

AIP¹-016: Gas Fee Redistribution Protocol

platfowner, liayoo 2021-03-06

Goals

- Introduce Gas Fee Redistribution Protocol Version 1 of AIN Blockchain

Problem Definition

In this document, we cover how to redistribute the collected gas fee to the contributors (e.g. block proposer, block validators)

Requirements

Gas fee redistribution policy has the following requirements:

- Should be fair and reasonable from the token economy perspective
- The simpler the better

Proposed Design

Key Ideas

- The collected gas fee (see [Gas Fee Charging](#)) goes to the block proposer 100%
- The money transfer is done when the block is created by the block proposer

Design Details

Gas Fee Distribution

The gas fee collected to the gas fee account (**/service_accounts/gas_fee/gas_fee/<block number>**) is transferred to the block proposer by adding a proposal transaction to the next block's last_votes which performs a SET_VALUE operation at **/consensus/number/<block number>/propose** with a value such as: { number, epoch, proposer, **gas_cost_total**, ... } and

¹ AI Network Improvement Proposal. Visit <https://docs.ainetwork.ai> for the full list.

triggers the native function **_distributeFee()**. The **_distributeFee()** will then transfer the gas cost collected at `/service_accounts/gas_fee/gas_fee/<block_number>` to the proposer by triggering **_transfer()** native function.

```
e.g. / consensus / number / 10000 / propose / {
  number: 10000,
  proposer: "0x_user_a",
  ...,
  gas_cost_total: 12345
}
```

Data Structure

The `gas_amount_total` and `gas_cost_total` are calculated while processing all transactions in a block and collecting gas costs. The **gas_amount_total**, which is the sum of used `gas_amount` and **gas_cost_total**, which is the sum of gas fees ($= \sum \text{gas_amount} * \text{gas_price}$, over all transactions), are included in the block's header. Updated structure of a block is as follows:

Table 2. Structure of a block

<pre>{ number: <number>, epoch: <number>, hash: <string>, last_hash: <string>, state_proof_hash: <string>, proposer: <address>, validators: { <address>: <number>, ... }, timestamp: <number>, size: <number>, last_votes_hash: <string>, transactions_hash: <string>, gas_amount_total: <number>, gas_cost_total: <number>, // body last_votes: Transaction[], transactions: Transaction[], }</pre>
--

Further Extensions

We have the following ideas for further extensions:

- Distribute the collected fee to other block validators as well, e.g. distributing 50% to other block validators
- Allow adaptation of the related parameters (such as bandwidth budget) by the block proposers

Conclusion

We proposed a design for the gas fee redistribution.

Links

- AIP-015: Gas Fee Charging ([link](#))

Document History

Date	Who	Change	Notes
2021-03-06	platfowner	Initial draft	
2021-03-08	platfowner, liayoo	Synced with liayoo	
2021-03-15	minsulee2, liayoo, cshcomcom, platfowner	Internal review	
2021-03-22	liayoo, platfowner	Detailed internal review & revision: - Data structure (transaction, block) - Terminology: gas_fee_total, gas_unit_total	
2021-03-31	platfowner, liayoo	Integration with block proposal	
2021-05-12	platfowner	Github IDs Link to full list	
2021-05-12	platfowner	Published	