Consensus

In the Filecoin blockchain, network consensus is achieved using the Expected Consensus (EC) algorithm, a secret, fair, and verifiable consensus protocol used by the network to agree on the chain state

Overview

In the Filecoin blockchain, networkconsensus is achieved using the Expected Consensus (EC) algorithm, a probabilistic,Byzantine fault-tolerant consensus protocol. At a high level, EC achieves consensus by running a secret, fair, and verifiableleader election at everyepoch where a set number of participants may become eligible to submit a block to the chain based on fair and verifiable criteria.

Properties

Expected Consensus (EC) has the following properties:

- Each epoch has potentially multiple elected leaders who may propose a block.
- A winner is selected randomly from a set of network participants weighted according to the respective storage power they contribute to the Filecoin network.
- All blocks proposed are grouped together in atipset
- , from which the final chain is selected.
- A block producer can be verified by any participant in the network.
- The identity of a block producer is anonymous until they release their block to the network.
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Steps

In summary, EC involves the following steps at eachepoch :

1. A storage provider checks to see if they are elected to propose a block by generating anelection proof
2. .
3. Zero, one, or multiple storage providers may be elected to propose a block. This does not mean that an elected participant is guaranteed to be able to submit a block. In the case where:
4. - No storage providers are elected to propose a block in a given epoch
5. - ; a new election is run in the next epoch to ensure that the network remains live.
6. - One or more storage providers are elected to propose a block in a given epoch
7. - ; each must generate aWinningPoSt proof-of-storage
8. - to be eligible to actually submit a block.
9. *
10. Each potential block producer elected generates a storage proof usingWinningPoSt
11. for a randomly selectedsector
12. within in short window of time. Potential block producers that fail this step are not eligible to produce a block. In this step, the following could occur:
13. - All potential block producers fail WinningPoSt
14. - , in which case EC returns to step 1 (described above).
15. - One or more potential block producers pass WinningPoSt
16. - , which means they are eligible to submit that block to the epochs tipset.
17. *
18. Blocks generated by block producers are grouped into atipset
19. .
20. The tipset that reflects the biggest amount of committed storage on the network is selected.
21. Using the selected tipset, the chain state is propagated.
22. EC returns to step 1 in the next epoch.
23.

Previous Blocks and tipsets Next Drand

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