

More slides about proposer-builder separation



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L1 R&D Workshop, DEVCON, Bangkok

It takes a village...

- h/t Barnabé for being a great KOL.^{1,2}
- h/t Julian, Thomas, Francesco, et al. on extensive IL work.^{3,4}
- h/t Terence & Potuz on relentless ePBS work.^{5,6}



¹<https://efdn.notion.site/Block-construction-session-bd611621250f45948eff05fcf6a34067>

²<https://mirror.xyz/barnabe.eth/QJ6W0mmmyOwjec-2zuH6lZb0iEl2aYFB9gE-LHWIMzjQ>

³<https://ethresear.ch/t/fork-choice-enforced-inclusion-lists-focil-a-simple-committee-based-inclusion-list-proposal/19870>

⁴<https://ethresear.ch/t/uncrowdable-inclusion-lists-the-tension-between-chain-neutrality-preconfirmations-and-proposer-commitments/19372>

⁵<https://eips.ethereum.org/EIPS/eip-7732>

⁶<https://ethresear.ch/t.builder-bidding-behaviors-in-epbs/20129>

Desiderata



- “*Block production is centralized, block validation is trustless and highly decentralized, and censorship is still prevented.*” – Vitalik¹
 - *block production is centralized*
 - ⇒ **design goal #1: encourage builder competition.**
 - *block validation is trustless and highly decentralized*
 - ⇒ **design goal #2: limit the value of validator² sophistication.**
 - *censorship is prevented*
 - ⇒ **design goal #3: preserve the neutrality of block space.**

¹<https://vitalik.eth.limo/general/2021/12/06/endgame.html>

²N.B., I notationally abuse the word *validator*.

Alphabet soup

(hope you like acronyms)



- We are going to describe a few existing proposals that are the building blocks¹ for endgame block construction.
- Payload-Timeliness Committee² + MEV-burn³ – (abbr. PTC)
- Fork-choice enforced inclusion lists⁵ – (abbr. FOCIL)

¹ pun intended

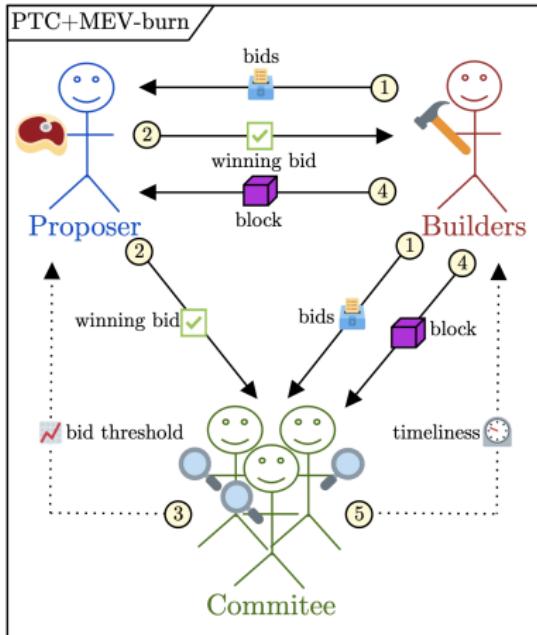
²<https://ethresear.ch/t/payload-timeliness-committee-ptc-an-epbs-design/16054>

³<https://ethresear.ch/t/burning-mev-through-block-proposer-auctions/14029>

⁵<https://ethresear.ch/t/fork-choice-enforced-inclusion-lists-focil-a-simple-committee-based-inclusion-list-proposal/19870>

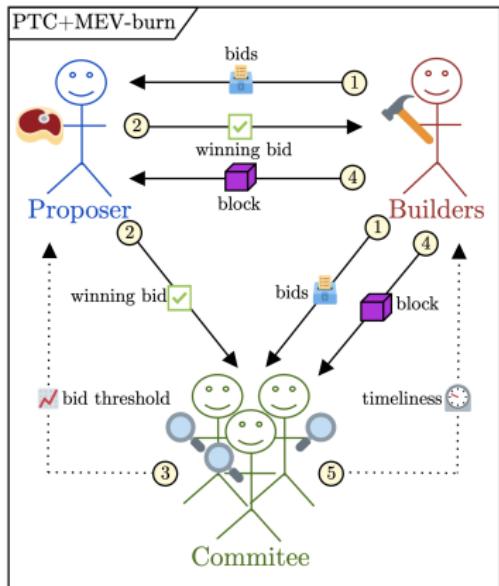
Payload-Timeliness Committee + MEV-burn (PTC)

(if it ain't broke don't fix it)



- ① **The builder bids** in the auction by sending (block header, bid value) pairs to the proposer and the committee members.

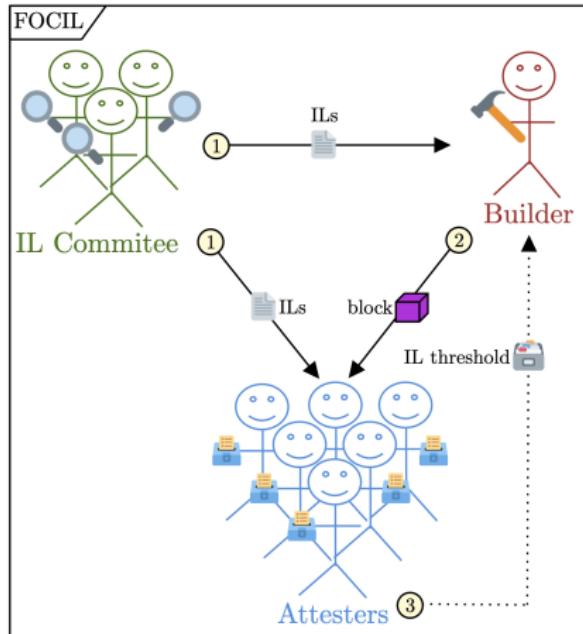
PTC analysis



- PTC solves in-protocol fair exchange between builder and proposer.
- PTC primarily implements design goal #1: encourage builder competition.
 - JIT auction, MEV-burn for bid threshold enforcement, permissionless bidding.
- PTC marginally addresses design goal #2: limit the value of validator sophistication.
 - Democratize access to MEV, smooth variance of MEV rewards, suffers from the “value-in-flight” problem.
- PTC does not address design goal #3: Preserve the neutrality of Ethereum block space.
 - Small set of builders responsible for transactions (have exclusion discretion).

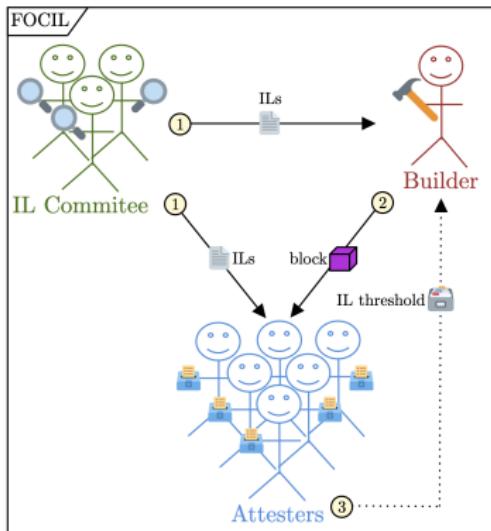
FOCIL

(teamwork makes the dream work)



- ① **The IL committee publishes** their inclusion lists to the builder and the attesters.

FOCIL analysis



- FOCIL increases the protocol's neutrality by allowing multiple validators to express their preferences in the block co-creation.
- FOCIL primarily contributes to design goal #3: preserve the neutrality of Ethereum blockspace.
 - Block template co-creation increases preference entropy over block contents. Constrains builders' ability to exclude.
- FOCIL addresses neither design goal #1: encourage builder competition nor design goal #2: limit the value of validator sophistication.
 - FOCIL is agnostic to the exact block production process beyond enforcing a block template.

Zooming out

- mev-boost is a trusted third party to handle fair exchange of blocks.
- ePBS is supposed to remove the need for relays.
 - ▶ Proposers no longer need to trust the relay to process the payment.
 - ▶ Builders no longer need to trust the relay to process the protect their block contents.
- More accurately, “ePBS allows but doesn't compel proposers to source their blocks trustlessly from the protocol instead of a relay.”
- Happy path: Most proposers strictly prefer using ePBS to the relays, forcing builders to participate in the system. Relays no longer are profitable and shut down.
- Medium path: Some proposers prefer using ePBS to the relays, but enough proposers continue using relays for them to stay operational.
- Sad path: Builders strictly prefer using/being relays, forcing proposers to use them instead of ePBS.

Relevant factors

- Relays already exist, have all the proposers connected, and have low latency links with the builders. *Path dependence of mev-boost.*
- Builders and relays are effectively the same entity now, so we should treat them as such.
- There are only 2 builders and there is no clear indication that the market structure will change on its own.

Further questions & Action items

- Technical:
 1. How is builder collateral handled? CL or EL? Do they have regularly deposit/top up?
 2. How risky is the DoS vector resulting from proposers IP leaking through sending a direct request to the builder during their slot?
 3. How important is pipelining afforded by ePBS?
- Spiritual:
 1. Is there any reason to believe the builder market structure will change?
 2. Is this the right use of valuable engineering and core-dev resources?
 3. Is there a world where this is useful as a first step towards endgame block production?
- Action items:
 1. Talk to builders, relays, & staking pools about what they would do.
 2. Think more about actual market structure changes, ToB/RoB, Braid, APS, Execution Auctions, Mechan-stein.

thanks :-)



<https://ethresear.ch/t/mechan-stein-alt-franken-ism/20321>