Cold Staking Model Proposal

1. Proposal Description

This proposal assumes that the cold staking block reward (20% of the mined block reward) plus a fraction of the accumulated staking reserve is distributed to every stake holders depending on their weight at a given block i.

For illustrative purposes, we assume that the cold staking block reward is only 20% (120 CLO) of the actual block reward without taking into account the staking reserve, if the contract receives the following requests:

- Staker 1 will stake 100 CLO at block 2.
- Staker 2 will stake 200 CLO at block 3.
- Staker 3 will stake 300 CLO at block 4.
- Staker 1 withdraws his stake at block 5.

The reward of each stacker is illustrated in table.1.

Block	1	2	3	4	5	Total Reward
Staker 1	0	120	40	20	0	180
Staker 2	0	0	80	40	48	168
Staker 3	0	0	0	60	72	132

Table.1 Block reward distribution illustration

As a proposition, In case of a staking gap where no user is staking (which will be highly improbable) the cold staking block reward will be sent to the treasury fund.

2. Cold Staking Formula

First of all, we define $R^j_{N,K}$ as the reward of user j between block N and K

$$R^j_{M,N} = \sum_{i=M}^{i=N} A^j_i * \frac{BR_i}{S_i}$$

Where:

- BR_i is the cold Staking block reward 20% of the current block reward.
- S_i is the total staked amount in the contract at block i .
- A^j_i is the amount staked by user j at block i .

Since A^j_i and S_i will not change on every block, we will have in interval M to N for example, where A^j_i and S_i will be fixed :

$$R^j_{M,N} = \frac{A^j}{S} \sum_{i=M}^{i=N} BR_i$$

$\sum_{i=M}^{i=N} BR_i$ is going to be the total cold staking bloc reward between block M and N, to get it in the smart contract since the balance of the contract is known and the transfer are known it can be easily calculated.

The further development of the formula stays the same as in first proposal, please note that the development were done to minimize the gas consumption.

3. Implementation

A beta implementation of the proposed model can be find here.

The first tests were conducted on a private blockchain using “remix-ide” and “geth”. the expected outputs illustrated in table 1 were satisfied.