Abacus V1: An NFT Valuation System

Abstract. An NFT valuation system that uses optimistic proof-of-stake to create a liquid backed valuation system. Traders act as validators by staking their money in different valuation tranches. The attributable valuation of the NFT is the liquidity locked in the pool at any point in time. Validators are kept honest because if a pool closes, the liquidity in the pool is sent to the NFT owner and the pool receives the proceeds of an immediate NFT auction which is then liquidated in a FIFO manner. If the NFT sells at a premium to liquidity in the pool, traders are rewarded by splitting the premium based on proximity to the sale value. However, if the NFT sells for less than the pool value, anyone who owns a position above the sale value will be slashed.

1. Introduction

The crypto world has been plagued by underwhelming NFT finance applications due to an inability to properly value NFTs. The current landscape offers solutions that fall victim to a combination of low LTV, inefficient liquidation thresholds, or high borrowing rates. Furthermore, lack of a common, risk-free valuation system limits NFT lending to direct peer-to-peer lending, which results in a system where demand far exceeds supply of lending capital and leads to many unfulfilled lending potential. The overall effect of these conditions is a significant loss of value creation in the larger crypto ecosystem due to having foregone the opportunity to trade on the time value of assets.

What is needed is a liquidity backed valuation system to remove the need for trusting third party estimations. This is achieved by combining optimistic rollup and proof of stake logic to create a coordination game in a long term pricing coordination game in which users decide whether or not to lock in certain valuation slots depending on their confidence of that price level. The locked liquidity acts as a guarantor that if the pool is closed, all of this liquidity will go to the holder of the NFT, the NFT will be sold at auction, and the auction proceeds will be sent to the closed Spot pool. In this paper we introduce a decentralized solution for NFT valuation through the use of an optimistic proof of stake consensus system that will serve as the bedrock for the coming world of NFT finance.

2. The Abacus Protocol

Abacus uses a combination of principles from optimistic roll ups and proof of stake consensus mechanisms to create *optimistic proof of stake* which guarantees a dependable NFT valuation at any point in time.

2.1 Open a pool

Anyone can create (open) a spot pool for any NFT in an allowed collection, unless there is already an open pool for that NFT. However, in order to receive emissions, the owner of the NFT must sign the pool as proof of life. **An open and active (owner signed proof of life) pool does not custody an owner's NFT**.

Example: Alice would like to start a Spot pool for Punk 1000 and Bob owns Punk 1000. Alice creates a pool for Punk 1000 and then finds Bob and convinces him to turn on the emissions of the pool by passing a proof of life check for the pool.

2.2 Trade in a pool

Buying into a pool means you believe the value of the pool's NFT is higher than a tickets upper bound. For example, buying into tranche 0-1 ETH means you are confident that the NFT at hand is worth more than 1 ETH. Due to the FIFO liquidation method used for pool closures, any ticket above the value of the final auction sale value will be slashed completely. Furthermore, if the sale value is within a tickets range, all holders are slashed pro rata.
Example: If Alice buys the two tickets between 10-12 ETH and the NFT sells for 10.5 ETH during the closure auction, Alice's 11-12 ETH position will be completely slashed and she'll retain 0.5 ETH worth of value from her 10-11 ETH position.

2.2.1 Ticketed positions

Pools are separated into ticketed positions that have 1000 tokens which are worth 0.001 ETH each (positions are limited to 1 ETH in size). Furthermore, each of these positions represents a range of values. For example, the lowest position is the 0-1 ETH position. So, if you buy into the lowest position you believe that the NFT is worth more than 1 ETH.

2.2.2 Pool Credit Cap

When a user buys into a pool with no live position they can set their positions lock time and in exchange their tokens are locked and they receive a nominal amount of ABC per pool epoch (a *pool epoch* is a pool specific epoch tracker. Each epoch has a set EDC emission based on the amount of ETH in the pool and capped at 100 EDC per pool epoch. For example, if there is 5 ETH in a pool during an epoch, that pool's epoch emission will be 5 EDC split among the holders based on their nominal pool tokens and risk taken in proportion to the rest of the pool.

2.2.3 Risk Adjustment

As traders enter pools, the max tranche per epoch increases. This max tranche determines how a user's nominal token count is boosted or discounted in a 50% range between 75% (lowest tranche) and 125% (max tranche). Each tranche's risk adjusted boost is calculated as follows:

$$Risk\ Adjustment\ =\ (75\ +\ (tranche\ \ **\ \ 2)\ /\ (max\ tranche\ \ **\ \ 2)\ \ *\ \ 50)\ /\ 100$$

So if the max tranche is 50 ETH, tokens in a 50 ETH tranche will get a 125% boost on their nominal count (which translates to a higher portion of that pool epochs EDC emission). Whereas a trader in a 2 ETH tranche will have their nominal count discounted to 75.08% of the original nominal count (meaning they'll receive a smaller portion of that pool epochs EDC emission).

2.2.4 Pending positions

If a position is fully locked, traders can submit pending orders in which they compete in an auction to own the locked position when it unlocks. This change happens atomically when a sale occurs and the reward goes to the caller of the sale (doesn't have to be the owner of the position).

2.2.5 Closing a position

When a position fully matures, anyone can sell the position for the holder. For example, if Alice owns a position which has fully matured, Bob can close the position for her. After a position is closed, if there are no pending positions, anyone can come in and fill that spot in the pool.

2.2.6 Epoch Distribution Credit Generation

When a position is closed, credits earned is calculated using the following equation:

$$EDC = creditCap * riskAdjustedNominalPerEpoch / totalNominalPerEpoch$$

2.2.7 Credit Bonds

Credit bonds are the equivalent of a trader's pledge to spend a certain amount of ETH in the upcoming epoch. In exchange for this pledge traders receive boosts on the rate of EDC emission as well as a boosted proportion of the revenue share.
The max boost can be earned by crossing the 100 ETH threshold of bonded ETH. This will apply a 2x boost to both EDC emissions and revenue share proportion. If a user doesn't cross the 100 ETH threshold their boost will be equal to their proportion of the threshold bonded. For example, if Alice bonds 60 ETH she'll receive a 1.6x boost to her EDC emissions and revenue share proportion.

2.3 Close a pool

2.3.1 Trading and position maturity concludes

The owner of an NFT can close a pool at any time. When a pool closes trading and position maturity are halted. For example, if Alice locked a position for 12 weeks but the pool closed 6 weeks in she'll receive a 6x multiple instead of a 12x multiple on her ETH to EDC exchange rate.

2.3.2 Liquidity sent to NFT holder

The liquidity in the pool is immediately sent to the holder that closed the pool and the NFT is put up for a 48 hour auction.

2.3.3 FIFO liquidation

When a pool closes all holders are liquidated in a FIFO manner. For example, the 0-1 ETH position is guaranteed to receive their principal before the 1-2 ETH position.

If an NFT is sold at a premium to the pool's price, that premium is split among the pool's traders. The proportion of profit is calculated based on proximity to the final auction value. This proximity is determined through position points which are calculated based on ticket number.

So, anyone who owns tokens in position 0-1 ETH will receive one point per token owned and a position in 1-2 ETH translates to two points per token owned. These points are used to calculate each user's proportion of the auction premium that they'll receive based on their positions in the pool.

- Ex: Alice owns the entire position 0-1 ETH, Bob owns the entire position 1-2 ETH, and the NFT sells for 3 ETH at auction. Therefore, Alice has a total of 1000 position points and Bob has 2000 position points. When the two are closing their accounts Alice will receive ⅓ of the 1 ETH premium (in addition to her full 1 ETH principal) and Bob will receive ⅔ of the 1 ETH premium (in addition to his full 1 ETH principal).
    - Alice final payout = 1.33 ETH
    - Bob final payout = 1.66 ETH

2.3.4 Account closed

At the point of closing an account, each trader will have an amount of credits available for purchase based on the maturity of their position and lock size at the time of closure. When closing an account a trader can decide how much of their matured credits they'd like to buy and how much of their profit they'd like to spend on credits. Profits traded for credits trade at a 1 ETH: 1 EDC ratio, they don't carry the matured exchange rate that a principal purchase carries.

- Ex: Alice has a final payout of 1.33 ETH and her position matured 3 weeks before the pool closed. Therefore, Alice can trade her 1 ETH principal for 3 EDC and her 0.33 ETH profit for 0.33 EDC.

Any profit or principal not spent on EDC is returned to the trader and their account is closed.

2.4 Optimistic proof of stake

This method of valuation is called *optimistic proof of stake* because while the pool is active, it assumes that the trader (equivalent to validators) generated valuation is constantly correct. This is a dependable assumption since the trader unlock schedule is all transparently held on chain. If the NFT goes to auction due to liquidation (or the owner simply thinking the NFT is currently overvalued to a point where they'd sell) the "truthfulness" of the Spot traders is tested because the pool's liquidity is exchanged for the auction revenue. In the case that it's proven fraudulent (they overvalued it) they're slashed (on FIFO basis) and if it's undervalued they each receive a portion of the profit. Meanwhile, when the pool is active they receive yield (similar to nodes in a proof of stake system) in the form of a decreasing cost basis for ABC in exchange for validating the price and guaranteeing the integrity of that pool's NFT valuation.

3. ABC Tokenomics

3.1 Epoch distribution credits

Epoch distribution credits represent a proportional claim on an epochs ABC emission. For example, imagine that an epoch generates 100m EDC, Alice owns 10m of that epoch's EDC generated, and 50m ABC are emitted. Alice will be able to claim 5m ABC (10% of total ABC emitted) from that epoch's emission because she is responsible for generating 10% of the total

EDC in that epoch. As outlined above, these credits can be earned at varying costs depending on how long a trader locks up a position in a pool. (*Refer to 2.2.4 for example)*

3.2 Utility

3.2.1 Voting escrowed ABC

ABC can be staked in exchange for voting escrowed ABC (veABC) which will represent governance powers over Abacus. Owning veABC comes with the benefits of revenue profit share, gauge control, governance voting power.

1. Revenue share: 90% of all ETH revenue generated by Abacus will be paid to veABC holders (in the form of ETH). This means if 100 ETH of revenues are generated by Abacus, 90 ETH is paid out to veABC holders.
2. Gauge control: The epoch distribution gauge controls the premium size that the protocol offers to different NFT collections. For example, if Punks hold 20% of gauge vote, anyone who earns EDC in a Punk based Spot pool receives epoch distribution credits equal to 120% of EDC purchase (i.e. if purchasing 60 EDC they'd receive 72 EDC for the same price). Since traders will look for the highest offered EV in a pool this gauge acts as a powerful incentive to draw traders into NFTs of a certain collection. This cascades into higher levels of liquidity flowing and higher yields for the NFT owner that created the Spot pool (due to higher activity levels), making gauge control a powerful tool. In addition to specific allocation powers, collection agnostic veABC holders can auto allocate their tokens. Every epoch, interested parties can bribe auto allocators as a whole for control over allocation usage. For example, imagine 20% of the veABC supply is auto allocated, 1000 ETH of bribes comes in, and 100 ETH of those bribes are for the Punks collection. This means that on top of the explicit allocation, Punks will have an added 2% increase. Meanwhile, auto allocators will split any bribes paid in each epoch.
3. Governance voting power: voting participation in Abacus governance decisions will be limited to veABC holders.

3.2.2 Network fees

ABC is a network token and is required to do certain core actions (similar to gas fees) such as buying into pools, creating a pending order, closing a pool. All network fees get added on to the current epochs emission size. If an epoch has a fixed distribution of 50m ABC and 1m ABC of network fees are spent during that epoch, 51m ABC will be distributed at the end of the epoch to EDC holders.

3.3 Economics

There will be an emission schedule set to approach 2B ABC supply in the next 3 years (y1 700m, y2 350m, y3 150m). These yearly emission rates will be split into epoch distributions. Once the supply hits 2B there will be a terminal inflation rate of 3% (adjustable within a 5% band of 2% to 7%) per year.

4. Protocol economic parameters

Min ABC lock time - 2 weeks
Max ABC lock time - 4 months
Epoch length - 2 weeks
Min pool lock time - 1 week
Max pool lock time - 3 months
Auction length - 48 hours

5. Conclusion

The goal of Abacus is to unlock the world of NFT finance and the benefits it can offer to the larger crypto world. Abacus supplies 100% dependable valuations in an open sourced on-chain manner. We have proposed a system that operates as a consensus based coordination game. It applies a combination of optimistic rollup and proof of stake consensus logic to solve the large-scale NFT pricing problem in the crypto world.