Storage proving

Storage proving, known asProof-of-Spacetime ("PoSt"), is the mechanism that the Filecoin blockchain uses to validate that storage providers are continuously providing the storage they claim. Storage providers earn block rewards each time they successfully answer a PoSt challenge.

Proving deadlines

As a storage provider, you must preserve the data for the duration of thedeal , which are on-chain agreements between a client and a storage provider. As of March 2023, deals must have a minimum duration of 180 days, and maximum duration of 540 days. The latter value was chosen to balance long deal length with cryptographic security. Storage providers must be able to continuously prove the availability and integrity of the data they are storing. Every storage sector of 32 GiB or 64 GiB gets verified once in each 24 hour period. This period is called aproving period . Every proving period of 24 hours is broken down into a series of 30 minute, non-overlappingdeadlines . This means there are 48 deadlines per day. Storage sectors are grouped in apartition , and assigned to a proving deadline. All storage sectors in a given partition will always be verified during the same deadline.

WindowPoSt

The cryptographic challenge for storage proving is calledWindow Proof-of-Spacetime (WindowPoSt). Storage providers have a deadline of 30 minutes to respond to this WindowPoSt challenge via a message on the blockchain containing azk-SNARK proof of the verified sector. Failure to submit this proof within the 30 minute deadline, or failure to submit it at all, results inslashing . Slashing means a portion of thecollateral will be forfeited to the f099 burn address and thestorage power of the storage provider gets reduced. Slashing is a way to penalize storage providers who fail to meet the agreed upon standards of storage.

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