ALTIUS

PRODUCT LITEPAPER

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1. Executive Summary

This litepaper lays out the vision of the Altius finance team to provide an on-chain risk tranching solution to its users. The need for such a solution arises from a lack of depth in current products offering downside protection and or leveraged exposure. The issues in current offering include, high upfront costs and fee, need to rebalance or enter the position at regular intervals, high margin requirements, liquidation risk , lack of liquidity and so on.

Altius's solution is a combination of two sets of smart contracts - a risk tranching vault and an AMM. The risk tranching vault will split a token into stable and leveraged components in a 4:1 ratio at a Marked (Strike) Price . The stable component will offer 25% downside price protection in exchange for a 10% upside haircut at no initial fee or cost. The leveraged component offers the opposite position in the form of a leveraged exposure to the token price, but without any margin requirements or liquidation risk.

Users wishing to only hold one component can swap out the other on the Altius AMM. The AMM also provides additional yield opportunity for either component holder in the form of liquidity provisioning. The components can be combined in a 4:1 ratio and redeemed for the original token at any time.

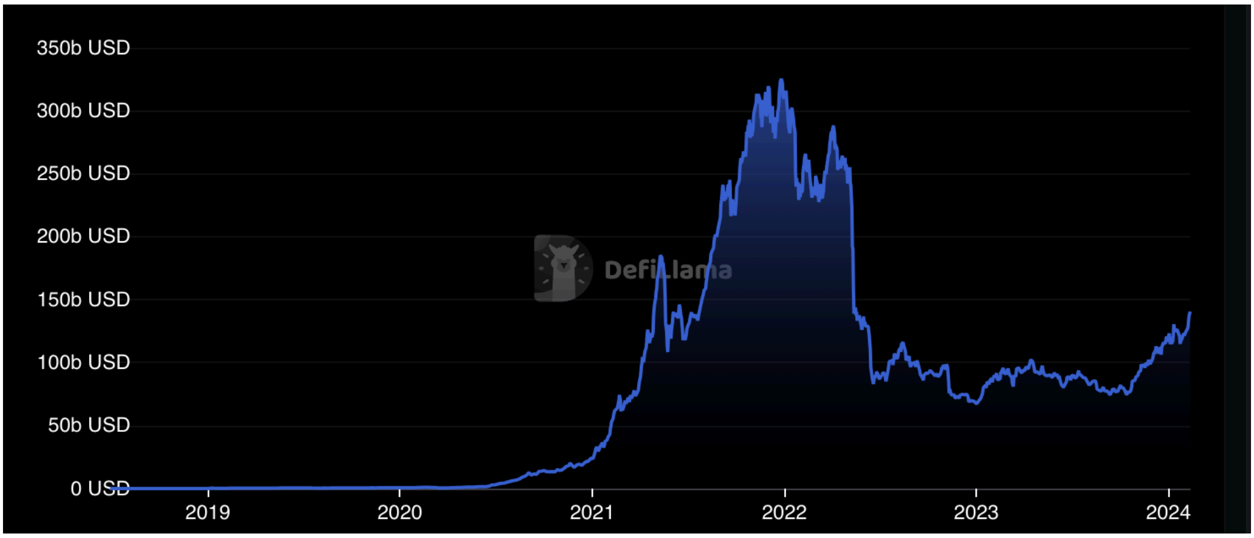
Market price for the stable and leveraged components will comprise of their Intrinsic Value (based on the current price of the underlying token w.r.t. Marked Price) and a market expectations part (representing the market consensus for future price movement). The market expectation part of the price may be positive or negative but the redemption mechanism and liquidity provisioning will ensure that the total price closely follows the intrinsic value in a mechanism similar to Perpetual contracts.

Altius finance aims to be live on Testnet in Q1 2024 with a beta launch on an L2 blockchain to follow in Q2 2024.

2. Background

a) **Investing in Crypto Assets**
Total market cap of crypto currencies stands at $1.8Trn+ in Feb 2024. This is set to increase as regulators around the world have either defined or are in the process of defining regulations related to digital assets, paving the way for new products and new segments of investors entering into the market. The market is dominated by a few major tokens such as BTC,ETH and stable coins.

b) **State of DeFi applications**
Several DeFi applications have been built to provide access and yield generation opportunities to investors, most notably in Liquid Staking, DEXs , Money Markets etc



While basic swapping and staking requirements are well catered to , lending / borrowing to obtain a leveraged position is still quite cumbersome and expensive (in terms of transaction costs and fees). Additionally, products which offer downside protection like options are very expensive and relatively illiquid.

c) SImple market map for digital asset investing

There are several different participants in the crypto markets with different objectives and risk appetites. Additionally when it comes to digital assets the amount of knowledge and preference in self-custodying is an important distinction to make. Very rudimentarily we can categorize investors across two dimensions - how they custody assets and the frequency of their transactions

Best-Fit-Products	**Passive managed**	**Actively managed**
Designated custody	ETFs, staking through CEXs or custodial platforms	CEX perpetuals, off chain lending , borrowing, margin trading
Self-custody	Staking, lending, liquidity pools etc	On-chain options & perps, leveraged positions through borrowing

While we describe the nuances within investors above, it is important to note that crypto investments are generally more volatile and relatively high risk when compared to the broader investment landscape. Thus most investors in crypto tokens want to participate on the upside in this space with differing time horizons, return expectations and risk tolerances

3. Current solutions and Issues

In this section we explore the options available for users to manage the risk in their portfolios. To achieve the desired level of risk tolerance on their portfolios users have a few options in the CeFi and DeFi domains, it is informative to look at this in terms of their objectives

i) Users wanting downside protection (long term investor)

- On chain, these users can buy Put options, however these options typically have low liquidity leading to high slippages and often need to renewed each week / month requiring active management of the portfolio
- Such options are also available with CeFi players (like exchanges), however there are high minimum ticket sizes to participate in these OTC markets as well as the need to trust a centralized institution to honor / clear the transaction

ii) Users wanting leveraged positions (short term traders)

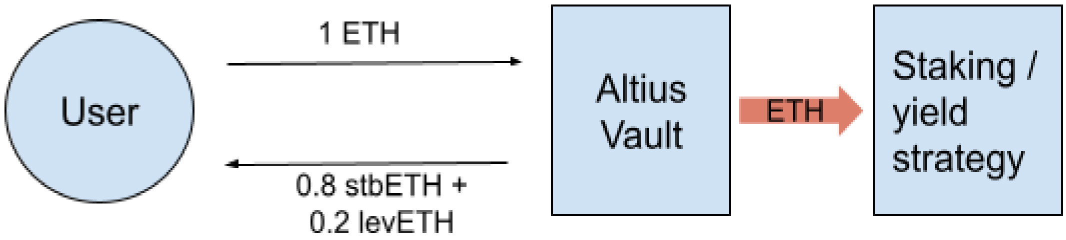
- On chain, these users can built leverage positions through money markets, however this is capital inefficient (most money markets require over collateralization) , can be expensive (based on the borrow rate) and runs the risk of liquidation
- Perpetuals on CeFi platforms is another way to achieve a leveraged position however there are potential costs associated with the funding rate, margin requirements that need to be monitored, the risk of liquidation and the need to trust a centralized institution to honor / clear the transaction
- On chain perpetual contracts solve the centralization problem but still suffer from a need to manage margin requirement and liquidation risk

4. Altius Solution

a) **Basic structure and entering into a position**
At Altius Finance we aim to solve this by introducing two new DeFi primitives, focused on risk tranching/segmentation to cater to the needs of both long term investors and short term traders.

We take the example of ETH in this paper but any token can be used to create these primitives

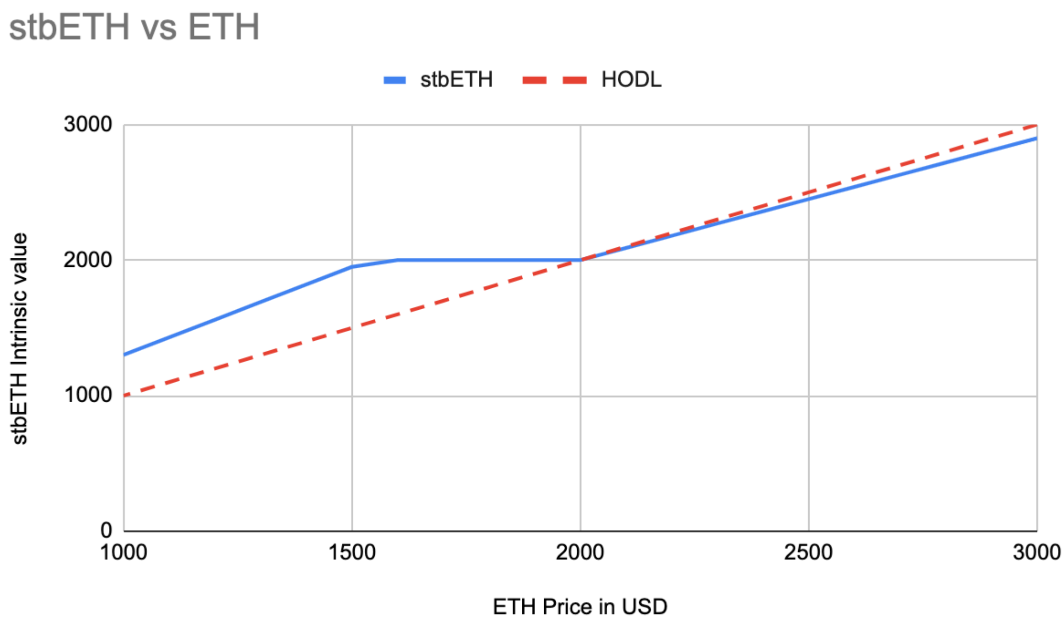
The basic schema for the product is mentioned below



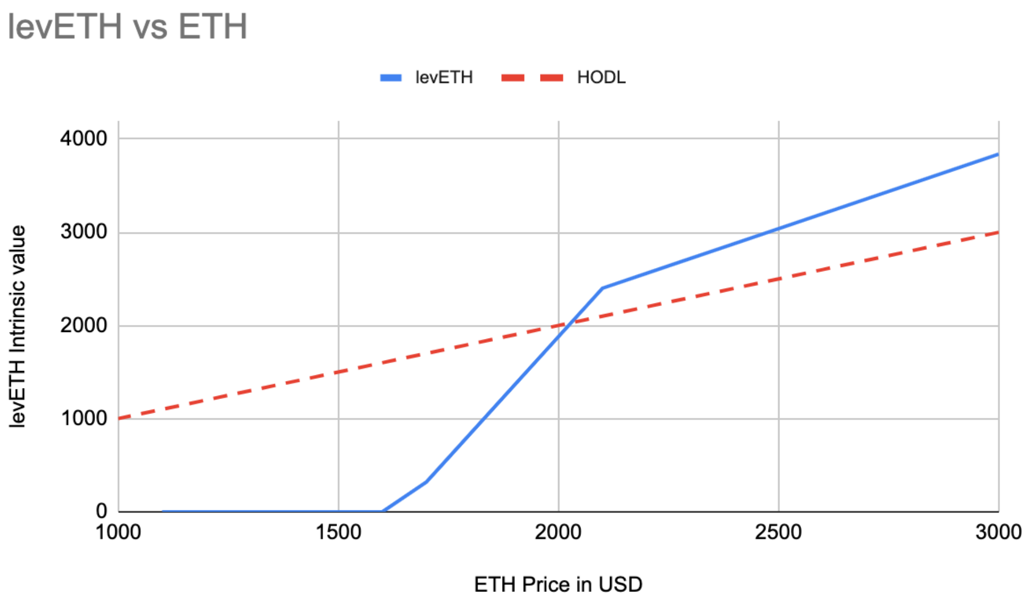
The Altius vault accepts ETH from the user and mints stbETH and levETH in a 4:1 ratio to provide to the user, the ETH from the user is then staked / deployed in a yield strategy

Each vault has a Marked Price in USD for 1 ETH which is used to calculate the split of ETH in the vault between stbETH and levETH as the price of ETH moves w.r.t to USD

Stable ETH (stbETH) - token offers 90% of the upside of ETH above the Marked Price with 20% downside protection and no yield. Figure below shows price movement for 1 stbETH w.r.t to HODL ETH for a marked price of $2000/ETH and a staking yield of 4%



Leveraged ETH (levETH) - token offers leveraged upside exposure to ETH coming from the upside haircut on stbETH and the yield generated from staking / other strategies. However it also absorbs any losses below the Marked Price first before they are passed on to stbETH holders. Figure below shows price movement for 1 levETH w.r.t to HODL ETH for a marked price of $2000/ETH and a staking yield of 4%



b) Redemption and exiting a position

Any user can deposit stbETH and levETH into the Altius vault in a 4:1 ratio and obtain the underlying ETH to exit their position through the direct redemption.

Alternatively, users can also swap their stbETH or levETH tokens through DEX pools. The price of the tokens can be thought of comprising two components: an intrinsic value and a market expectations component which may be positive or negative

stbETH price = (Intrinsic stbETH value) +/- (Market expectation stbETH component)
levETH price = (Intrinsic levETH value) +/- (Market expectation levETH component)

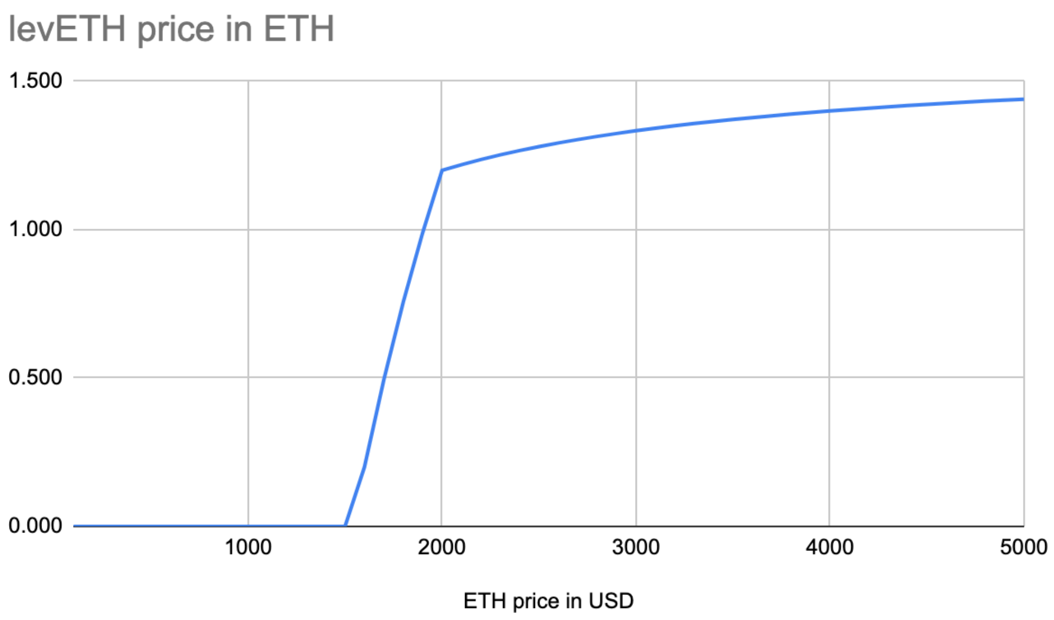
The Intrinsic Value of stbETH or levETH can be thought of as the value of the token based on the current price of ETH in USD , this is described in the price charts above.

The Market expectation component can be thought of as a representation of the future expected price movement of ETH and its effect on the Intrinsic value of stbETH and levETH. For example if most market participants believe that ETH price will rise from current levels, it would follow that going long levETH is the more profitable trade and thus we would expect the Market expectation levETH component to be positive. At the same time the Market expectation stbETH component should be negative which imply that those users (in the minority) who want the comfort of downside protection have to pay lesser to obtain their stbETH

c) **Liquidity provisioning and price discovery**
In order to create a robust market for these new DeFi primitives, it is necessary to create a healthy amount of liquidity with the underlying (original) token . The characteristics of these token lend themselves to different types of liquidity pools, as an example consider the figure below which shows the price of 1 stbETH in ETH terms and different levels of underlying ETH price in USD for a vault with Marked Price of $2000/ETH and a staking yield of 4%

As can be seen in the graph the price of stbETH/ETH varies between a narrow range of 1.3 to 0.9 for a wide range of ETH price in USD, such characteristics make a stable swap pool between stbETH and ETH very efficient at providing low slippage for swappers and low impermanent loss for liquidity providers

The levETH price in ETH terms for a similar vault can be seen below, while the range of price is a bit broader , from 0 to 1.5 , the graph follows a similar pattern (though mirrored) to those in stable swap pools but with a different offsets.



It is pertinent to note that due to the redemption option on the Altius vault, the following relationship will always hold good

0.8 stbETH + 0.2 levETH = ETH

This creates a bounded relationship between the tokens and opens up opportunities for arbitrageurs to keep the market prices in check.

In order to provide the best possible swap experience , in terms of slippage and liquidity, Altius plans to host its own pools for stbETH/ETH and levETH/ETH

5. Advantages for Altius vaults

For **long term token holders** in the retail and institutional segments (VCs, family office, RIAs etc), stbETH offers a unique opportunity as it provides:

- Unique payoff characteristics
    - Protect downside risk
    - Capture 90% of upside
- No fee:
    - No upfront or recurring payments
    - Low transaction fee
- High liquidity
    - Ability to enter / exit a position instantaneously
- Low operational overhead
    - No need to change positions every week/month (as with options)
- Opportunity to earn additional yield through liquidity provisioning

For **short term traders** in the retail and institutional segments (hedge funds,market makers etc) Altius offers a unique opportunity as it provides:

- Capital efficient
    - Leveraged ETH exposure with no margin
    - No collateral requirement
- No liquidation risk
- Opportunity to profit from price drops with stbETH positions
- No fee:
    - No upfront or recurring payments
    - Low transaction fee
- Low operational overhead
    - No need to change positions every week/month (as with options)
- Opportunity to earn additional yield through liquidity provisioning

5. Roadmap

March 2024:
- Smart contract development
- Testnet Launch with one tranching vault (single token)

April - May 2024
- Smart contract audits
- Beta launch on an L2 with first token
- Launch of Altius AMMs

May - June 2024
- Bug bounty program
- Launch of Altius governance token
- Liquidity expansion and platform updates based on initial feedback

Q3 2024
- Launch of other tokens through dedicated tranching vaults
- Expansion to L2s and other chains

Q4 2024
- Launch of fully configurable risk tranchig vaults

6. Risks and Disclaimer

This whitepaper offers a detailed project overview for the purpose of seeking feedback from the community. Please note that the Altius Finance team and its affiliates reserve the right to review and modify this document at any time.
No section of this whitepaper establishes a legal relationship with the recipient or binds Altius Finance legally.

There are several risks associated with participating in DeFi protocols such as Altius Finance, some of them are listed below, however this is not a comprehensive list and users are required to do their own due diligence before participating in the project.

a) Regulatory and legal risks: The regulatory and legal landscape regarding DeFi and distributed ledger technology remains uncertain across various jurisdictions. Regulatory actions might significantly impact the Altius Finance protocol , its product as well as its future governance token
b) Development risk:There are inherent risks associated with the development of any DeFi protocol including Altius finance, including unanticipated technical obstacles, market volatility, insufficient funding etc.Such factors could hinder or alter the planned execution of the Altius finance protocol
c) Smart contract and security risk: As with any smart contract based protocol , Altius Finance also carries smart contract risk - the risk of the smart contract not working as planned or being misused by malicious actors. Additionally, advancements in cryptography or the development of technologies like quantum computing might pose unforeseen risks to the cryptographic consensus mechanism on which Altius is based
d) Other risks: There are additional risks, not exhaustively mentioned above, associated with using DeFi protocols such as Altius Finance. These risks might materialize in unanticipated combinations or variations and may not be foreseeable by the Altius Finance team or its affiliates. Users are advised to conduct comprehensive due diligence on all aspects of their activities with DeFi and Altius Finance in accordance to the legal and regulatory requirements applicable to them

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