HOPE Price Feed

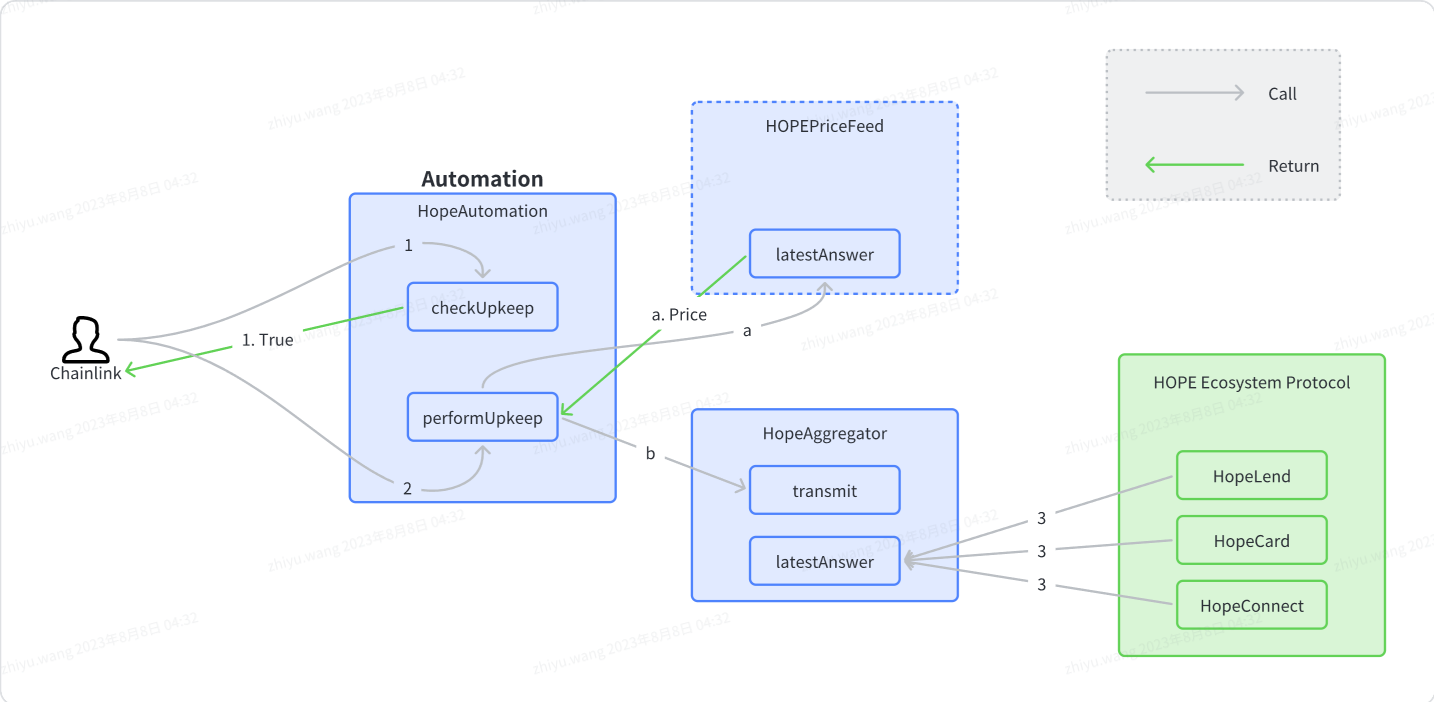
Design Background

Due to the limitations of the HOPE Token mechanism, we are unable to list it on centralized exchanges. Additionally, the current 24-hour trading volume of HOPE on HopeSwap has temporarily not reached 2 million, which means that the price of HOPE can be easily manipulated. Therefore, we can't currently list HOPE on Chainlink.

HOPE Token is backed by BTC and ETH reserves, and the minting ratio of HOPE to BTC and ETH is calculated using a constant value, K (0.000010801804843475 01). You can view the **Pegging Ratio Discovery** section on the official website for more information. Thus, we can calculate the intrinsic value of HOPE based on the total supply of HOPE on the blockchain and the prices of BTC and ETH. During the period when HOPE is not pegged, we will use the intrinsic value as the market price of HOPE to mitigate the risk of manipulation.

On the eve of HOPE being pegged to $1, we will list the HOPE oracle on Chainlink, and subsequently use the price of HOPE on Chainlink.

Architecture Diagram

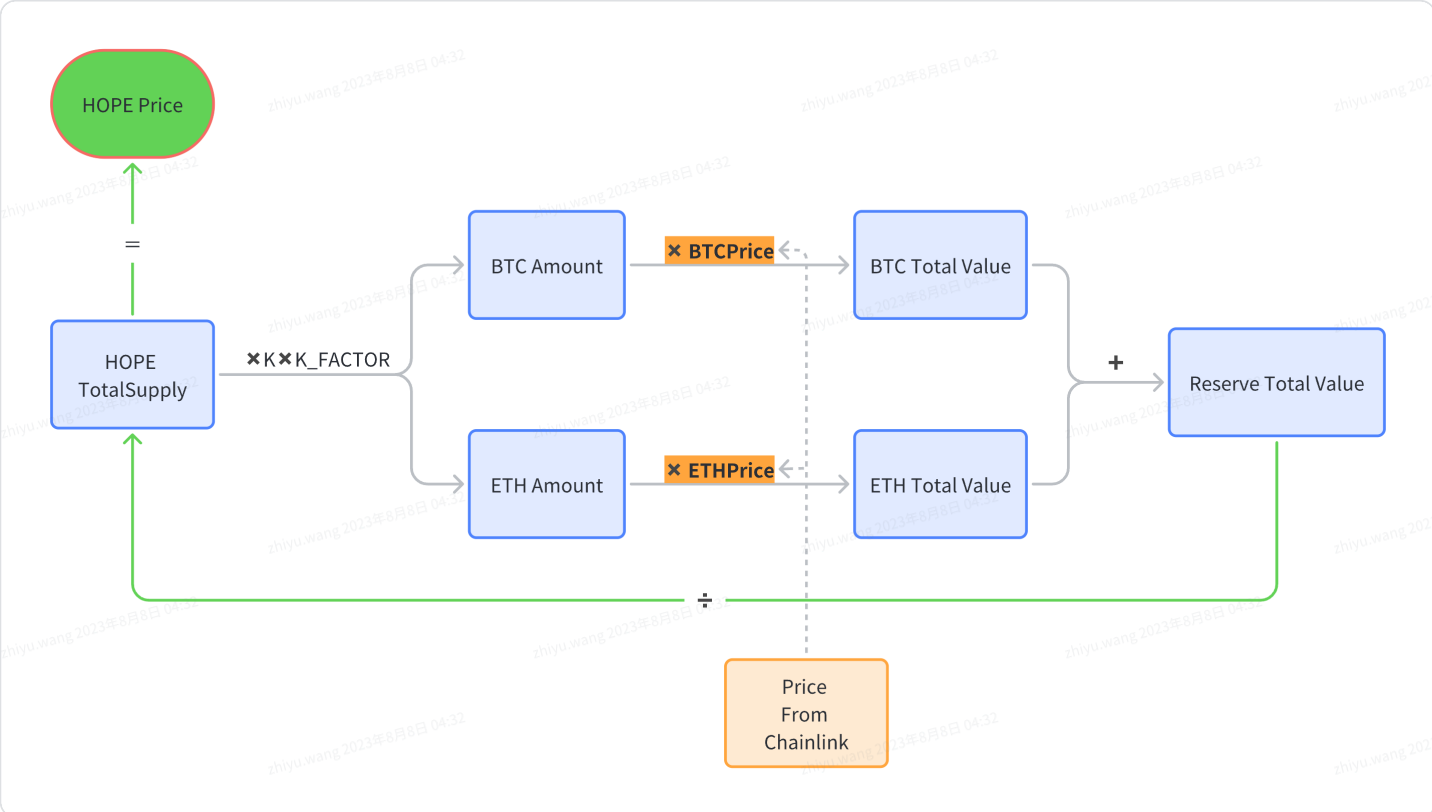


1. Chainlink utilizes off-chain automation services to invoke the `checkUpkeep` function from `HopeAutomation` once per block. Based on the returned value, further actions are taken.

2. When `checkUpkeep` returns `True`, the `performUpkeep` function from `HopeAutomation` is invoked.
    a. The `latestAnswer` function from the `HOPEPriceFeed` contract is called to retrieve the latest price of HOPE, which is then returned.
    b. The latest HOPE price is recorded by invoking the `transmit` function from `HopeAggregator`.
3. The HOPE Ecosystem Protocol utilizes the `latestAnswer` function from `HopeAggregator` to obtain the latest price of HOPE for its usage.

HOPEPriceFeed

Logic Diagram



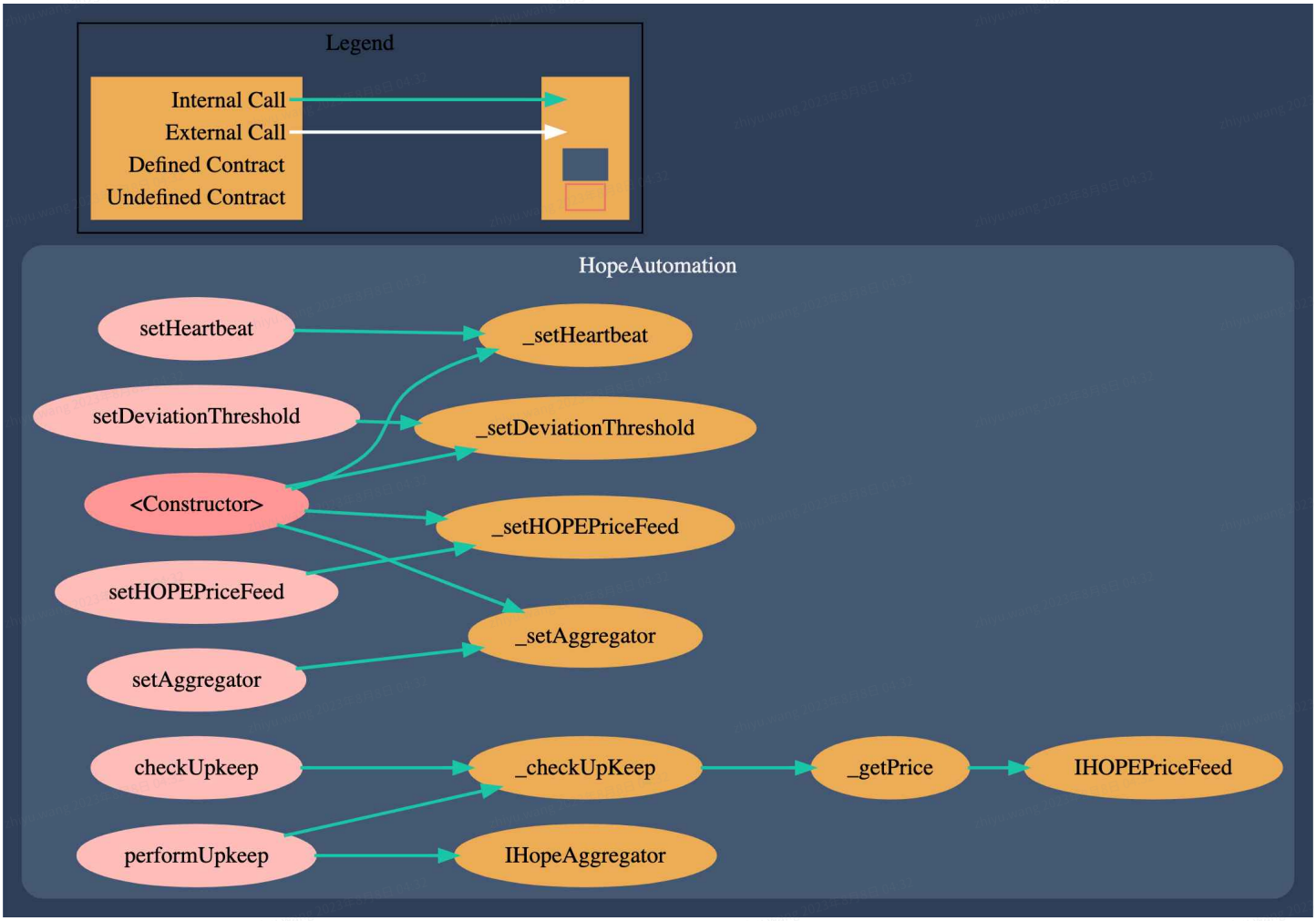
Design Logic

- Calculate the quantity of BTC in the reserve by multiplying the total supply of HOPE by the constant value K (0.000010801804843475 01).
    - Multiply the result by TokenConfig.factor to obtain the quantity of ETH in the reserve.
- Obtain the BTC and ETH prices using Chainlink.
- Calculate the total value of the reserve based on the quantities of BTC and ETH and their respective prices.

- Divide the total reserve value by the total supply of HOPE to determine the intrinsic value of HOPE.
    - If the calculated price is greater than 1, set it to a constant value of 1. (Note: This particular aspect of the design should be abandoned if the price exceeds 1.)

HopeAutomation

Function Structure Diagram

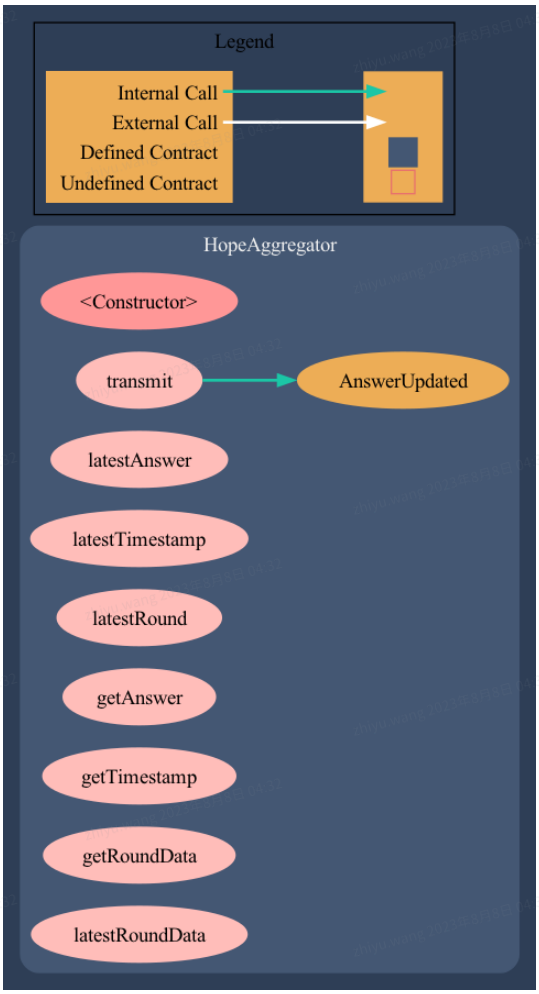


- `setHeartbeat` : Sets the heartbeat interval in seconds.
- `setDeviationThreshold` : Sets the deviation threshold (10000 represents 100%).
- `setHOPEPriceFeed` : Sets the address of the HOPE price discovery contract.
- `setAggregator` : Sets the address of the HopeAggregator contract.
- `checkUpkeep` : Checks if the HOPE price needs to be updated; a necessary function for the Automation service.
    - Returns true if the deviation between the latest HOPE price and the previous block's price is greater than or equal to the deviation threshold.

    - Returns true if the current block time minus the HOPE price update time is greater than or equal to the heartbeat interval.
    - Otherwise, returns false.
- `performUpkeep` : Submits the latest HOPE price to the `HopeAggregator` ; a necessary function for the Automation service.

HopeAggregator

Function Structure Diagram



- `transmit` : Submitted by the OPERATOR_ROLE to submit the latest price of HOPE.
- `latestAnswer` : Returns the price of the last submitted HOPE price (the latest price).
- `latestTimestamp` : Returns the timestamp of the last submission for HOPE.
- `latestRound` : Returns the ID of the last submission for HOPE.
- `getAnswer` : Returns the HOPE price for a specified round ID.
- `getTimestamp` : Returns the timestamp for a specified round ID.
- `getRoundData` : Returns the timestamp and HOPE price, among other information, for a specified round ID.

- `latestRoundData` : Returns the timestamp and HOPE price, among other information, for the latest round.