Predix Network: A Prediction-Based Reward System

Predix Network Team

Abstract

Predix Network is a prediction-based reward system on the Ethereum blockchain powered by *PRDX*, a price-reactive deflationary stakable ERC20 token. PRDX supports a tiered staking mechanism where users are placed in different staking tiers based on the staking size. On the Predix Network, time is divided into phases of one week (starting at Sunday/Monday 00:00:00 UTC). Before the beginning of each phase, a user can bet on the closing price of *PRDX/ETH* for that phase. At the end of the phase, the state is updated and users can claim their rewards based on how accurate their prediction was. Throughout the phase, a weighted running average of the bets is calculated as to represent a collective prediction for that phase. At the end of the phase, users who are actively staking tokens can then claim extra rewards based on the accuracy of this collective prediction.

Introduction

A common phrase in the cryptocurrency community is: "Not your keys, not your tokens". Despite this important motto, the far majority of the trading volume is still performed on CEX's (Centralized EXchanges). However, in recent months, DEX's (Decentralized EXchanges) have been uprising with one exchange in particular; Uniswap v2. With the rise of Uniswap v2 countless trading pairs have been created where one can start trading in an entirely decentralized manner with the click of a button.

Trading these pairs can be difficult and risky as anyone can create a pair and information on them can sometimes be hard to find and/or understand. Besides, because of its decentralized nature, no orderbooks are available all the while orderbooks are a popular and powerful tool for traders to analyze other market participants to gain an advantage over them. Predix Network introduces a prediction market for users to publish predictions (their thoughts on future price movement of the pair) to the Ethereum blockchain and get rewarded handsomly when they are right, all powered by its native *PRDX* token. As the Ethereum blockchain is inherently transparent, all predictions are public for one to see, creating a trustless and decentralized way for traders to get insight into what other traders are doing.

This whitepaper explains the different parts of the Predix Network, which workings can all be fully verified on the Ethereum blockchain[1].

Release Schedule

The following list provides a time schedule for the release of the different parts making up the Predix Network.

- September 5, 2020: Initial Distribution Start
- September 12, 2020: Initial Distribution Stop + Staking Start + Uniswap listing
- September 19, 2020: Prediction Market Live

[1]The code of the smart contracts are all verified on etherscan, see `https://predix.network` for the contract addresses

PRDX Token

The native token of the Predix Network is *PRDX*, a deflationary and stakeable ERC-20 token. Through the working of its staking properties and the prediction market, *PRDX* is slowly awarded to users while also getting burned by the prediction market, causing the total supply and circulating supply to converge asymptotically to a steady-state. The token properties are listed below.

- Initial Total Supply: 1,600,000 (1.6 million)
- Decimals: 18
- Ticker: *PRDX*
- Name: Predix Network
- Contract address: T.B.D.

Token Distribution

At inception, all 1.6 million tokens are created. The initial distribution of these tokens can be seen in figure 1.

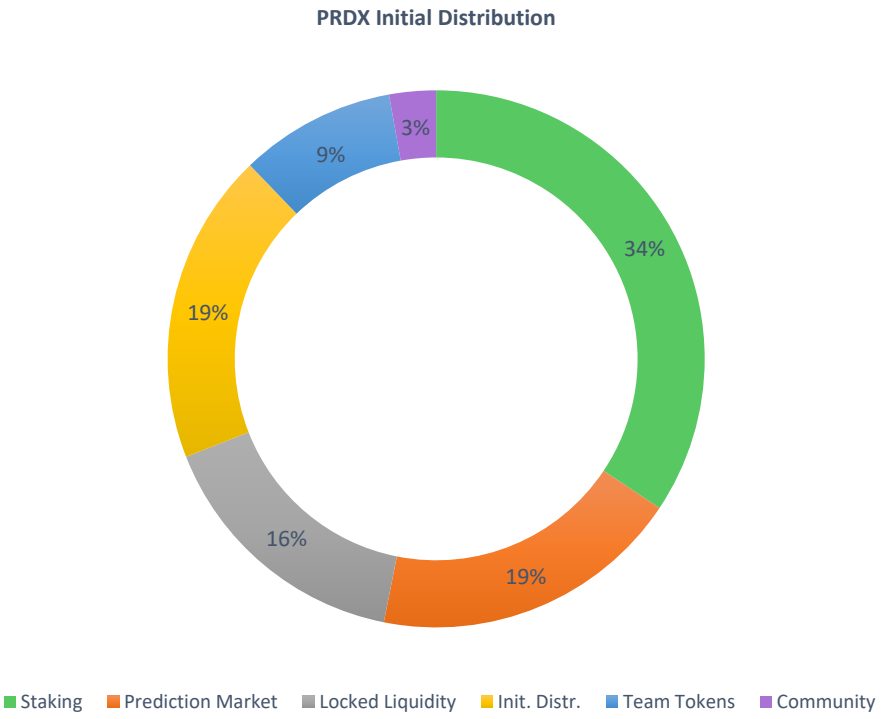

Figure 1: Initial *PRDX* distribution. Note that these numbers are suspect to change depending on the amount of tokens sold during the initial distribution; leftover tokens are added to the staking- and prediction market contracts. Of all the tokens, the Predix Network Team gets only 9% of the tokens which are divided by 5 team members. The tokens are locked up and get released 10% every month, starting the second month after release.

As can clearly be seen in figure 1, a vast majority of the tokens are locked up right from the start. Most tokens will be in the staking contract, the prediction market and locked up for liquidity for the Uniswap trading pair *PRDX/ETH*.
The tokens from the staking contract are locked and can only be redeemed in the form of staking rewards, explained in the "Staking" section. The tokens from the prediction market are locked and can only be redeemed in the form of winning predictions and will be burned if predictions are too far of, explained in the "Prediction Market" section. Of the tokens sold in the initial distribution, 85% will be matched with the tokens reserved for providing liquidity, which will then be locked for two months to ensure liquidity. The other 15% of the tokens will be reserved for the community and the 15% of the ether goes put into a developers fund.

Initial Distribution

The initial distribution is done in a fair and decentralized manner in which users always have the option to opt-out the initial distribution by selling their tokens to the initial distribution for the same price as the buying price. This makes our initial distribution unique as users can exit the initial distribution at any time without making a loss [2].
The initial distribution starts on September 5, 2020. A clean and easy-to-use front-end is provided on our website: `https://predix.network`. The user enters the amount of ether they want to buy *PRDX* for and the front-end calculates and shows immediately how much *PRDX* you will receive. To use this front-end, a web3 compatible wallet like MetaMask is required. It is of course also possible to directly call the smart contract.
Below, some key points of the initial distribution are listed:

- Initial Distribution Start: 5 September, 2020, 02:00 PM UTC
- Initial Distribution End: 12 September, 2020, 02:00 PM UTC
- Goal: 600 ETH
- Tokens Available: 300,000 *PRDX*
- Buy/Sell Price: 0.002 *ETH/PRDX* (1 $ETH = 500\ PRDX$)

Staking

On the Predix Network, a one-click staking solution is realized with the help of smart contracts. A separate smart contract fueled with *PRDX* (see token distribution) to reward for stakers is available from 12 September.
Staking rewards are determined based on a leveled system, consisting of three levels. See table 1 for details. When staking, the tokens will be held inside the staking smart contract but can be redeemed at any time.

[2] This does not include paid transaction fees in the form of ether.

Level	Min. *PRDX* amount	Weekly	Monthly	Yearly
Lvl. 1	50	0.25%	1.00%	13.9%
Lvl. 2	500	0.50%	2.00%	29.6%
Lvl. 3	5,000	0.85%	3.44%	55.3%

Table 1: Staking rewards for different levels. For a staking level of 1, a minimum of 50 *PRDX* is required. For level 2, a minimum of 500 *PRDX* is required. For level 3, the highest level one can achieve, a minimum amount of 5,000 *PRDX* is required. All staking rewards are compounding, meaning that one earns interest over the previous earned interest.

Prediction Market

On the prediction market users can publish their predictions (their thoughts on future price movements of the pair) for each phase. The phase duration is 1 week. However, in this whitepaper we will speak of phases to not lose any generality.
Each phase, a user can make a bet with any amount of *PRDX* on the close price of the *PRDX/ETH* pair of any future phase that has not started yet. At the end of the phase, the prediction market is updated with the close price which is determined using the Uniswap v2 pair and is fully verifiable with the smart contract. Then, after the close of the phase the user has predicted on, the rewards can be claimed through the same easy-to-use front-end or directly through the smart contract itself.

Prediction Reward Structure

The reward of the prediction depends on multiple variables: prediction size, percentage difference between predicted price and phase close price and the prediction age. The prediction size is the amount of *PRDX* the user betted on his prediction. The percentage difference between the prediction and the phase close is simply calculated by taking the predicted price and the phase close for which the prediction was made. The prediction age is the time between the phase on which the user has predicted and the phase in which the prediction was made, it thus is an integer representing the amount of phases the user has predicted the price in the future. The reward curve is represented by a fifth degree polynomial fit to an exponentially decaying function, described by the following formula:

$$f(x) = ax^5 + bx^4 + cx^3 + dx^2 + ex + f \tag{1}$$

where x represents the percentage difference between the close and prediction price as an integer with a two digit precision (i.e. 1.34% means $x = 134$). This is done to work around floating point precision problems in the Solidity programming language, which can only work with integers. The fit resulted in parameters to be released when the prediction market goes live. These parameters are immutable and are hardcoded in the smart contract.
A prediction is considered "wrong" if the percentage exceeds a certain parameter: the invalidation parameter. This invalidation paremeter depends on the prediction age: the bigger the age, the bigger the invalidation paremeter. This in essence means predictions made further into the future can be off by a bigger percentage to be still considered for rewards. The invalidation parameter is described by the following formula:

$$\eta(t) = b \cdot t/T \tag{2}$$

where t is the time in seconds, T the phase duration in seconds (a phase lasts for one week, so $T = 604800$ s) and b is the base percentage. The base percentage represents the invalidation

percentage of a standard prediction of one phase into the future, it's default value is 5% but is suspect to change when price action becomes more stable in the future.
These two structures together result in the reward curve as can be seen in figure 2.

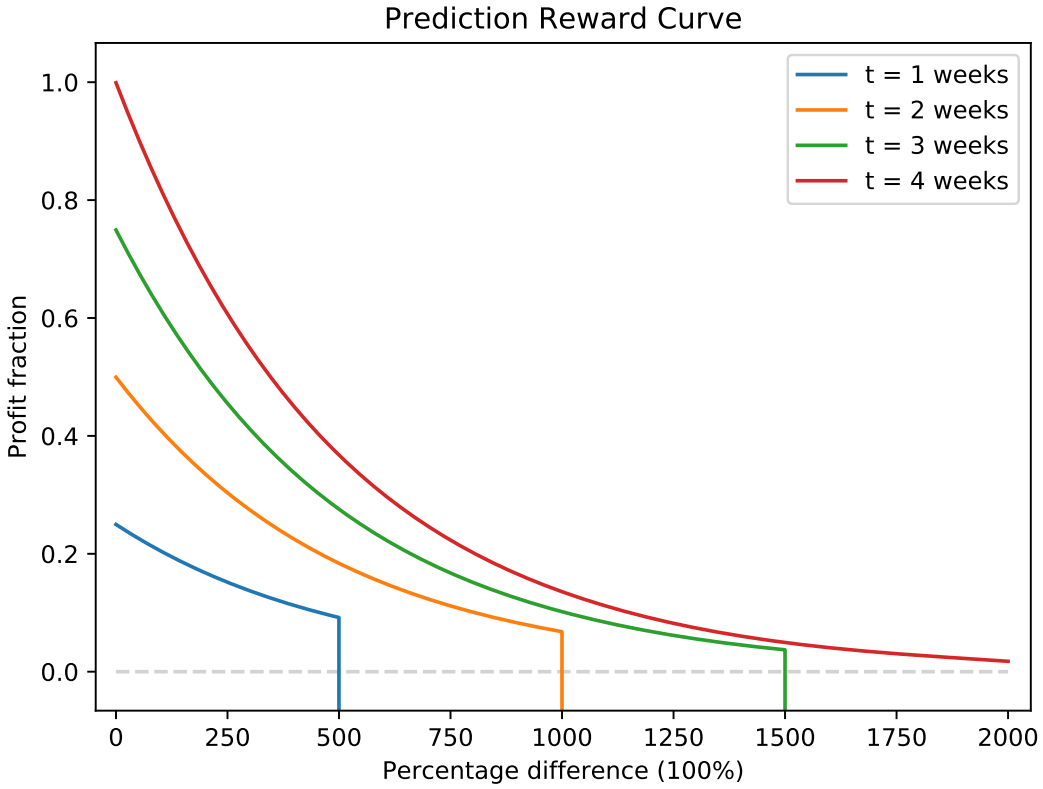

Figure 2: A fifth degree polynomial fit to an exponential function representing the prediction reward curve for different values of t, $c = \frac{1}{4}$ and $b = 5\%$. On the horizontal axis, the percentage difference in 100% is given (i.e. 1000 represents 10%) and on the vertical axis the fraction of the profit is given. This fraction is then multiplied with the prediction amount which results in the total profit in *PRDX*.

The vertical axis represents the fraction of profit the user receives on top of the prediction value. This result is incroporated in the total reward structure according to the following formula:

$$P_{pred}(N, x, t) = \begin{cases} c \cdot N \cdot t \cdot f(x) & x \leq \eta(t) \\ r \cdot c \cdot N \cdot t \cdot f(x) & x > \eta(t) \end{cases} \tag{3}$$

where P_{pred} is the total awarded amount for a prediction, c a constant to scale the total reward with a default value of $\frac{1}{2}$, $0 < r < 1$ the refund parameter representing how much of the total prediction value they get refunded with a default value of 0.75, N the prediction value and the other parameters as in (1) & (2).
In the second case, when the prediction is too far off, the user does not get all their tokens back depending on the refund percentage. This refund percentage is suspect to change and can be

altered in special events. The tokens that do not get refunded to the user are burned forever, lowering the total *PRDX* supply.
The rewards can be claimed after the close of the phase for which the prediction was made.

Weighted Running Average

During each phase in which predictions have been made, running average weighted on the prediction value is calculated using the inherently public predictions published to the contract. This represents a "collective prediction". This information can be invaluable for traders as it immediately gauges the market sentiment in a decentralized and trustless way.
On top of the prediction market rewards, those who have actively staked during a phase can claim rewards at the end of the phase depending on the performance of the *PRDX/ETH* pair. If the price of *PRDX/ETH* is greater of equal than the weighted running average of the predictions during that phase (meaning that the price as overperformed), those who were actively staking during that period can claim 2% of their staking amount as a bonus reward. If the price of *PRDX/ETH* is lower than the weighted running average, those who were actively staking can claim 0.5% on top of which 2% is burned, paid for by the prediction market contract. This makes the *PRDX* supply deflate while the users are rewarded. This mechanism is summarized in the form of a formula below.

$$P_{WRA}(N) = \begin{cases} 2\% \cdot N & \textit{PRDX/ETH} \text{ closes above } WRA \\ 0.5\% \cdot N & \textit{PRDX/ETH} \text{ closes below } WRA \end{cases} \tag{4}$$

where P_{WRA} the awarded amount for stakers during the phase (paid for by the prediction market), N the staked amount during the phase and WRA the Weighted Running Average calculated for that phase.
The rewards can be claimed during the phase after the phase in which the user has actively staked N tokens. When the user is staking for longer period, they can claim extra rewards each week as long as their staked tokens are older than the phase duration.

Future Development

In this section future developments that are set on the road map for the short- and long term are discussed and possible implementations and solutions are given.

Short Term

Liquidity Pool Token Staking

At the inception of the *PRDX/ETH*, the Uniswap v2 liquidity pool will be provided with enough liquidity generated by the initial distribution. This liquidity will then be locked for two months such that traders are assured of a liquid pool to trade. However, to further decentralize the project and give more power to the people, a liquidity pool token staking contract will be made to incentivize providing liquidity.
With this contract, users who provided liquidity to the *PRDX/ETH* pool (other *PRDX* pools will be considered too) can stake their liquidity pool tokens in return for extra *PRDX*. This makes providing liquidity to the pool an even more attractive way of earning profits using the Predix Network. As enough third party liquidity is provided, the liquidity provided by the Predix Network Team can slowly be removed as to decrease the centralization of liquidity.

Bounty Program

Although all components making up the Predix Network are tested extensively, bugs can always be present. To incentivize reporting bugs a bounty program will be set up. This bounty program rewards users with *PRDX* or *ETH* to report bugs to the Predix Network Team. The developers will then get in contact with the bounty hunter and talk through the bug such that it can be patched before getting exploited. Based on the severity of the bug the bounty hunter will be rewarded with either *PRDX* or *ETH*.

Long Term

General Purpose Prediction Market

In the beginning, only the *PRDX/ETH* pair will be integrated in the prediction market. However, as the ecosystem grows and more liquidity pools will come available, more pairs will be added to the prediction market.
After the first few months of having succesfully facilitated many predictions, extensive analysis on prediction behavior and price action and its relation will be performed. This research will be published and its conclusions will be incorporated in the development of a decentralized general purpose prediction market, powered by *PRDX*. This general purpose prediction market will make it possible to make predictions on any pair available, even those for which no prediction markets are available yet. Users will then be able to make their own fully customizable prediction markets without having to write a single line of code, all while being 100% transparent on the Ethereum blockchain.

Dislaimer

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