

# ROPE Ecosystem

A Decentralized Volatility Index

## Abstract:

In traditional markets, there are numerous tools and asset divisions to appropriately manage risk and hedge positions. One of the most integrated tools for day traders is the Cboe *Volatility Index* (VIX). This index is a real-time representation of the market's expectations of near-term price movements in the S&P 500 index. It is derived from SPX index options prices with approaching expiration, and generates a projection of assumed volatility for the next 30 days. In these markets, it is utilized through exchange traded funds (ETFs), exchange traded notes (ETNs), futures contracts, and options contracts. All of these modes of trading serve different functions, and have varying correlations to the implied volatility projected with the VIX.

The structure of cryptocurrency markets differs significantly from the equities markets, so sentiment and overall health is primarily gauged through Bitcoin as opposed to using asset indices. In addition, Ethereum still reigns as a primary indicator for the health of the *altcoin* market. Various products and portfolio management tools are still actively being developed and incorporated into the cryptocurrency space, but there is an immense amount of work to be done before the infrastructure is complete and scaled to integrate existing framework of traditional markets that is used daily for trading and asset management. There have been attempts to make a volatility index for cryptocurrencies, but because they are significantly more volatile than equities there are new considerations to take into account with the Black-Scholes model that derives VIX volatility calculations. Index smoothing is the most apparent issue that can be addressed directly, which will be

appropriately integrated in the modeling of this ecosystem—more on this later. By utilizing the features of decentralized finance (DeFi), a token swapping mechanism will be used for volatility trading as opposed to the above mentioned methods found in equities markets.

## **Introduction:**

The ROPE ecosystem is comprised of two tokens, ROPE and ROPEV, and is built on top of the high-performance Proof of History (PoH) technology implemented by the Solana network. PoH is a concept that allows for validators and individuals alike to prove that a message has occurred before or after a specific event. In the current state of the market, most DeFi projects run on congested and backdated networks. As great as they have been at paving the way for the many use cases and real-world applications of DeFi, they have their drawbacks. Drawn out transaction times and gas fees have been steadily climbing on these networks as they have garnered more attention, which has caused a higher barrier to entry for those freshly introduced to cryptocurrency and made its practical use cases rather limited. The seamless technology that Solana brings to the table with PoH solves the problems of scalability and practicality to bring billions of people into an integrated world of digital assets. In its current state, the network can process over 50,000 transactions per second with near-zero latency, and is capable of scaling that to over 700,000. As Solana states on their website: PoH is a “clock before consensus.”

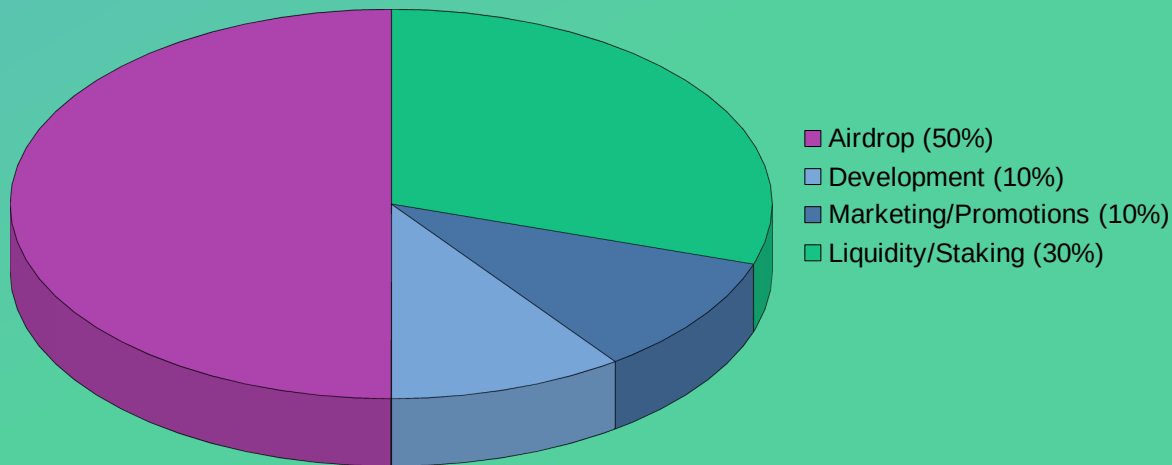
In order to effectively trade with decentralized markets, particularly assets geared towards tracking real-time volatility, using a high-throughput network is the only feasible way to make this happen. The ROPE ecosystem utilizes this infrastructure and will break down the market’s assumption for future volatility with an index generated through options chain data for Bitcoin and Ethereum. This index will provide an implied volatility forecast that can be used as a tool to hedge during times of extreme price fluctuations and

speculate on volatility versus direction in price movement, just as the VIX is used for the equities markets.

## The Tokens:

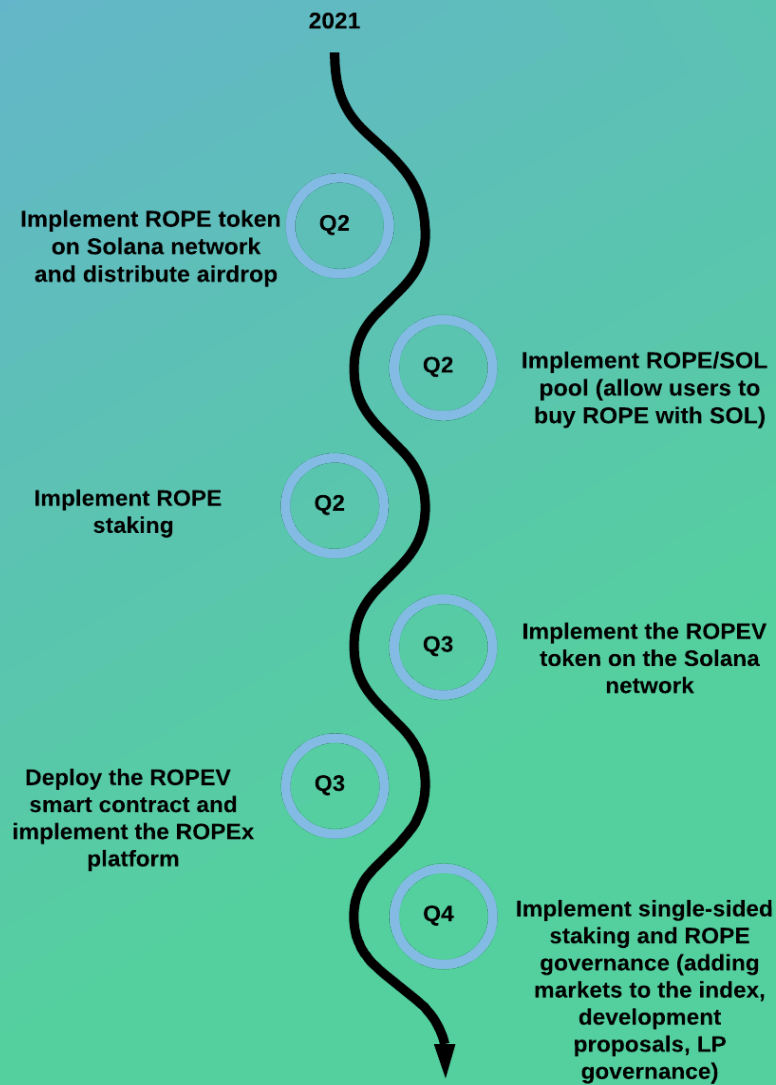
ROPE is the governance token of the ecosystem, and ROPEV is the volatility token with its value tracked through the volatility index. ROPE is hard capped at a 10 million token supply. The token distribution was completed on April 4, 2021 as an airdrop to thousands of people from all over the world. This left the remaining 5 million tokens to be allocated to marketing/promotions (1 million), development (1 million), and liquidity/staking (3 million).

ROPE Tokenomics



Staking will be available through the *Raydium Protocol* and *Orca Platform* liquidity pools. Single-sided staking will also be made available through our front-end GUI, ROPEX—which will be facilitated on our website—and the fees for trading both the ROPEV index and the DEX (powered by *Project Serum*) will provide the staking rewards.

## Roadmap:

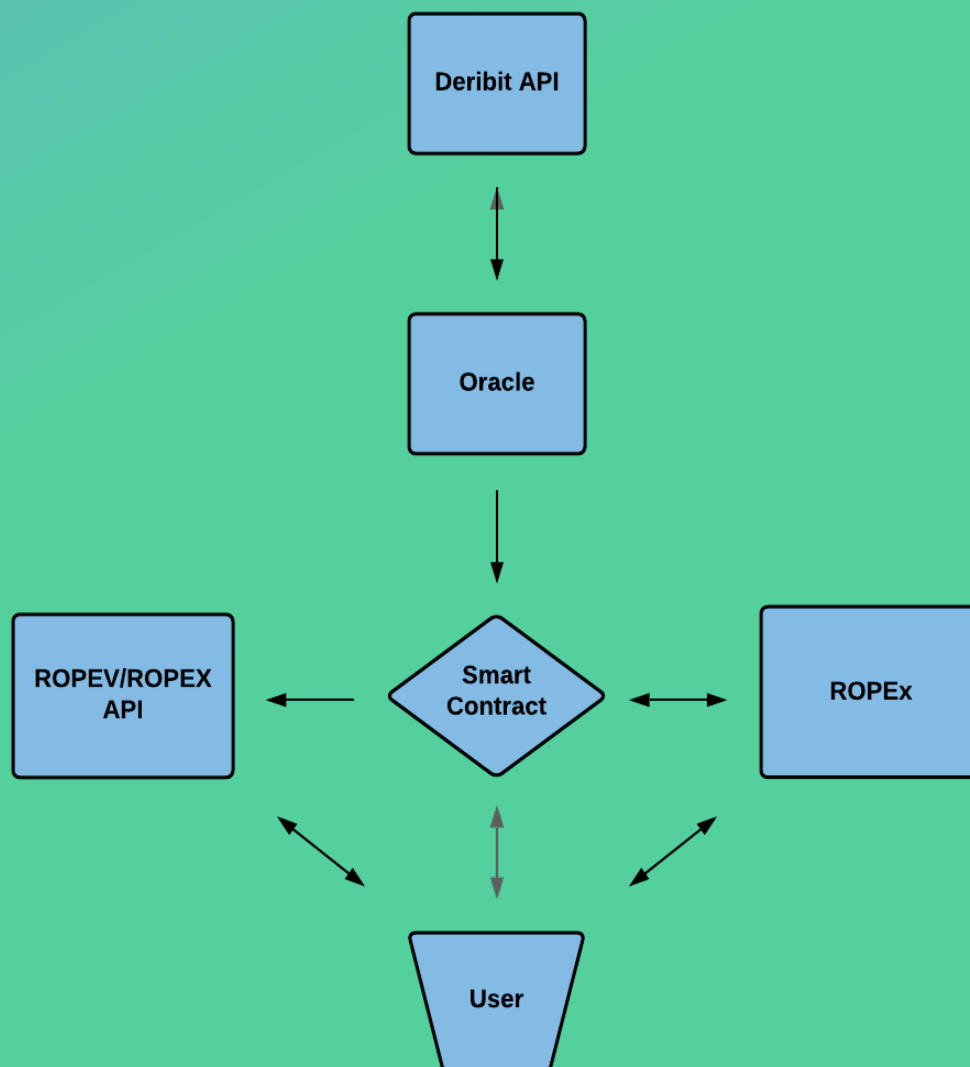


## ROPEV and the Volatility Index:

ROPEV will not have an initial circulating supply and will have a fluid total supply. Tokens will need to be minted or burned by the user, allowing ROPEV users to determine the circulating supply. Minting and burning of ROPEV tokens will be managed through a smart contract on ROPEX. As mentioned, the index valuation will be calculated through

cryptocurrency options prices, which will be done via oracle integration. As of now, Bitcoin and Ethereum are the only assets in the market that have options chains we can pull data from—as more options chains become available with increasing market participation and adoption, more assets can be added to the index and appropriately weighted by market capitalization. Those that are staking ROPE will be able to vote on these proposals in the future.

Detailed information on the index, including a virtual prospectus, and each of the index constituents will be made publicly available on the ROPE website and through a RESTful API. Details on the ROPE API will be provided at a later date. A high-level diagram of the ROPEV ecosystem structure is shown below, highlighting the various access points that are exposed to the end user.



## Calculating Volatility:

Assessing the volatility of a particular market can be accomplished in multiple ways. The Black-Scholes option pricing model was created for European-style options and is commonly used for determining implied volatility. In particular, Cboe's *Volatility Index* (VIX) uses the Black-Scholes model for their calculation, and thus, the ROPEV index aims to mimic the approach highlighted in the VIX for cryptocurrency and token markets.

Following the VIX index calculation with the added assumption that, in this case, the risk-free interest rate to expiration (given as **R** in the VIX White Paper) is zero:

$$\nu = 100 \cdot \sqrt{\frac{2}{T} \sum_i \frac{K_{i+1} - K_{i-1}}{2K_i^2} Q(K_i) - \frac{1}{T} \left[ \frac{F}{K_0} - 1 \right]^2},$$

<sup>1</sup> "Cboe Volatility Index® White Paper." Cboe Global Markets, Cboe Exchange, Inc., <http://cdn.cboe.com/resources/vix/vixwhite.pdf>

where **T** is the time to expiration, **K<sub>0</sub>** is the first strike below the forward index level (**F**), **K<sub>i</sub>** the strike price of an out-of-the-money call option, **Q(K<sub>i</sub>)** the midpoint of the bid-ask spread for each option with strike **K<sub>i</sub>**, and **ν** is the ROPEV index value. The VIX White Paper also mentions that the time to expiration is given by the following (where **M** is the number of minutes):

$$T = \frac{M_{\text{Current day}} + M_{\text{Settlement day}} + M_{\text{Other days}}}{\text{Minutes per year}}.$$

Additionally, the forward index price is defined by the expression below:

$$F = K_t + (C_t - P_t)$$

where  $K_t$  is the strike price of the option,  $C_t$  is the call price, and  $P_t$  is the put price.

To prevent unwanted volatility and manipulation of the ROPEV index due to the highly volatile nature of cryptocurrencies, the calculation of the index will also include a level of smoothing. Please note that as more data becomes available, the extent of smoothing is subject to changes until the full release of ROPEV and the ROPEX smart contract. The index will use a 2-period moving average by default, and temporarily shifts to a 60-period moving average if the current value of the index moves beyond 2% above or below the last value. To further prevent manipulation, the index also features what we call *strike contribution persistence*. The option with the lowest difference between bid and ask is used to calculate various parameters of the index. If this option changes (i.e. the BTC-35,000 option maintained the lowest difference, but now the BTC-37,000 option has the lowest difference), then the option must persist the lowest difference for 3 periods before its parameters are used for the determination of index valuation, which are also subject to smoothing. These measures will be dynamically updated as needed as the index is launched, and will continue to be monitored for optimal functionality.

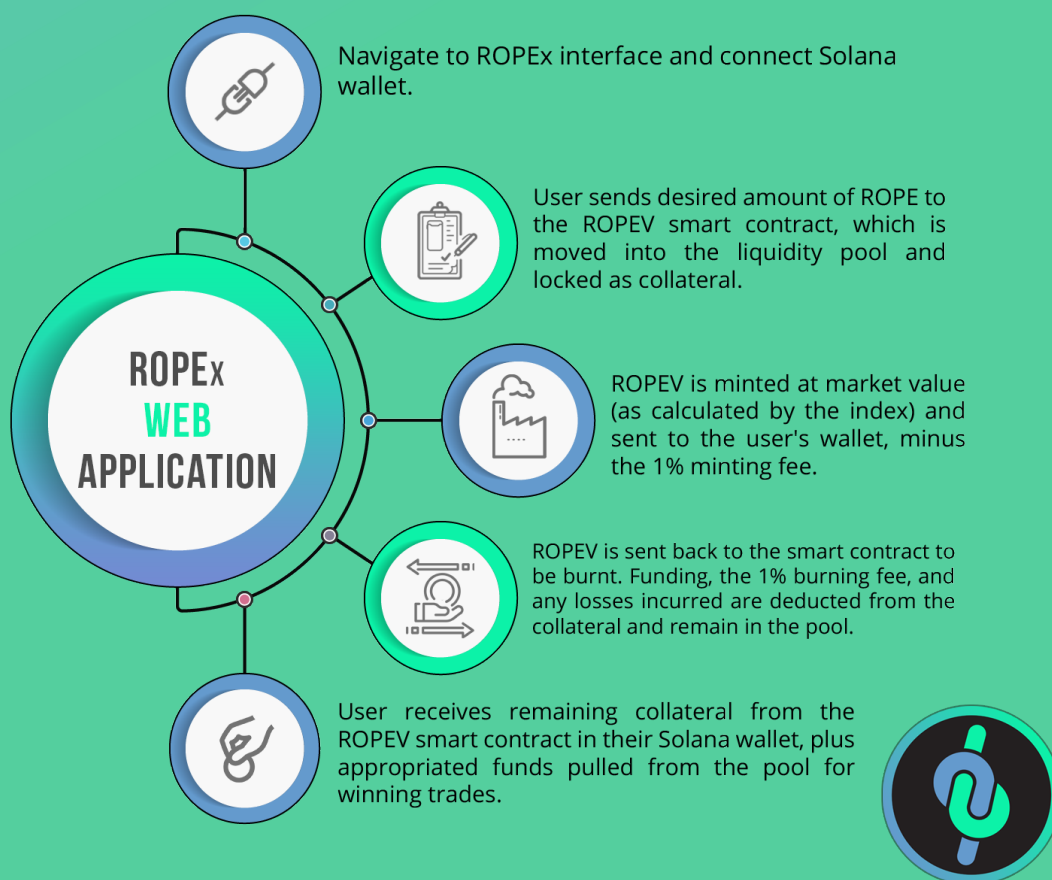
## ROPEX GUI:

ROPEX is the interface that will allow traders to mint ROPEV tokens by collateralizing their ROPE, which will be held in the smart contract tied to time-stamped ROPEV tokens. These tokens will have a funding and minting/burning fee structure (paid in ROPE) that will be accumulated and locked in the ROPEX liquidity pool. The framework of our exponential decay model of funding will not only be used to maintain liquidity, but also as a dynamic tool to safeguard the integrity of the index. Once this liquidity pool reaches a certain



threshold, it will be distributed to ROPE stakers and also used for emergency funding for any liquidity requirements.

The ROPEx pool will initially contain tokens acquired from the liquidity allocation (set to be 1 million ROPE). Users will be able to navigate to the ROPEx web application to exchange their ROPE for ROPEV or vice versa. Users can also directly interact with the smart contract without the need for any GUI. The exchange rate of the ROPE/ROPEV pair will be determined by the value of the ROPEV index at the time of the transaction. As previously stated, all transactions of ROPEx will be fully managed by a smart contract. If a user returns their ROPEV tokens for a value less than they originally minted at, the smart contract returns the equivalent value of ROPE and keeps the remainder of the collateral. On the other hand, if a user returns their ROPEV tokens for a value greater than they originally minted at, the collateral is returned plus any profit earned. Minting fees are paid at the time ROPEV is transferred to the user's wallet, and the burning and funding fees are automatically paid at the time collateral is returned.





## **Jurisdiction and Participation Restrictions:**

*Nothing in this White Paper constitutes an offer to sell or a solicitation of an offer to buy a security in any jurisdiction in which it is unlawful to make such an offer or solicitation. No domestic, nor any other foreign regulatory authority with respect to securities, commodities, currencies, and the like have approved an investment in the tokens. In the event transacting in cryptocurrencies such as ROPE is not legal, regulated, or otherwise permitted in your jurisdiction, you are not to participate in the ROPE community, and any such user who participates anyway, does so at their own risk.*

*This document is not a final technical specification.*

*Information presented here in regards to the ROPE and ROPEV ecosystem does not imply a final technical specification of ROPE or ROPEV, or any products specified therein. It is meant to outline the design and use cases of the ROPE and ROPEV ecosystem, and is not an exhaustive specification of said ecosystem.*