Stateless-FOCIL

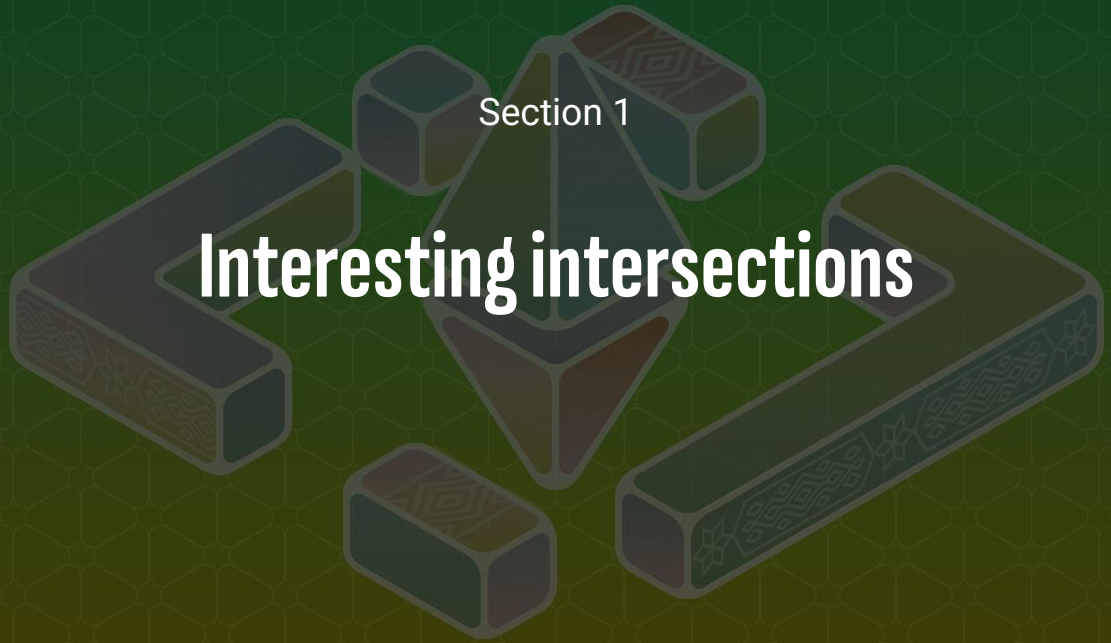
A quick TLDR

@CPerezz

stateless-consensus

Section 1

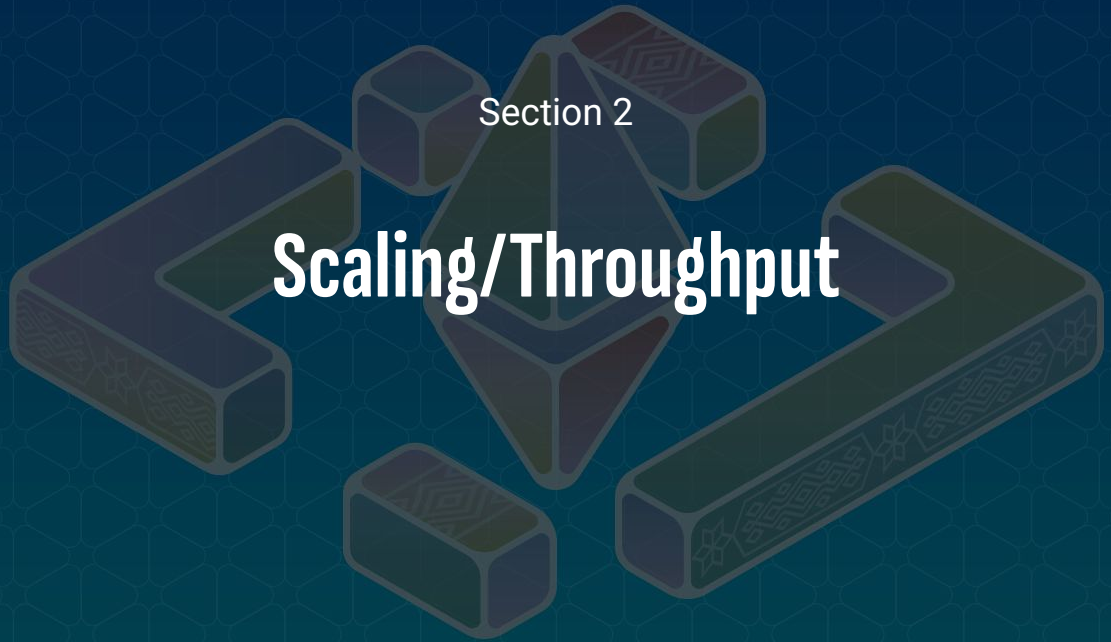
Interesting intersections

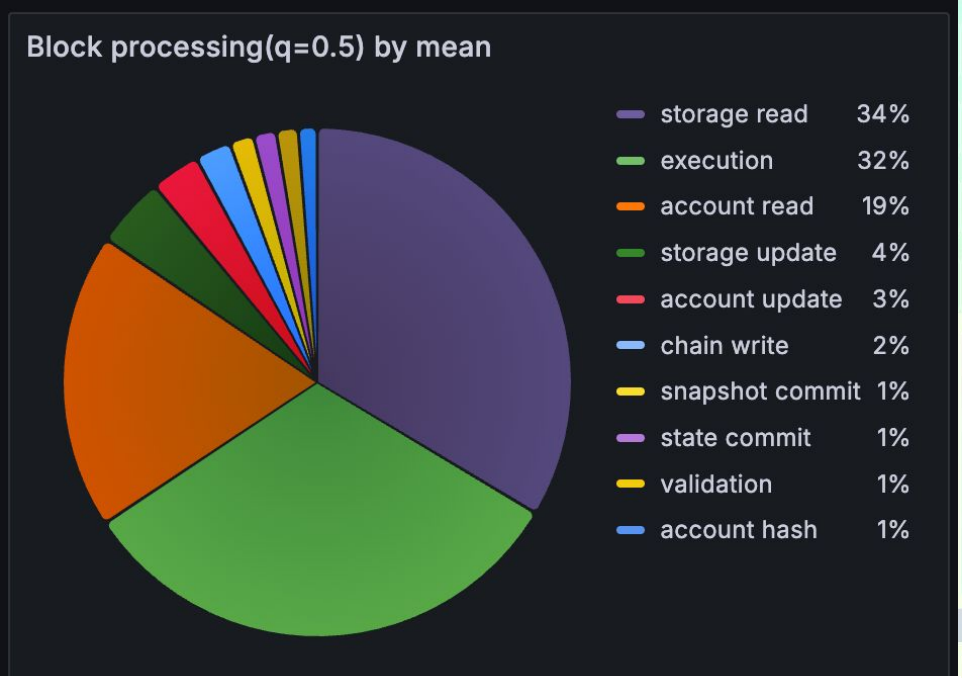


Scaling/Throughput - Networking - Mempool Health - AA

Section 2

Scaling/Throughput





research

Decoupling throughput from local building

Proof-of-Stake Economics protocol-research-call

barnabe 2 Mar 25

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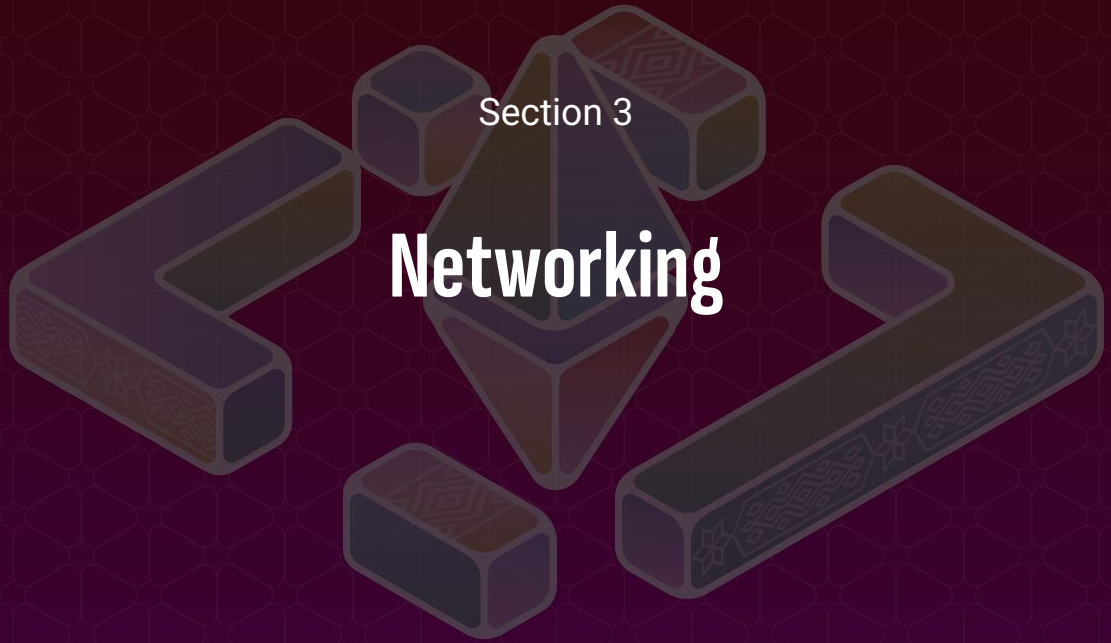
Scaling/Throughput

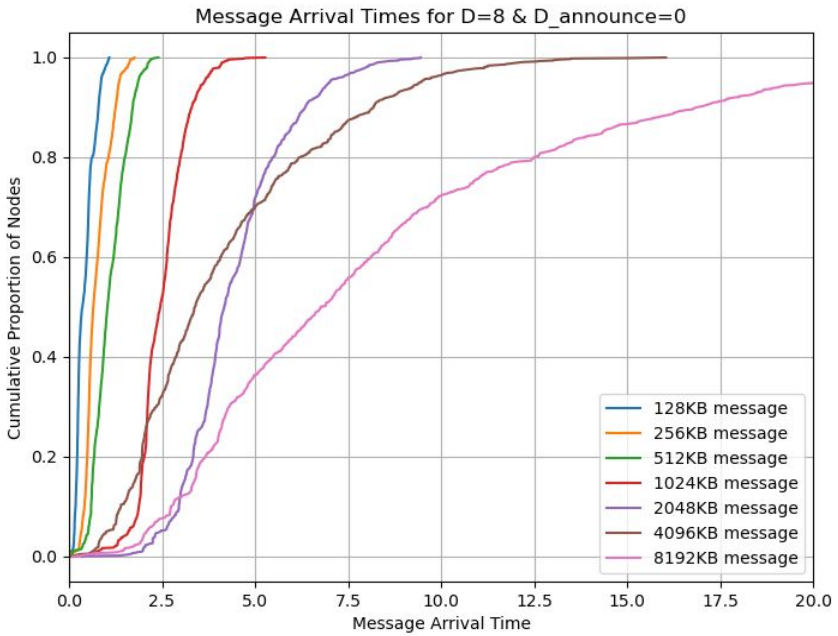
- Stateless or partial-stateless validators will save 100% of block execution time.

- FOCIL decouples throughput from local block building. Without FOCIL, throughput would need to be set at the level of a local block builder.

Section 3

Networking





On Bandwidth Requirements For Validators

Summary

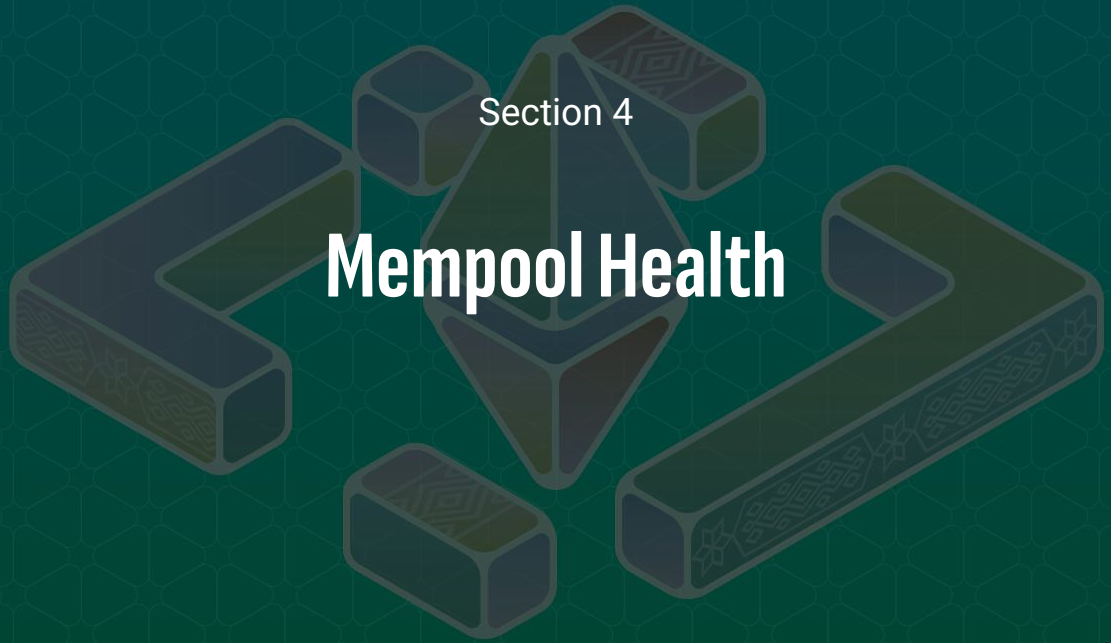
- With Inclusion Lists, we recommend:
  - 50 Mbps download and 25 Mbps upload for users using MEV-boost
  - 100 Mbps download and 50 Mbps upload for local block builders
- Without Inclusion Lists, if a local block builder does not have enough bandwidth, we recommend that they fill up enough of the block to match their bandwidth constraints. E.g. no blobs.

Networking

- Concerns aren't massive. Specially since ZKEVMs have tiny proofs (~128-256 KiB).
- Concerning if we move towards any tx-proof entangled submission requirements (See AA later).
- BALs (statediffs) will also take up some size.
- ILs don't need to linearly follow the gas limits. Thus they will stay small, not impacting block-size/IO constraints.

Section 4

Mempool Health



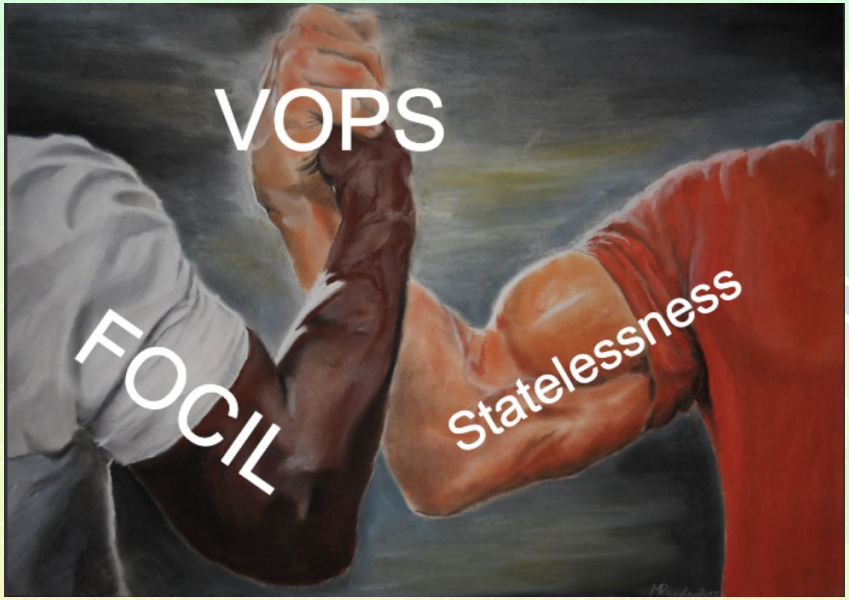
Public Mempool health

When a client is fully stateless, it looses the precious ability of checking transaction validity.

- Enough funds to pay to even trigger the call.
- Correct nonce is set (not re-used).

Without these, the node can be flooded with invalid txs, and it will forward them and happily include them within the IL.

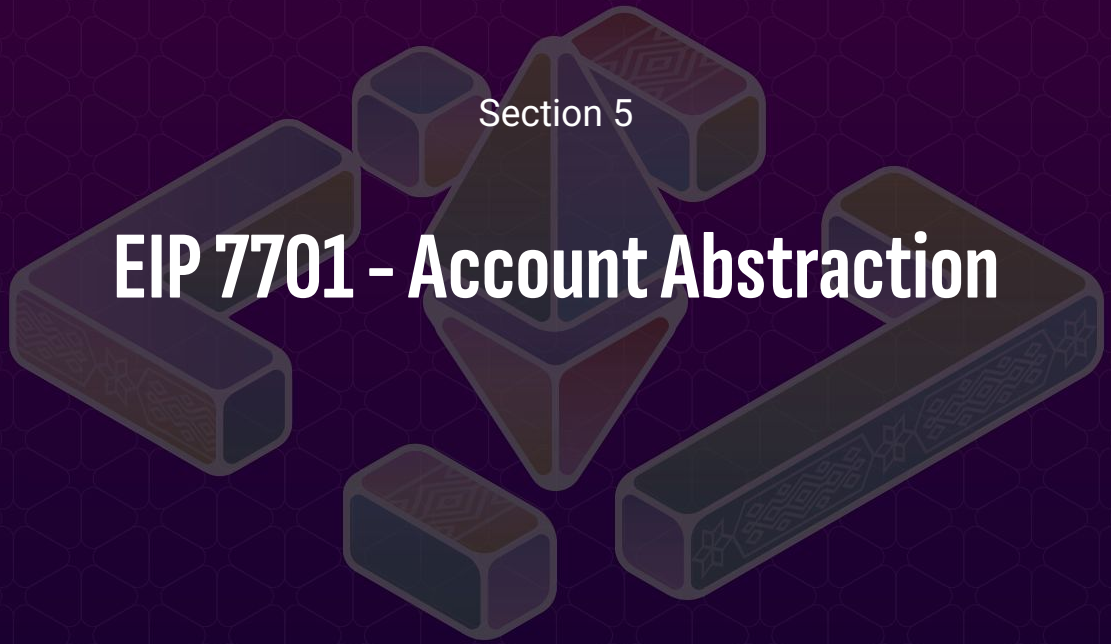
Partial statelessness + FOCIL



- The small tradeoff of storing the account-related information allows a fully-compatible Stateless-FOCIL. Preventing IL poisoning and guaranteeing mempool health.
- Inline with the idea of partial-stateless nodes from Vitalik (selective state retention of my interest).
- You can be a “**Partial Stateless” Includer!**

Section 5

EIP 7701 - Account Abstraction



- VOPS requires the node to store the account-trie state.
- AA requires access to “arbitrary state” to check tx validity.
- There might be workarounds we can take.
  - Facilitate proof construction via protocol changes.
  - Reduce proof size to save on Bandwidth.

Thanks!