flashbots.

Papers & Articles

- Threshold Encrypted Mempools: Limitations and Considerations by Antoine Rondelet and Quintus Kilbourn is the result of FRP-31 which investigates the market and incentive implications of using encrypted, specifically threshold encryption, as techniques to mitigate negative externalities of MEV extraction.
- Tweet-thread by Antoine Rondelet
- Summary by Antoine Rondelet
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- Towards a Theory of MEV, Part II: Uncertainty by Tarun Chitra explores MEV reduction and suggests that neither so-called fair ordering techniques nor economic mechanisms can individually mitigate MEV for arbitrary payoff functions.
- Talk: Towards a Theory of MEV, Part II: Uncertainty at PBS.day by Tarun Chitra (slides)
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- UniswapX by Hayden Adams, Noah Zinsmeister, Mark Toda, Emily Williams, Xin Wan, Matteo Leibowitz, Will Pote, Allen Lin, Eric Zhong, Zhiyuan Yang, Riley Campbell, Alex Karys and Dan Robinson introduce UniswapX; a new auction-based protocol for trading across AMMs & other liquidity sources. The protocol aggregates both onchain and offchain liquidity, internalizes MEV, offers gas-free swaps, and can be extended to support cross-chain trading.
- Tweet-thread by Uniswap Labs
- Tweet-thread by Dan Robinson
- Tweet-thread by Will Pote
- uniswapx-artemis by Mark Toda is a Rust implementation of an atomic UniswapX filler strategy built on the Artemis MEV framework.
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- uniswapx-artemis by Mark Toda is a Rust implementation of an atomic UniswapX filler strategy built on the Artemis MEV framework.
- Latency in Blockchains and Ethereum L2 Migration by Davide Crapis discusses the challenges of high latency on Ethereum L1 for DeFi applications and how migration to L2s could offer higher market efficiency and reduce the potential for market manipulation.
- The Espresso Sequencer: HotShot Consensus and Tiramisu Data Availability by Espresso Systems introduces HotShot, a proof-of-stake consensus protocol based on the HotStuff protocol and optimized for running an ordering consensus between a large number of parties.
- Tweet-thread by Espresso Systems
- Talk: Dumb blockchains require smart solutions (shared sequencing in the modular stack) at Modular Summit by Ben Fisch
- Releasing the Espresso Sequencer Testnet II: Doppio
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- Talk: Dumb blockchains require smart solutions (shared sequencing in the modular stack) at Modular Summit by Ben Fisch
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- Introducing Essential: We Are Intents by Liesl Eichholz introduces Essential as an organization “building intent-based infrastructure & tooling to accelerate the transition from value extraction to intent satisfaction”.
- Tweet-thread by Essential
- Tweet-thread by Essential on intents
- Tweet-thread by Essential
- Tweet-thread by Essential on intents
- Upgradeability of Ethereum L2s by L2BEAT dives into the various upgrade mechanisms of eight different Ethereum Layer 2s. The report focuses on the technical and organizational aspects of upgrading these L2s and provides recommendations for system architecture and safety measures.
- Tweet-thread by L2BEAT
- Tweet-thread by L2BEAT
- MEV Matters: Decoding Chorus One’s winning MEV strategy by Chorus One presents their strategy related to maximizing MEV extraction through relay selection, latency games, and infrastructure optimization.

Talks & Discussions

- Last week of EthCC[6] was packed with events related to MEV and PBS. To connect the dots and bring it all together, Flashbots together with Celestia and Maven 11 hosted PBS.day on July 22. The day gathered leading researchers to navigate the PBS design space, from the elegant PEPC proposal to the latest version of the enshrined PBS design, PTC.
- Recordings and resources from pbs.day can be found in the forum thread.
- See [MEV-Week Paris

](https://www.notion.so/flashbots/MEV-Week-Paris-6522b2aa9c2f4acabbc648c9965f0751) for a comprehensive overview of all MEV-related content. Recordings and slides will be added continuously over the next couple of weeks as these are being uploaded.

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- Flashbots also hosted a series of salons at our Pi-rate ship last week, diving deep into various topics. Keep an eye on the forum for more updates in the coming days.
- SajZ published a summary with their takeaways from orderflow.salon.
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- Flirting with Models: Grug - Grug (Finally) Teaches Us MEV (S6E12) is a conversation with Grug on MEV strategies with examples and risks associated with them. The conversation also covers the impact of alt-L1’s and L2’s on MEV and how the space might evolve going forward.
- Epicenter Podcast: Vitalik Buterin: Ethereum - MEV, Staking Derivatives and Privacy invited Vitalik to discuss MEV, staking derivatives, privacy, decentralization, and future interoperability.
- Scraping Bits by DeGatchi invites world-class hackers, developers, and cybersecurity specialists for technical deep dives into the chaotic world of the EVM. The four most recent episodes invites searchers to explore the dark forest of MEV.

- E03 - DeFi Food Revolution: From Yam Finance to Foundry and Pyrometer - A Journey of Innovation and Growth - With Brock Elmore And DeGatchi:
- E04 - Unlocking DeFi's Untapped Potential: From Statistical Arbitrage MEV to Crafting Permissionless Options on Ethereum - With 0xAlcibiades And DeGatchi
- E05 - From Code to Cash: Building MEV Bots and Doubling Money in 1 Minute - With Raph And DeGatchi
- E06 - An Encrypted Arena Emerges: Anonymous Transactions and MEV on Aztec's ZKVM - With Maddiaa And DeGatchi
- E03 - DeFi Food Revolution: From Yam Finance to Foundry and Pyrometer - A Journey of Innovation and Growth - With Brock Elmore And DeGatchi:
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- MEV (not only) for lawyers by Mikołaj Barczentewicz is an introduction to MEV that looks at where MEV appears, how it's extracted, and some of the mechanisms available to mitigate the negative externalities.
- Mevlaw.xyz by Mikołaj Barczentewicz is collating law and policy analysis related to MEV.
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Posts & threads

- Quintus has published a series of topics on the forum opening up discussion for various research areas related to PBS, SUAVE, shared sequencing, TEE/SGXs, and more.
- PBS (and alternatives) wiki
- SUAVE wiki
- TEE/SGX wiki
- Censorship Resistance In PBS (Heterogeneity, BFT)
- Private Bidding In PBS (Cryptography)
- Economic Censorship Resistance in PBS
- Pre-Execution Privacy In PBS
- Proposer Incentive Compatibility of Private Bidding in PBS
- Latency Races In PBS
- The Absence of Proposer Myopia
- Understanding Building In A Continuous Time Setting
- Revenue allocation in shared sequencing
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- Understanding Building In A Continuous Time Setting
- Revenue allocation in shared sequencing
- Evan Van Ness published a summary of the July 2023 r/ethereum Research AMA with comments from EF researchers on Deneb, RANDAO, DVT, SSLE, MEV and more.
- Toni Wahrstätter introduced a new diagram on builder efficiency on mevboost.pics, comparing the average number of bids with the total number of blocks that make it on-chain.

Other

- Open sourcing the Flashbots MEV-Share Node announce that the MEV-Share Node implementation is now open source. MEV-Share Node is a service that implements the MEV-Share protocol and merges user transactions with searcher bundles.
- Tweet-thread by Shea Ketsdever
- Protocol specification
- Client library
- Example bots
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- Announcing Winners from the EthGlobal Paris Hackathon 2023 by Reid Yager announces the three winners of the ETHGlobal Flashbots track. If you're a searcher looking for you next challenge, stay tuned for more information on an upcoming event!
- AugmentHack update by sxysun includes takeaways and results of the hackathon that was organized together with augmenthack.xyz with a $15K research grant as prize.
- Tweet-thread of the winning project by DeEnabler
- Announcement thread by sxysun
- Announcement thread by Emperor
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- Announcement thread by sxysun
- Announcement thread by Emperor
- nvTrust: NVIDIA Confidential Computing Ancillary Software is a repository that contains much of the utilities & tools, open-source code, and SDKs leveraged when using NVIDIA solutions in trusted environments, such as Confidential Computing.
- Andrew Miller and Alex Obadia will participate in Crypto Lounge Experience on July 29th in Barcelona to host two sessions on "Understanding Privacy Technologies through the lens of MEV".

[Sign up here

](https://forms.gle/Qr6MEUkVa13TDipW6) if you'd like to get The MEV Letter straight to your inbox!

Previous editions of The MEV Letter