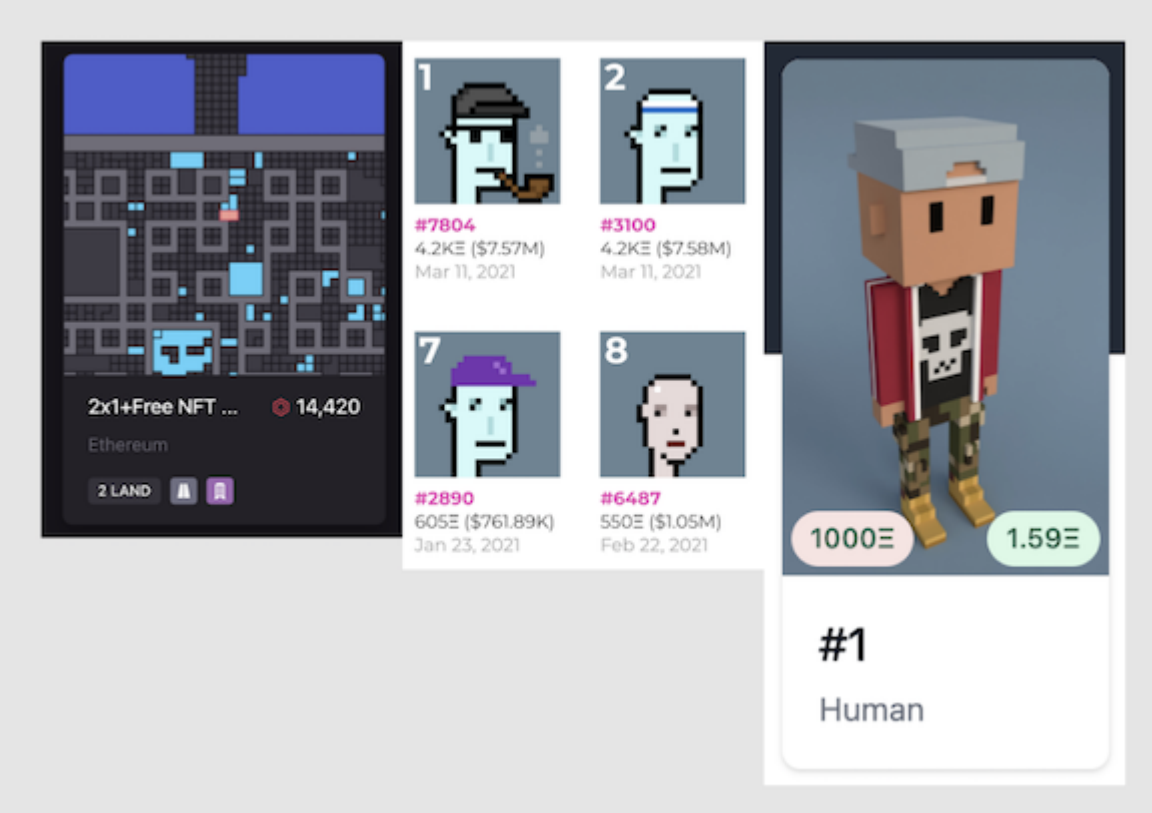
Pricing Protocol ($PP)

The Idea

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 PricingProtocol, a protocol that allows the community to value any past, present, or future NFTs.

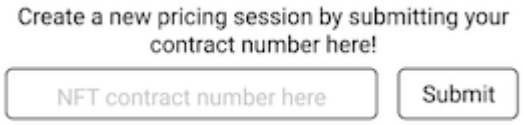


Left to right: Decentraland Estate, Crypto Punks, Meebit.

How does it work?

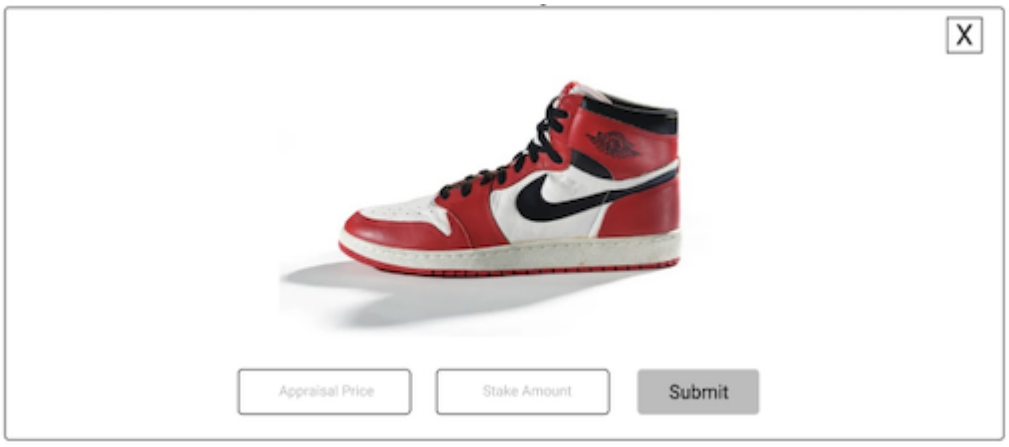
The contract that'll be referenced throughout this section can be found here. For users reading this on paper, the code can be found on github at: alangindi/pricingcoin/contracts.

Step 1: Create a Pricing Session



To create a pricing session from the pricing protocol front end, a user will be able to simply submit the address of an NFT in the above form and pay the gas fee for creating the session. Once this address is submitted, the contract creates a new PricingSession instance which starts a timer that expires 24 hours later, which marks the end of the pricing session.

Step 2: Active Pricing Session

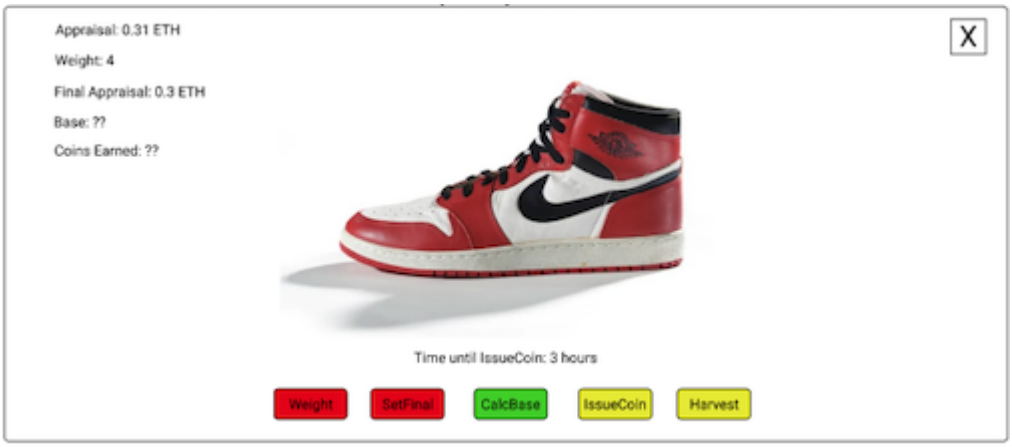


During an active pricing session any user can submit a vote by entering an appraisal price (pricing the NFT) and an amount they'd like to stake. Voters participation:

- Price a randomly selected NFT that is shown on the Pricing Protocol website.
- Look up a specific NFT address of interest through the look up form on the Pricing Protocol website.
- Directly interact with the contract itself.

When a vote is submitted, the stake and vote are locked in until the end of the pricing session. Additionally, the protocol prohibits the same address from voting in a single pricing session more than once. Each vote is weighted using the formula $\sqrt{user\ stake/pricing\ session\ lowest\ stake}$. This method allows each appraisal to stay "pure" while still being counted proportionally based on the user's stake in relation to others. Furthermore, a quasi-quadratic voting method is used to limit "overpowered" voters from heavily influencing the outcome of the pricing sessions. In order for users to enact their vote weight, they must trigger the weighting event which occurs after the PricingSession closes and lasts for one day. *If a user misses the vote weighting window, their vote is kept at the default weight (1 vote).*

Step 3: Post-Session Computations



Once the pricing session is over and the vote weighting window is complete, one user in the pricing session needs to trigger the contract to set the final appraisal. Due to the fact that this call helps the entire community of users involved in that specific pricing session, the user that triggers to SetFinal function receives a reward of $2 * \sqrt[4]{session\ size}$.To compute the final value we take the totalAppraisalValue and divide it by totalVotes (not to be mistaken with total unique voters). This can be done because all of the weighting is accounted for in the weightVote stage. After the finalAppraisalValue is computed, each user is responsible for calculating their base through the CalcBase button above. *If a user fails to calculate their base within the CalcBase window, their base is automatically set to zero and they lose any reward they were eligible to receive*. A user's base determines the base value that the user's multiplier factors will be applied to. For example, as documented above the calculateBase function, if a user is within 1% of the finalAppraisalValue their base is set to 5. Once user bases are set, pre-lossHarvest, "in the money" users are required to claim their $PP token reward, which is issued based on four factors:

1. Size of pricing session (constant for all participants in that session)
2. Size of total staking pool (constant for all participants in that session)
3. User stake (quadratic multiplier)
4. Accuracy (base)

The equation used to distribute PricingProtocol ($PP) coins per user is →

$$\$PP\ issued\ =\ base\ *\ \sqrt{user\ stake}\ *\ \sqrt[4]{size\ of\ pricing\ session}\ *\ \sqrt{total\ ETH\ in\ staking\ pool}$$

Post coin issuance, any participant who was "out of the money" (i.e. not within 5% of the finalAppraisalValue) loses a portion of their stake equal to $margin\ of\ error\ -\ 5\%$.For example, if they were 6% off, they would lose 1% of their stake. This harvested loss gets added to the larger profit pool. Furthermore, either at $session\ end\ time\ +\ 6\ days$ or when loss harvesting is declared done (i.e. all session participants activate the harvest), one session user can call endSession which will declare the session inactive and clear any remaining session funds into the community loss pool. *If the session size is greater than 25, the endSession caller will be rewarded with a coin issuance equivalent to* $2 * \sqrt[4]{session\ size}$.

Step 4: Post pricing session

At the conclusion of a pricing session, NFT appraisals are easily accessible through:

- The Pricing Protocol user interface using the NFT address
- A direct call to the contract using the NFT address

Furthermore, a new session cannot be created for an NFT until eight days after the most recent pricing session for that specific NFT is over.

Protocol Considerations

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). Using quadratic staking causes a dilemma because we disincentivize participants from staking large amounts due to the quadratically increasing marginal cost of a vote. This is why PricingProtocol uses the equation $base * \sqrt{user\ stake} * \sqrt{size\ of\ pricing\ session} * \sqrt{total\ ETH\ in\ staking\ pool}$ to issue $PP tokens. The user's stake works as a multiplier to the amount of coins issued. Additionally, the protocol weaves session participant interests with overall coin holder interests by using the total ETH staking pool and session participant sizes as a coin issuance multiplier. Larger staking pools translate to greater lossPools and a higher rate of profit distribution for all token holders. Lastly, the more users staking and taking part in these pricing sessions the more accurate or "telling" these appraisals are and the greater the benefit to the users and overall community.

$PP Token

Ownership of a $PP token represents claim to a proportion equal to $balanceOf(user) * lossPoolTotal/totalSupply()$of the total lossPool. Every 30 days, a claim session opens for two days, during which $PP owners can claim their monthly reward. At the end of the two day claim period, any funds left in the lossPool get moved to the next month's lossPool total and the claim session is locked up for 30 days.

As aforementioned, these tokens can be mined through participation and success in pricing sessions. There is no maximum amount of coins that will be set in order to incentivize constant participation lest you slowly lose ownership proportion as the coin supply grows. At the official launch 100M $PP tokens will be minted and used to develop and promote PricingProtocol growth and usage. At the launch, this token supply will be slowly distributed to contributors of all forms; creators who promote PP usage, developers who continue to build on PP, and any other user that takes part in developing the greater PP community.

Conclusion

The goal of the Pricing Protocol is to be the valuation protocol of Web3. A pricing protocol by the people, for the people. Bringing a sound method of valuation to a volatile NFT market is the first step in opening the door to further mainstream adoption. The hope is that pricing protocol can serve as the valuation tool that sparks this wider spread adoption and overall growth of Web3.