

Miner Report

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1 Introduction

This document is about meta-node blockchain's miner, which can run on computer or mobile device to verify transactions and execute smart contracts. Miner will receive amount of MTD native token for contributing.

There are 2 types of miner: Verify and Execute

2 Join node

In order to start mining, Miner have to do following step:

- Install [Meta-node browser](#).
- Install [Mining dapp](#).
- Stake to node as Verify and/or Execute Miner.
- Connect to the node and start mining with the staked account.

3 Mining reward and halving

3.1 Basics of MetaNode Mining

Mining is the process by which people use mobiles, computers or mining hardware to participate in MetaNode's blockchain network as a transaction validator, processor or forwarder.

Despite using Proof Of Stake, MTDs have to be generated by the mining process. Each block generated will reward some MTDs to the leader who created it.

From start, there is a limit cap for total MTDs are 100 000 000 000 MTD. And after 100 years, there's no more new MTD will be generated.

3.2 Halving

After the network mines 315 360 000 blocks roughly every once year, the block reward given to the leader for creating a block is cut in half. This event is called halving because it cuts the rate at which new MTDs are released into circulation in half.

This rewards system will continue until about 2123 when the proposed limit of 100 billion coins is reached. At that point, leaders will be rewarded with fees for processing transactions, which network users will pay. These fees ensure validators, nodes and miners are still incentivized to participate and keep the network going.

The halving event is significant because it marks another drop in the rate of new MTD being produced as it approaches its finite supply.

Example of halving: In the first year, for each block generated the leader will be rewarded with 158 MTDs, but in the second year reward will be 79 MTDs left. And once the total MTD is equal 100,000,000,000, the leader will receive only the transaction fee in the block it generated.

3.3 Formular

$$totalMTD = \sum_{i=1}^{100} rewardFromStart * totalBlockPerYear * \frac{1}{2^i}$$
$$100,000,000,000 = \sum_{i=1}^{100} rewardFromStart * 315,360,000 * \frac{1}{2^i}$$

After solving this we get $rewardFromStart \approx 158$ MTDs.

4 Reward distribute for node and miner

Whenever the miner success validates then sign or executes smart-contract, which creates an accepted vote¹, the node will add contribution point(CP) for the miner.

When node receive reward transaction from parent, it will save n percentage reward for itself and calculate CP percentage of each miner address then distribute leftover amount match percentage for miners by add it to pending reward.

Node will create transaction to send reward for any miner that have pending reward greater than threshold and transaction fee. Transaction fee for send reward will be direct subtract to miner receive amount.

Reward transaction will be add to pending pack pool. If transaction fail, reward balance will be added back to pending pool.

Example:

- Node A have 2 miner, miner1 and miner2.
- Threshold is 5 and transaction's fee is 1².
- miner1 CP is 6 and miner2 cp is 4.
- miner1 pending reward is 4, miner 2 pending reward is 0.
- Node A receive 10 reward transaction.
- Node A have reward distribute percentage is 80.

Then formula to calculate reward of miner1 and miner2 is:

$$miner1 = (5/(5 + 5)) * (10 * 80/100) = 4$$

$$miner2 = (5/(5 + 5)) * (10 * 80/100) = 4$$

Pending balance after distribute:

$$miner1 = 4 + 4 = 8$$

$$miner2 = 0 + 4 = 4$$

Because $8 > threshold(5)$ so miner1 will receive reward transaction with amount =

$$8 - transactionfee(1) = 7$$

¹Usually need 2/3 miner with the same vote to make that vote be valid

²In reality transaction's fee is calculate by gas used and gas fee

5 Slashing distribute

Whenever miner's vote is invalid³ depredation point(DP) will be added instead CP.

When node receive confirm block, it check all address with DP, any address have greater DP threshold will receive a slash transaction which subtract stake amount⁴.

³invalid vote is all vote different than valid vote

⁴threshold and slashing amount is configurable by each node

6 Verify Miner

6.1 Introduction

Verify miner will receive these command for verify:

- VerifyTransactionSign:
- VerifyPackSign: require miner to verify aggregate of single pack; data contents aggregate sign, list pubkey, list transaction's hash
- VerifyPacksSign: require miner to verify aggregate of multiple pack; data contents list of aggregate sign, list pubkey, list transaction's hash

6.2 Flow chart

Updating

6.3 Reward tracking

- VerifyTransactionSign: $1CP$
- VerifyPackSign: $1CP$
- VerifyPacksSign: $1CP * totalPack$

6.4 Hardware require

Updating

7 Execute Miner

7.1 Introduction

Execute miner will receive only ExecuteTransactions which content multiple transaction for execute include deploy and call

7.2 Flow chart

Updating

7.3 Reward tracking

- ExecuteTransactions: $1CP * totalTransaction$

7.4 Hardware require

Updating