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Linear Whitepaper v1.1
A Cross-Chain Compatible, Decentralized Delta-One Asset Protocol with Unlimited Liquidity

ABSTRACT

Linear Finance ("Linear") is a non-custodial, cross-chain compatible, delta-one asset protocol. Linear's long term DeFi vision is to increase inclusiveness and democratize access to investment assets (digital and traditional). Tremendous value exists in the ability for investors to easily and quickly invest, save fees, and secure assets at fair market value. Linear combines substantial technical experience from numerous crypto projects with extensive financial experience in exotic and structured assets from traditional global asset management firms to bring to market one of the first DeFi projects built upon Ethereum with cross-chain compatibility. Linear will allow users to build and manage spot or portfolio exposures with a slew of innovative digital and traditional financial products. Linear is backed by our ETH-based Linear Token (LINA) with synthetic assets built on other EVM compatible chains first and other prominent blockchains in the long run, making the staking, investing, and redemption process easier, quicker and with substantially lower transaction fees whilst maintaining access to the Ethereum DeFi ecosystem.

Linear is a non-custodial cross-chain compatible DeFi protocol with unlimited liquidity and serves in the creation of synthetic assets (Liquids) with zero slippage. The backbone to Linear's protocol is our collateralized debt pool, backed by our Linear token (LINA), and eventually other digital and real assets. Users who have provided collateralized assets to the debt pool are able to "build" Linear USD (ℓUSD) which can then be used to purchase synthetic assets (Linear Liquids) on our exchange. The collateralized assets are subsequently pooled to enable instantaneous liquidity and serve as a counterparty. LINA will also be a governance token enabling holders to vote on distribution models, assets to be listed, oracle selection, pledge ratio etc. LINA holders within the debt pool will obtain pro-rata fees from the synthetization of assets.

The LINA token will adopt an inflationary model to enhance staking incentives and will have liquidity mining programs to encourage usage of the exchange and stability of the pool. Synthetization of assets will focus on cryptocurrencies, commodities and, more importantly, traditional assets such as market indices and thematic theme exposures.

The long term vision for Linear is to move from an exogenous collateral model to an endogenous collateral model, such that non-LINA token collateral can also be accepted. We also envision an advanced order type for the exchange functionality.

LINA token - Collateral and Governance

LINA as the Base Collateral with other Digital Asset Options

LINA tokens are the base collateral to create Liquids using Buildr, which is a decentralized application for synthetic asset management. The creation of Liquids will require a pledge ratio which is over 100%, i.e. over-pledged. Over-pledging is necessary to ensure the volatility of the underlying synthetic crypto assets do not adversely affect the stability of the entire system. In the long run, the pledge ratio can gradually be reduced and this will be determined by the LinearDAO (for community governance).

Compared to other competitors which are testing to accept cryptocurrency such as Ether (ETH) as collateral, Linear protocol will take a hybrid approach instead. As such, Buildr will accept a mixture of LINA tokens and other digital assets as collateral. The initial breakdown of LINA:other digital assets is set as 80%:20%, meaning at least 80% of the collaterals have to be in LINA for maintenance and at most 20% in other digital assets. The ratio is subject to community adjustment with the inception of the LinearDAO.

LINA Staking Rewards

Incentives are provided to LINA stakers in the following ways:

Pro-rata Exchange Fee

Transaction fees are generated whenever a user exchanges one type of Liquid to another using our Linear.Exchange platform. The initial transaction fee is set to be 0.25%, subject to community governance decisions in the future. Stakers will obtain such rewards (in ℓUSD) weekly on a pro-rata basis given that their Pledge Ratio (P ratio) is above the threshold. The non LINA-type collateral part of the staking (if any) is only partially entitled to such reward.

Inflationary Reward

Linear adopts an inflationary tokenomics with a decreasing rate until a terminal floor is reached. We share the same vision as Ethereum in the sense that the imminent inflation reward is important for the explosive growth of the platform while the long term terminal rate should help stabilizing the total LINA supply in circulation. Currently the starting inflation is set as 75% (of the tokens designated for staking) which decreases weekly at a decay of 1.5% with respect to the inflation rate and is subject to change by the LinearDAO. Stakers will obtain such reward weekly on a pro-rata basis given that their P ratio is above the threshold. The non LINA-type collateral part of the staking (if any) is only partially entitled to such reward.

Yield Farming Campaign

Given the current DeFi environment and yield farming trend, we realize the importance of appealing to yield farmers upon the launch of the project in order to help bootstrap the debt pool and have users experience the usability and ease of our protocol. As such, we view this as a cost of user acquisition and upon the launch of Linear, in addition to the proposed token distributions, which will be front loaded in the first two years, users who fully utilize the exchange will have token bonuses, allowing them to yield a larger portion of the reward pool. Whilst our LINA token and ℓUSD are ERC-20 tokens, Liquids are EVM compatible and hence, they can all be deposited by users in third party pools such as Balancer, Uniswap, and Curve to facilitate yield stacking.

In addition, we will also be leveraging the use of token rewards to also incentivize users to help stabilize the debt pool in certain instances. When the debt pool becomes unbalanced in exposures e.g. if a large number of users create Liquids against gold (Long), we will provide users who counterbalance this trade by creating a Liquid short against gold with additional token rewards, ultimately reducing the volatility and increasing the safety of the debt pool.

Pledge Ratio

The starting ratio is initially set at an optimal rate of 600% and will be subject for further review by the LinearDAO. The initially high P ratio is essential for the long term growth of the platform amid black swan or volatile incidents. The P ratio varies with the price variation of LINA token. If the P ratio of a staker rises, the user can choose to build more Liquids as long as the P ratio is not below the threshold. On the other hand, if the P ratio of a staker drops below the threshold, the user is required to burn part of the Liquids until the ratio is at least on par with the threshold in order for him to claim pro-rata platform transaction fees.

The Linear Pool

The existence of the Linear Pool is the key to the overall platform as it acts as "an decentralized counterparty" to all Liquids exchanges, thus generating unlimited liquidity for platform users. For LINA stakers, they incur a debt whenever using Buildr to create a Liquid. The debt value varies with respect to all the Liquids in the system. For example, if all the Liquids on the platform are synthetic gold (ℓXAU), the price fluctuation of gold is insignificant as gold price increases the corresponding debt value of each ℓXAU holder increases the same amount, or vice versa.

Users, i.e. the LINA stakers hence act as liquidity providers while using the platform at the same time. Depending on the Liquid created, the overall debt level changes according to the overall long / short ratio. Below are the 2 major journeys that normal users and market-makers have:

Normal Users

1. Get LINA tokens via our fiat payment gateway partners
2. Stake LINA tokens via our Buildr to build ℓUSD
3. Get Liquids exposure using ℓUSD and exchange among different Liquids via Linear.Exchange
4. Claim the transaction split and inflationary reward
5. Convert the Liquids exposure back to ℓUSD
6. Burn the ℓUSD to unlock the staked LINA tokens

Market Maker

1. Get LINA tokens via our fiat payment gateway partners
2. Stake LINA tokens via our Buildr to build ℓUSD
3. Depending on the net position of a particular Liquid, for example, if the position of ℓXAU is net long 50%, marketmaker can help stabilize the debt pool by doing the other side (i.e. go short on XAU in this case)
4. Linear will incentivize the marketmaker to do so by providing extra yield (i.e. LINA token) on top of the inflation reward and transaction split for their effort to stabilize the debt pool

Linear.Exchange

The Issue

Liquids provide a seamless exposure for all users. Imagine a world without Linear.Exchange, when Alice wants to switch her exposure from CAC 40 to Bitcoin, it would take her approximately two days to get the proceeds from her broker because of T+2 settlement timeframe and another one to two days for the broker to direct a transaction to Alice's bank account. Afterwards, it would be another couple of days for Alice to wire money from her bank account to a cryptocurrency exchange before she can finally switch her exposure into Bitcoin, ultimately exposing her to a potential negative price movement.

The Solution

Linear.Exchange can seamlessly solve the issue with the debt pool concept and unlimited liquidity. Any Liquids settlement timeframe can be lowered into seconds with the help of blockchain technology (as compared to T+2 in traditional securities). Linear is now working with well-known public blockchains to further lower the settlement timeframe with block times as low as 1 second and instant finality. In this case we can combine the best of the both worlds: the most sought-after tooling and infrastructure of Ethereum and the high TPS of other public blockchains. In addition, when creating Liquids, as it will be on the other blockchains, the transaction fees will be minimal, compared to the high gas fees of Ethereum. The front-running problem of some existing platforms can also be solved as the oracle will be able to refresh prices in a frequency to as low as 1 second at much lower fees.

For All Investment Exposure

One of the goals of the Linear.Exchange is to not only reduce the hassle and risk involved in cross-assets investment but to also expand the breadth of investable assets. Upon our launch, Linear.Exchange will support not only cryptocurrency but also traditional assets such as commodities, forex, market indices, thematic exposures, and ultimately equities in the near term. In addition, we will start an internal group that will be focused on building thematic exposures within the crypto world and traditional equities depending upon the wishes and asks from our users and approved by the governance base. What's more, Linear will be building our exchange functionalities that will allow users to effectively manage their exposure and additional asset management functionalities such as portfolio management and analytics.

System Architecture

In order to effectively solve the high transaction fee and oracle frontrunning problem of existing DeFis on Ethereum, Linear is adopting a cross-chain approach by supporting both the Ethereum and EVM-compatible blockchains. From a user perspective, the user would only need to initialize both a Ethereum-based wallet and the EVM-compatible wallet. Operation-wise it would be exactly the same as handling the wallets separately, while Linear will help pegging the two wallets and record the pegging on smart contracts. By separating the smart contract suite of Linear into 2 different blockchains, the following benefits can be achieved:

1. As LinearDAO and Linear tokens (ERC-20) are deployed on Ethereum, we are able to maximize the support from the DeFi community (which is the largest on Ethereum so far) and cross-DeFi partnership with other protocols.
2. For Buildr and Exchange the smart contract logic will be deployed on the EVM-compatible blockchains. The entire Liquids building and trading will be nearly free from gas fee, which greatly increases the user experience.
3. Since the block time of our partnering EVM-compatible blockchain is much shorter than that of Ethereum and the transaction fee is almost minimized as compared to the Ethereum side, Linear enables users to build Liquids with a more prompt oracle price update, making the window for front-running much lower. As such, stakers' tokens can be better protected and there will also be less concern on the debt inflation.
4. The entire process will be optimized and automated in the near future to reduce any potential friction when cross-chain smart contracts are called.

Building

All assets are supported by the decentralized debt pool of LINA tokens and other major/stable cryptocurrencies. Hence holders of LINA (and/or other major/stable cryptos) can use their balances to build Liquids using Buildr.

In order to reduce the gas fee required and improve the time required for building Liquids, Linear makes use of the best of both Ethereum and partner chain networks. This means that there will be a cross-chain operation when LINA tokens are pledged to build Liquids, utilizing smart contracts on both chains so that from a user perspective they will not notice the difference. The only extra requirement is for users to have a partner chain-based wallet which will be pegged to their Ethereum wallet so that when LINA tokens / other cryptos are pledged, the Liquids will be built cross-chain and sent to the pegged wallet address.

Once the Liquids are built, an user can perform seamless transactions and adjust his exposure freely with much lower fees and faster confirmation time due to the high performance of the EVM-compatible blockchains. Users can also perform cross-chain actions to convert Liquids back to Ethereum-based LINA tokens.

For the optimal P ratio as initialized above, it can be adjusted upward or downward via community governance. The ratio of LINA:other acceptable collaterals can also be included shall the community provide a sensible proposal. On the other hand, stakers will create a debt when building Liquids. In order to remove the exposure (i.e. to unlock the staked LINA tokens / other acceptable collaterals), Liquids haveto be burned. If the prices of LINA increases, a user can choose to keep a higher P ratio as a price shock buffer OR build more ℓUSD and maintain the minimal P ratio.

Exchange

For the best user experience, the Liquids exchange smart contract suites will be on the EVM-compatible partner blockchain. To trade on Linear.Exchange, the counterparty is different from a traditional Centralized Exchange (CEX) or any order book based Decentralized Exchange (DEX) where a user trades against another user. Instead, users are trading directly with Linear's smart contracts backed by a debt pool with the price provided by Oracle to supply price feed of underlying assets.

Linear will support Liquids pairing with respect to ℓUSD and other large cap coins such as ℓBTC and ℓETH in the future. Depending on the base pair, it will be first burned into ℓUSD form and a transaction fee of 0.25% will be deducted from the proceeds before the conversion. The total supply of the newly built Liquids will then be updated.

Fee Claim

The fee claim procedures will be as follows:

Depending on the amount of LINA tokens users stake (any other digital assets staked will only be entitled to partial rewards), their rewards (a. Inflationary reward and b. transaction fee split) will be stored in the corresponding reward claim smart contracts.

Users will be able to claim their unlocked weekly distribution of transaction fee split every Sunday UTC 20:00. For inflationary reward, there is a lock-up of 1 year for ensuring the healthiness and long term growth of the platform. The locked up amount of inflationary reward will be automatically staked in the debt pool. This amount will also help to lower the overall P ratio of that user.

Burning

Stakers can reduce their debt and unlock the LINA tokens / others by burning the Liquids they built. The initial debt level and the current debt level of a particular user may vary, depending on the long / short ratio of the overall pool. Ideally speaking it should be 50:50 and Linear is incentivizing marketmakers to maintain this ratio by providing extra yields.

Since the decomposition of Liquids (i.e. burning of debts) will be performed on the partner blockchain, the entire process can be done nearly instantaneously and nearly 0 fees.

Debt Pool

As the debt pool serves as the counterparty of users on the platform, there should be proper tracking on the segregate level of each user's debt amount (and the changes over time due to platform use of building and decomposing by himself or others).

This means that the current debt amount may be different from the initial debt amount of users. User's debt proportion with respect to the entire debt pool is based on the building / decomposition history and the corresponding Liquids size, and overall debt pool level. This is a changing number determined by the entire Liquids portfolio of the platform as users are indeed betting against the decentralized debt pool.

Oracle

Oracle is the backbone of feeding our platform prices of different Liquids. Supported by the Dev team of our first EVM-compatible partner blockchain, we will be using the oracle that can update prices in a nearly-instantaneous manner. Linear is also exploring some of the decentralized cross-chain oracle partners in long term.

For inverse Liquids, the reference price / spot price then when the Liquids were minted will also be taken into account with the following formulas:

Movement = Current Price - Reference Price

Inverse Liquid Price = Reference price - Movement

Solutions for Existing Issues

The following session concludes different issues that our current DeFi competitors still have:

Improved Collateralization Mechanism

There is no proper mechanism to deal with the high pledge ratio of synthetic asset landscape right now. Linear is solving the problem right at the beginning by accepting major stable cryptocurrency as collateral. The community can further decide the LINA:others ratio after the governance protocol is completed. In the long run Linear will look to tokenize real world assets as collaterals.

Instant and Dynamic Mechanism with Partner Chains

Secondly, the oracle front-running problem has long been an issue with Ethereum based dApps. To really enable financial innovation and permissionless finance, Linear is tackling the problem by cross-chain capabilities between Ethereum and other EVM-compatible chains. On the partnering EMV-compatible blockchain side, thanks to the low block time and much lower cost, exchanging Liquids on the platform is a seamless experience. On the other hand, for oracles on the Ethereum blockchain, a higher frequency of update will be used. Linear adopts a dynamic mechanism to shorten the update interval based on front-end interaction on the assets. When the gas fee is low or in the future when scalability is achieved, the oracle update gas fee can be directly embedded into the transaction performed by users.

Liquidation Mechanism and Insurance Fund

Last but not least, it is vital for Linear to implement a liquidation mechanism in order to handle black swan events such as the March 12, 2020. Linear will propose a proper liquidation mechanism and open it up for community governance to decide in order to safeguard the healthiness and resistance to any market situation. In addition, the setup of an insurance fund will also help tackle any liquidation loss so that the loss would not need to be socialized everytime. Again, the community can decide on the source of the insurance fund, e.g. a percentage from the transaction fee.

Long Term Technology Roadmap

Cross-chain compatibility with non-EVM-compatible blockchains

Though Linear is now working with EVM-compatible blockchains to solve the clogging issues of Ethereum on day one, the team has already been in touch with some other prominent public blockchains with innovative and dynamic design that could potentially gain community traction over time. In the long run, Linear seeks to become the cross-chain compatible delta-one protocol that provides seamless trading experience across any major blockchains.

Optimization of Transaction Fee and Speed

Currently, we tackle the issue by separating the smart contract logic of Buildr and Exchange on the EVM-compatible blockchains which have high TPS and much lower fees. However, the gas fee on the Ethereum side could still be a long term problem shall the usage of the blockchain keep going up with ETH 2.0 still a long way to go.

In order to solve the issue, Linear plans to implement Layer 2 solution in the later versions. For example, by using zk-rollup on Ethereum, the TPS, fees and oracle problems can be better handled. The team is currently looking into the best way for utilizing zk-rollup without adding friction on the front-end side.

Liquidation mechanism

As mentioned above, despite the fact that users are required with a dynamic pledge ratio of around 600%, there should also be a liquidation mechanism that should be triggered when the P ratio is under a certain number, say 150%. There will be a punitive conversion rate for Linear to re-purchase the corresponding Liquids using the pledged LINA tokens to ensure the stability of the debt pool. If the value from the liquidation of the Liquids is higher than the value of the LINA tokens at liquidation, a system loss will be incurred. On the other hand, when the value from the liquidation of the Liquids is lower than that of LINA tokens, there will be a system profit.

LinearDAO (explained in the paragraph later) will decide on this implementation and handle the profit and loss when it comes to liquidation. It could be in the form of an insurance fund or distributed socially across the platform.

LinearDAO

After the launch of the protocol, Linear will be under the governance of LinearDAO on important parameters and platform design such as:

1. Pledge ratio
2. LINA inflation reward and frequency
3. Split of transaction fees on areas such as burn, fee claims and Linear Reserve
4. New functionalities and technology roadmap
5. Proposals can be submitted by the community and voting will be done to determine whether they should be adopted or not. In between there will be discussion on each proposal before the voting so as to ensure the voting is meaningful to the long term growth of the platform.

Summary

The team at Linear, with a strong technical background and financial investment experience is committed to bringing our protocol to market and expanding financial inclusivity to all users. While investing may be difficult, we want it to be easy, cheap, and transparent so that you don't have to be a rocket scientist to build and manage your investments on our exchange. Whilst the above will be our short term goal, in the long term we recognize the value of building Linear as an asset layer and will welcome app developers to build additional asset management dApps on top of Linear. Lastly, in the spirit of decentralized finance, upon launch, we will start the planning and transition of our governance to a DAO, allowing our user community to help and continue to drive innovation and be key decision makers within our protocol and ultimately becoming a protocol for users, built by users.