Fort Product Document

I. System Definition of Terms

Option Contract: Abbreviated as option, is a transaction of buying and selling rights, which provides that the buyer of an option has the right to exercise the option at a specific time in the future at a specific price to the seller of the option. Options have 2 directions, call options and put options, and the gain is determined by the spread between the price of the underlying and the strike price.

Perpetual contract: A futures contract with no delivery date, which brings the futures price closer to the spot price (index price) through a capital charge.

Out-of-the-money option: An option that has no intrinsic value, such as buying a call option, if the contract price is less than the strike price then the option is out-of-the-money.

In-the-money option: An option with intrinsic value, such as a call option, which is at-the-money if the contract price is greater than the strike price.

Fort Protocol: A decentralized protocol consisting of multiple smart contracts, including DCU Token, DAO and discount computer. Fort provides unlimited liquidity, and other financial product protocols are developed based on Fort.

Fort Contract: Fort is developed based on Fort protocol and currently contains perpetual and options.

DCU Token: Fort protocol tokens, no upper limit on the number of tokens, increase or destroy in accordance with the algorithm of the fort protocol.

Margin: DCU staked to the system when a position is opened in a perpetual contract.

Option Fee: The fee paid by the buyer of an option to the seller of the option, in DCUs.

Open position: buy options or perpetual contracts, users can choose to open calls or puts in two directions, the counterparty is the Fort contract.

Liquidation: Selling the option or perpetual contract held, the counterparty is the DAO contract.

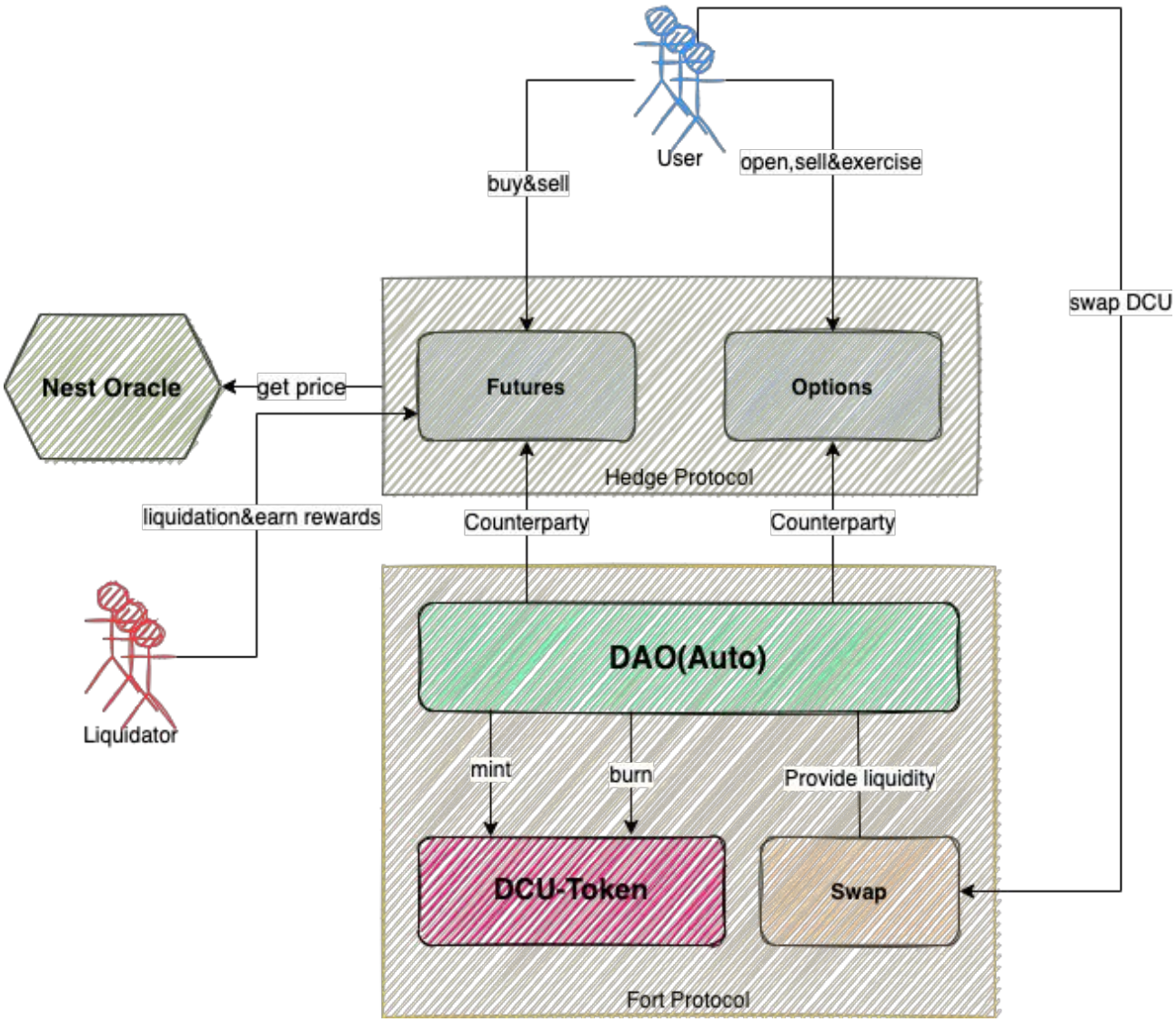
Position: the number of options held or the amount of perpetual contracts.

II. System roles

Role	Definition
Trader	Users who trade perpetual contracts and options in Hedge Protocol. Generally, it is a wallet address or smart contract.
DAO Contract	The counterparty of the trader. For the options module, the DAO contract acts as the seller of options; for perpetual contracts, when the user is in the long position, the DAO contract generates a corresponding short position, and when the user is bearish, the DAO contract generates a corresponding call position.
Settler	The object of liquidation of the position of the perpetual contract is generally completed by a robot, and the liquidator can obtain the residual value reward after the liquidation.
Governor	The objects participating in the governance of the Hedge system, the holders of DCUToken, revise and upgrade the Hedge system by initiating a vote.

III. System Data Model

3.1 System Structure Diagram



3.2 System operation process

1.DAO finances 30 million NEST from early developers, community KOLs, etc. for SWAP initial liquidity with a 1:1 consideration, while DAO injects 30 million DCU into SWAP, forming a pool of 30 million NEST: 30 million DCU. Users get DCU Token through SWAP transactions, which currently supports ETH<=>DCU and NEST<=>DCU.

2.Users can choose options or buy perpetual contracts, choose 2 directions of call or put, pay with DCU and get option or perpetual contract positions.

3.Options, the user can sell the option to the system at any time and receive DCUs, or exercise the option after the exercise date. The sale or exercise will invoke the NEST Price Oracle for settlement.

4.Perpetual contract, when the position net asset is below a certain amount, it will trigger liquidation, any third party can initiate debt position liquidation to the system, after successful liquidation, the position will be destroyed, and the liquidator can get certain remaining DCU of the liquidated position as liquidation reward.

IV. Options Module

4.1 Introduction to Options

Hedge options are standard European-style options, European-style options with fixed risks and variable returns, which cannot be exercised in advance. When settling, if it is a in-the-money option, the return will be calculated based on the spread between the spot price and the strike price; if it is a out-of-money option, the return will be 0.

DAO acts as the seller of the option and the user acts as the buyer of the option, and can choose 2 directions: call and put; the user can buy its option in the trading pair supported by the system and settle the option after it expires. Unlike traditional financial markets the premium for opening a position and the proceeds for settlement are both DCU.

4.2 Buying Options

4.2.1 Option Elements

An option consists of the following four elements.

Option direction: 2 directions of calls/puts

Trading pairs: Currently the first version of the Hedge system only supports support for ETH/USDT

Exercise time: the user manually selects the date and time, and the system will calculate the block number to be saved in the contract

Exercise price: user-set exercise price, can be set to higher or lower than the current price.

4.2.2 Position opening formula

After the user selects the option currency element and enters the amount to be bought, the system calculates the number of option shares the user expects to receive, the user deposits the DCU into the DAO contract, and at the time of exercise, the user can settle with the system. With a given exercise price and expiration date, the cost per option is obtained according to the following formula.

$$Vc = S_0 e^{\mu T}(1 - \phi(\frac{d_1}{\sqrt{T}} - \sigma\sqrt{T}) - K(1 - \phi\frac{d_1}{\sqrt{T}})$$

$$Vp = K\phi(\frac{d_1}{\sqrt{T}}) - S_0 e^{\mu T}\phi(\frac{d_1}{\sqrt{T}} - \sigma\sqrt{T})$$

where

Vc is the cost of one call option.

Vp is the cost of one put option.

$\phi(x)$ is the standard normal distribution function

$$d_1 = \frac{1}{\sigma}[lnK/S_0 + (\frac{\sigma^2}{2} - \mu)T]$$

K is the strike price; σ is the volatility, obtained from the NEST oracle;S_0 is the current price; μ is the underlying return, an arithmetic average based on historical data statistics; and T is the strike time.

4.2.3 Purchase option constraints
Exercise time constraint: the minimum exercise time is 30 days after the current time (180,000 blocks, subject to the block number) to prevent rapid market fluctuations, the NEST prophecy machine price response is not timely enough for users to carry out risk-free arbitrage.

4.3 Option Exercise
After the option expires, the user settles with the DAO with the following settlement formula.

$$Ec = \max\{(S_0 - K) * N, 0\}$$

$$Ep = \max\{(K - S_0) * N, 0\}$$

Where,
Ec is the gain from settling the call option; Ep is the gain from settling the put option; is the current price; K is the strike price; and N is the number of option shares.
After settlement, if the user's return is positive, the DAO will issue additional corresponding DCUs to hit the user's address.

4.4 Option Selling
The number of DCUs after selling can be obtained from the option share sold * the option value (Vp or Vc) at this moment. the DAO contract issues additional DCUs to the user.

V. Permanent Contracts Module
5.1 Introduction to perpetual contracts
Hedge perpetual contracts currently support ETH/USDT trading pairs, call and put 1~5 times leverage. Users who hold leveraged contracts enjoy multiple leverage gains and bear multiple downside risks. Use DCU to pay for the corresponding perpetual position, with price fluctuations, the net margin assets of the perpetual contract is constantly changing, when the balance is less than the liquidation balance, a third party can initiate liquidation.

5.2 Elements of a perpetual contract
A perpetual contract consists of the following 5 elements.
Trading pairs: Currently supported coins are ETH/USDT
Direction: Calls and puts, with calls denoted by "L" and puts denoted by "S".
Leverage: currently supports 5 types of leverage: 1, 2, 3, 4 and 5 times.
Opening price: the price at which a position is opened in a perpetual contract, recorded in the contract
Margin NAV: when the change in margin NAV is less than 10, a third party can initiate liquidation.

5.3 Perpetual contract prices

Perpetual contract opening, settlement and selling call Nest prophecy machine price. Since on-chain price changes are not timely enough compared to centralized exchanges, a compensation factor (K value) is introduced for Nest prices to prevent arbitrage.

$$K = \mathrm{Max}(|S_1 - S_2|/S_2, 0.002) + \sqrt{t} * \mathrm{Max}(\sigma, \sigma_0)$$

Of which,

Instant Volatility $\sigma = |\frac{S_2 - S_1}{S_1\sqrt{T}}|$;

Volatility provided by Nest σ_1(not used for now in the first phase).

Long-term volatility as defined by Hedge σ_0.

The previous priceS_1; the current priceS_2; two quotes effective interval T; trading time difference t (trading moment and); trading with the corrected current price

Bullish: when the position is opened$P_t * (1 + K)$, when it is sold$P_t/(1 + K)$

Bearish: when the position is opened$P_t/(1 + K)$, when it is sold$P_t * (1 + K)$

5.4 Calculation of Margin Net Assets

HEDGE perpetual contracts use margin net assets for liquidation. The current position will generate unsettled profit and loss as the price rises and falls. The dynamic rate of return of the current position is calculated as follows:

$$r = \frac{S_t e^{-ut} - S_0}{S_0} * g$$

Where is the price at the current moment, the price is derived from the NEST oracle machine, which is the price at the initial moment; g is the leverage multiple, u is the current asset historical rate of return, which is uniformly set by the system, and t is the time interval between the current moment and the opening time;

As the price of the currency fluctuates, the net assets of the margin also change at any time. The calculation formula is:

$$B_L = X(1+r)$$

$$B_S = X(1-r)$$

Among them, B_L is the net margin assets in the bullish direction, and B_S is the net margin assets in the bearish direction; r is the current position yield.

5.5 Perpetual Contracts Consolidation

When a user buys the same perpetual contract again, the perpetual contract debt positions will be merged.

$$S = \frac{(X_1 + X_2)S_1S_2}{S_1X_2 + S_2X_1e^{\mu(T_1-T_2)}}$$

where :

S1 is the opening price before consolidation

X1 is the amount of margin before the merger

S2 is the price at the time of the new merger

X2 is the number of new margin buys

μ-usdt 0.000000025367

5.6 Perpetual Contract Settlement

Users can sell their positions to DAO and settle with DAO. Hedge will call the NEST oracle to get the latest price and calculate the margin NAV of the current position, and users get the number of DCUs as follows

$$B_{DCU} = B_{level}$$

where B_{DCU} is the last DCU available to the user and B_{level} is the net margin asset of the current position, and upon completion of settlement, the DAO sends an additional equal amount of DCUs to the user's address.

5.7 Liquidation of perpetual contracts

For positions in perpetual contracts with a leverage factor of 1, the concept of liquidation does not exist because the balance of the net margin assets is always greater than 0. For positions in perpetual contracts with a leverage factor greater than 1, the liquidation conditions are

$$B_{level} < Max(B * g * 0.02, a)$$

where B_{level} is the current position's margin NAV, B is the current position's margin, g is the leverage multiple, and a is the minimum retained balance of the set account, which is currently 10.

Liquidation can be initiated by any third party. After initiating liquidation, the position will be closed and the liquidator will receive the remaining DCU of the liquidated debt position as a reward.

VII. Initial Issue

Initial Issue: 100 million DCU

1. 30 million DCU: DAO financing 30 million DCU = 30 million NEST for swap liquidity
2.30 million DCU: Swap initial liquidity, 30 million NEST + 30 million DCU
3.4 million DCU: Locked NEST community airdrop of 4 million
4.10 million DCU: DAO for promotion and community building
5.26 million DCU: used for cross-chain oracle offer incentive (based on NEST model)

8. Risk Warning

Users/smart contracts who use Hedge Protocol to trade perpetual contracts need to fully understand the rules of Hedge perpetual contracts, understand the differences between them and similar products on the market, and fully understand the following possible risks. Users without risk tolerance are not recommended participate:

1. Uncertainty risk of income: The calculation method of income of Hedge perpetual contract is different from the calculation method of perpetual contract of traditional centralized exchange. Hedge perpetual contract converts the future price of assets according to the historical rate of return Pricing. Therefore, after the user opens a position, the asset price increases by 100%, and the user’s income is not 100%. In extreme cases, even if the asset price increases, your income may be negative;
2. Position liquidation risk: Hedge perpetual contract provides leverage of 1-5 times. When your leverage is greater than 1 times leverage, the price fluctuation of the underlying asset may cause liquidation.
3. DCU Token price fluctuation risk: Both the margin and the final profit and loss use DCU Token, and DCU itself is also a highly volatile asset. In extreme cases, even if your perpetual contract position is profitable, it is due to the fluctuation of the DCU price itself. , May cause you to lose money based on the fiat currency.

External oracle risk: Hedge protocol's perpetual contract price comes from the NEST oracle. If the oracle is attacked or the price is abnormal due to other reasons, the system may experience settlement abnormalities, resulting in errors in the user's profit calculation;

Users/smart contracts who use Hedge Protocol to trade options need to fully understand the rules of Hedge perpetual contracts, understand the differences between them and similar products on the market, and fully understand the following possible risks. Users without risk tolerance are not recommended to participate:

1. Option pricing risk: Hedge Protocol option pricing is derived from the BS option pricing model. Unlike traditional option pricing methods, Hedge options are completely priced by algorithms, while traditional centralized exchanges are freely quoted by users. This pricing The method is a bold attempt and innovation, but it may also bring unknown risks;
2. DCU Token price fluctuation risk: DCU Token is used for royalties and the final profit

and loss, and DCU itself is also a highly volatile asset. In extreme cases, even if your perpetual contract position is profitable, it is due to the price of DCU itself. Volatility, which may cause you to lose money in terms of fiat currency

3. External oracle risk: Hedge protocol's perpetual contract price is derived from the NEST oracle. If the oracle is attacked or the price is abnormal due to other reasons, the system may experience settlement abnormalities, resulting in errors in the user's income calculation;

4. Settlement time limit: After the exercise date is reached, if the user does not have manually settled options, there will be a certain period of settlement. Options that are still unsettled after this period will be marked as "expired", and settlement is not allowed.