Block Builders

Builder Fundamentals

What is a Builder?

Block builders are highly specialized actors who construct blocks from transaction orderflow (public transactions, bundles, private transactions, etc).

The Role of Builders

Builders run algorithms and simulations (e.g. First Come First Serve, First Price Auctions, etc.) to order bundles and TXs in a block template (technically:execution payload) that maximizes profit. Builders then bid for and buy the validators' blockspace, facilitated by one or more relays, so their execution payloads are proposed to the blockchain.

How do builders pay block proposers?

Flashbots proposed a standardized specification for how payments are made from builders to block proposers through the following process:

1. The builder sets their own address as thefeeRecipient
2. of the payload block header they are constructing.
3. The builder includes a transaction which pays ETH to the proposer'sfeeRecipient
4. address at the end of their proposed block.

Determining the value of blocks

A standard method for determining block value is crucial for multiple components of the MEV-Boost ecosystem; including relay monitoring, validator accounting, builder payments, block explorers, payment proofs, and MEV hiding.

Various methods for defining block value wereconsidered by members of the community. It was determined that block level scoring was the most simple and intuitive method for scoring block value.

Block level scoring

Block level scoring looks at the difference in the balance of the fee recipient account before and after the block execution.

Note that a "block score" is not meant to be a formal definition of realized extractable value, since this is a difficult metric to quantify. For example, a Layer 2 transfer to a validator' fee recipient address could be considered extractable value, but falls outside the scope of a block score calculation.

Constructing a payment proof for this scoring method requires a Merkle Proof of the fee recipient balance in block(n - 1) , and a Merkle Proof of the fee recipient balance in blockn .Payment proofs have not yet been put into production. Active discussion about payment proof implementation is still on-going. For more details or to participate in the discussion around payment proofs and block-level scoring, please check out to theblock scoring forum thread.

External Builders

External builders can submit blocks to Mainnet, Goerli and Sepolia Flashbots relays. The table below outlines Builder API methods available on each network.

Relay Block Submission Endpoints by Network

Mainnet Goerli Sepolia getValidators GET Request - Returns an array of validator registrations with assigned duties in the current and next epoch Mainnet Goerli Sepolia submitBlock POST Request - submits a block to the relayMainnet Goerli Sepolia * See also theRelay API documentation - Block Builder API * for more details on the API and payloads. * The exampleFlashbots builder implementation * is a good external builder reference, and is currently used in production by several builders.

Rate-limits

Submissions to all relays are currently rate-limited to 600 submissions / 5m / IP, which translates to in average 2 submissions / sec /IP.

Flashbots Builders

All Flashbots builders pay block proposers from the flashbots-builder.eth ENS address . Each Flashbots builder uses a different public key (builder_pubkey) for relay identification and analytics purposes.

The variousbuilder_pubkeys used to identify Flashbots builders to relays are listed below:

Builder Public Key
0x81babeec8c9f2bb9c329fd8a3b176032fe0ab5f3b92a3f44d4575a231c7bd9c31d10b6328ef68ed1e8c02a3dbc8e80f9
0x81beef03aafd3dd33ffd7deb337407142c80fea2690e5b3190cfc01bde5753f28982a7857c96172a75a234cb7bcb994f
0xa1dead01e65f0a0eee7b5170223f20c8f0cbf122eac3324d61afbdb33a8885ff8cab2ef514ac2c7698ae0d6289ef27fc
0xa1defa73d675983a6972e8686360022c1ebc73395067dd1908f7ac76a526a19ac75e4f03ccab6788c54fdb81ff84fc1b
0x81babad2d5fd9413c942f49bfd86bc1dca5b02ff4cd065a10c7ab05713e63883056e6a87777e236424574aa25bbe3e99
0xb89b9308fbc6c2998c7e60e39424b858c74b02c234b3e0fa5ecf7c3971208dfa5f92e0bdbe16fc24abfd71c248acf0f9
0xa1f1a5a4970903afd6f0f16049c3e9997d348a3254e99b08e89ffb553d0b1575595776b1d849ca2e8d64106443a47e76

Additional Links & References

- MEV-Boost Geth Builder
-
    - an example builder implementation
- Relay API documentation - Block Builder API
- Block Builder Self-Help Group:https://collective.flashbots.net/c/builders/14
- Github issue about becoming block builderhttps://github.com/flashbots/mev-boost/issues/145
- .
- Mevboost.org*
-
    - Tracking MEV-Boost relays and block builders. A quick hack byAnish
- . Design inspired by file.app.

Note: Flashbots does not control and cannot verify the data coming from external people and organizations. Please direct questions or issues directly to the creators of external data sources. Edit this page Last updatedonJan 30, 2024 Previous MEV-Boost Risks and Considerations Next Block Proposers