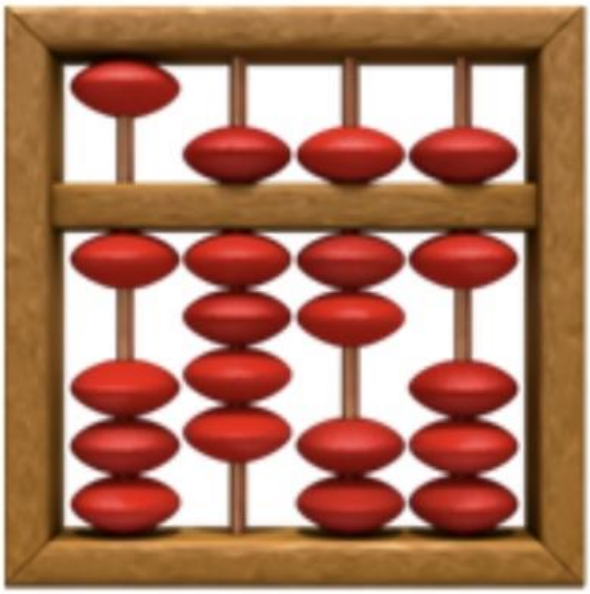

Abacus

White Paper

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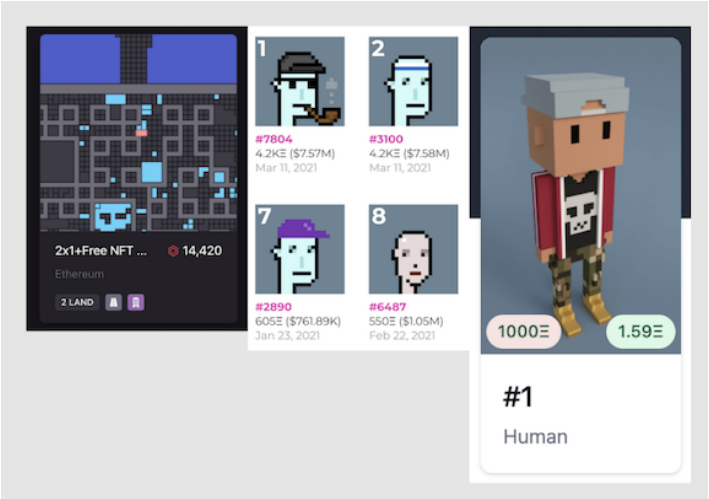
Abacus

The valuation tool of Web3.

Twitter: @abacus_wtf

Abstract

The world of NFTs is currently introducing a new form of art, ownership, and value to the world all at once. The derivation of value from a specific NFT is skewed and changes depending on the person evaluating it. As we see the Web3 ecosystem continue to thrive and become more reliant on NFTs representing different forms of ownership (i.e. Land in Decentraland, Mirror participation, Crypto Punk/Meebit ownership, etc…) there will be an increasing demand for a method of assigning value to these items. Taking this idea of “assigning value” in Web3 a step further, this value is derived from the question of “How much is the community willing to pay?” and, therefore, this valuation should be done by the community as a whole. In comes Abacus, a protocol that allows the community to value any past, present, or future NFTs.



Left to right: Decentraland Estate, Crypto Punks, Meebit.

Abacus operates on Arbitrum and introduces the ABC token which drives the tokenized incentive through profit distribution mechanisms to coin holders. We further detail the philosophical, technical, and aspirational aspects of the project.

1 How does it work?

Each step will be accompanied by a running example.

1.1 Creating a Pricing Session

To create a pricing session from the Abacus interface, a user must pay the protocol 0.005 ETH worth of ABC tokens (executed automatically) and submit an NFT contract address, token ID, and initial appraisal. Additionally, the user can offer a bounty for the pricing session which acts as an add-on in the reward distribution phase of a session.

Example → *A DAO would like to price a punk that they're looking to sell. The DAO decides to price their punk using Abacus and one of the users initiates a pricing session by inputting the NFT address, token id, and an initial appraisal value*.

1.2 Voting in a pricing session

Note: To interact with Abacus a user must deposit AETH in exchange for "in-game" credit. For example, Alice creates a pricing session for a Cryptopunk. Bob would like to submit an appraisal of 100 ETH and a stake of 0.1 AETH. Prior to appraising, Bob must deposit at least 0.1 AETH into his credit account.

A pricing session lasts for 24 hours. During an active session any user can submit an appraisal value and seed number (submitted in the form of a hash to keep it concealed) and an amount they'd like to stake. After a vote is submitted, the user can update the current vote by submitting a new hash of their appraisal value, wallet address, and seedNum.

Voting Restrictions:

- Each address is limited to one vote per pricing session.

- A new appraisal value may not exceed 69.420x the initial appraisal value.
- Stake must be greater than 0.009 eth
    - 0.005 eth is minimum stake contribution
    - 0.002 eth is for a keeper tax (see harvest and claim for Keeper reference)
    - 0.002 eth is for a bounty tax

Example → *Voters have 24 hours to come vote on the price of the punk. In order to vote, a member must submit an appraisal value and a seed number (submitted as a hashed value of their appraisal, public address, and seed number) and stake an amount of ETH greater than 0.009 ETH.*

1.3 Weighting a Vote

Each vote is weighed using the formula:

$$\sqrt{user\ stake / pricing\ session\ lowest\ stake}$$

Quadratic voting is used to limit “overpowered” voters from buying the outcome of the pricing sessions. The weighting window lasts for the same duration as the voting time and in order for a user to weigh their vote, they must re-submit their appraisal and seed number to reveal. **If a user misses the vote weighting window, their vote will not be counted in the appraisal session.**

Example → *Each appraiser has 24 hours from the conclusion of the voting window to weigh their vote. In order to weigh their vote, each participant submits their appraisal and seed number. The total appraisal value and total votes are updated to reflect each vote ←→ weight combination.*

1.4 Computing Final Appraisal

At the conclusion of weighting, the final appraisal value is set. The final value is computed using:

$$total\ appraisal\ value\ /\ total\ votes.$$

Example → *One session participant triggers the final appraisal function and the final appraisal value is calculated and set.*

1.5 Harvest

After the finalAppraisalValue is computed, three computations take place:

1. Accuracy calculated.
2. Loss is harvested.
3. Principal is credited.

A user's base represents their accuracy score based on their appraisals proximity to the final appraisal value.

Base calculation:

Tier 1: Exact appraisal results in a base of 6

Tier 2: User appraisal within 1% of the final appraisal results in a base of 5.

Tier 3: User appraisal within 2% of the final appraisal results in a base of 4.

Tier 4: User appraisal within 3% of the final appraisal results in a base of 3.

Tier 5: User appraisal within 4% of the final appraisal results in a base of 2.

Tier 6: User appraisal within 5% of the final appraisal results in a base of 1.

User's losses are harvested (only applicable to out of the money users) using the equation:

$$user\ stake\ *\ (margin\ of\ error\ -\ 5\%)\ *\ risk\ factor$$

User stake: amount staked when appraising

Margin of error: proximity to final appraisal value
Risk factor: current risk multiplier value
Losses harvested are added to the sessions profit pool for distribution during the claim period. Any losses that are not harvested are returned to the voters credit count. For example, if they were 6% off, they would lose 1% of their stake and the other 99% is credited back to them.
The harvest stage is operated by **Keepers**. Each harvest call performs the harvest function for 20 users at a time. Therefore, Keepers are the session participants who harvest on behalf of the others. Their reward is generated from the Keeper tax that each user contributes to when voting in order to cover gas fees. All Keeper rewards are paid out in profit to give them the opportunity to either withdraw in ETH or exchange for ABC as if they profited in the session.

Example → *The final appraisal value is 1 ETH. James (an arbitrary session participant) appraised the NFT at 1.06 ETH, so 1% of his stake (0.01 ETH) will be harvested and added to the profit pool. The other 0.99 ETH will be added back to his credit account and made available for staking or withdrawal. Assume Michael (another session participant) appraised the NFT at 1.005 ETH, he will have a base of 5 and none of his stake will be harvested.*

1.6 Claim Reward

After the completion of the harvesting stage, users can claim their reward earned which is then credited to their profit account. This profit account can be drawn down immediately or a user can allow their profits to build up and withdraw funds as they please. When a user decides to withdraw funds they have the option to withdraw it in AETH or ABC tokens (based on current ABC/ETH exchange rate).
The claim stage is operated by **Keepers**. Each claim call performs the claim function for 20 users at a time. Therefore, Keepers are the session participants

who claim on behalf of the others. Their reward is generated from the Keeper tax that each user contributes to when voting in order to cover gas fees. All Keeper rewards are paid out in profit to give them the opportunity to either withdraw in ETH or exchange for ABC as if they profited in the session.

Example → *Since Michael (from past example) was "in the money" he will have a claim to* $5 * his\ stake\ amount / total\ winner\ stake * total\ session\ harvest.$ *This amount will be credited to his profit account. Michael could now build up his profit amount and decide to take it out in ABC or ETH as he pleases.*

Session Complete!

2 Protocol Considerations

2.1 Concealed Voting

Abacus utilizes a commit-reveal scheme to conceal votes during the voting period. Therefore, when a user submits a vote, they MUST come back and reveal it during the next stage of the session otherwise their vote won't be counted and they'll lose their amount staked. This must be enforced, otherwise a user could submit a bid and then refuse to weigh if they find that they're wrong!

2.2 Appraisal Size Restriction

The maximum appraisal value in a session is limited to 69.420x the initial appraisal value set by the session creator. This is to stop malicious participants from setting obscenely high appraisals at a low cost of attack. Creates high friction coordination problem and cost in a game that the attackers will lose (read about Abacus Sybil Defense).

2.3 Vote Weighting

If you implement the weight when instantiating the vote it distorts the user's appraisal value because conventionally weighting a vote would be done by $\_appraisal * weight$. The weighting formula needs to be generalized for all pricing sessions regardless of the staking range in that specific session. Therefore, the weighting equation is $\sqrt{user\ stake / lowest\ stake}$. This system generalizes well because each user has at least one vote (since the smallest stake is equivalent to one vote) no votes get distorted anymore. Furthermore, the square root is used to stop overpowered voters from creating a lopsided pricing session (i.e. quasi quadratic staking).

3 Abacus Token (ABC)

*Tokenomics found here

3.1 Utility

An ABC token represents a proportional ownership over the protocol equal to $user\ ABC\ balance\ *\ general\ treasury\ balance\ /\ totalSupply()$. Furthermore, 0.005 ETH worth of the ABC token is required to initiate a pricing session. When a session is created the tokens used are not burned, but rather recycled by being sent back to the treasury for redistribution.

3.2 Supply

The supply of tokens will be capped at 2 billion ABC. Half of the token supply will be put towards the team, investors, a community fund, and a grant fund. The second half of tokens is sent to the Abacus treasury upon creation. ABC tokens can only be earned through community driven tasks, giveaway participation, or earning the tokens through correctly appraising NFTs with the Abacus system. There will be an eventual inflation and burning mechanism that may affect the spot supply of tokens. However, the total supply will never exceed 2 billion.

3.3 Exchange Rate

The ABC exchange rate will be based set at the predetermined rate of $0.00005\ eth\ +\ 0.000015\ eth\ *\ coins\ earned\ /\ 1,000,000$. As the protocol progresses and approaches the 1 billion ABC distribution mark the exchange rate will change to be a weighted, market based rate.

4 Roadmap

4.1 Appraisal Bounty

Creating an appraisal session only requires sending 0.005 ETH of ABC to the Abacus treasury. However, in the near future we will be implementing a bounty system in which any user with an interest in a specific session has the option to add a bounty (in ETH) to incentivize appraisers to participate in their pricing session. A bounty is simply added on to the harvested losses and distributed to in-the-money participants accordingly.

4.2 Private Pricing Sessions

Private sessions will be used to accommodate ownership groups (i.e. a DAO that owns an NFT together) who would like to privately (i.e. DAO members only) decide on a sale price for an NFT. In order to participate in a private session a user will be required to own an ownership token for their respective group.

4.3 Customizable Session Length

Different users will be interested in different pricing session time tables. This update will provide users with the ability to customize the length of session modules (i.e. voting and weighting periods) when creating a new pricing session.

4.4 Integrate ABC Staking

Users will have the option to stake ETH *or* ABC.

4.5 NFT Collateralizing

A major step in giving Abacus real application in the Web3 world beyond appraisals is backing these pricing sessions with liquidity to bolster appraisal

legitimacy. Therefore, Abacus will build an AMM for users to back NFTs with liquidity in order to make them “DeFi lending compliant”.

4.5 Integrate with Lending Protocols

The liquid backing created by a price floor guarantee mechanism will open the doors to integrate with lending systems. The reinforced NFT value will become eligible for collateralization without the need of raising a specific backing pool of any sort.

4.6 DAO

The goal of Abacus is to become a completely community-owned protocol. This will be accomplished through a merge of the general and ownership treasury and tokens. Governance will be determined based on ABC ownership.

4.7 Economic ABC

Once Abacus is sufficiently decentralized, ABC holders will be able to trigger a one time on switch which creates the ability to trade in ABC tokens for an economic value token which represents a direct proportional claim on the treasury.

5 Use Cases

5.1 General price discovery

Abacus is built to be the valuation tool for Web3. The core function of the protocol is to leverage tokenization and profit sharing to incentivize users to appraise based on perceived value. This produces a price discovery mechanism that can be applied to any and all types of NFTs.

5.2 Group-owned sale

With the rise of collective purchasing and fractionalization mechanisms, a valuation protocol will be increasingly necessary to allow large groups of owners to decide on a sale price. This would unlock a far more liquid group ownership market because it allows DAOs and general ownership parties to have a reliable way to price (and therefore list) an item for sale.

5.3 Collateralizing NFTs

A formal valuation tool for NFTs will open the door for DeFi to expand to include the world of NFTs and provide talented creators with a new stream of generating liquidity. A user will be able to price an NFT, collateralize it, and take out a loan on it all in the span of 48 hours (or less depending on module lengths).

5.4 Note on use cases

The use cases listed above are three of many other possible avenues to explore. The nature of web3 allows the scope of Abacus use cases to only be limited by a user's imagination.

6 Attack Vectors and Defensibility

The main attack vector against Abacus is a Sybil attack. Read how the protocol protects itself here.

7 Summary

Abacus utilizes reverse prediction market mechanics to produce a final appraisal value of an NFT and rewards users with an explicit profit share in the form of an Ethereum payout or an implicit profit share through a token reward that represents a distribution of the overall protocol profit share.

The protocol will be the valuation tool of Web3. The progression of the protocol will be driven by the positive feedback loop built into coin issuance, appraisal accuracy, and eventual reinforced appraisal power. This will unlock a whole new cache of powers that NFTs can afford people and supercharge the play to earn and learn to earn framework that drives the Web3 ecosystem because any user will be able to put a tangible value to their earning prospects.

The hope is that Abacus can properly serve the community and spark a wider spread adoption and overall growth of Web3.