UniLend OMNIS

Protocol Whitepaper

V2.0

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1.1 Abstract

UniLend Protocol is a permissionless decentralized money market protocol with lending and borrowing service through smart contracts.
UniLend enables users to utilize their cryptocurrencies by supplying collateral to the network that may be borrowed by pledging over-collateralized cryptocurrencies. This creates a secure lending environment where the lender receives a compounded interest rate annually (APY) paid per block while the borrower pays interest on the cryptocurrency borrowed.

This document highlights the latest version of our protocol, UniLend V2, which brings the dual asset pools for lending borrowing with price feed oracles and gas optimization.

UniLend v2 is implemented as an entirely new set of contracts, available here. The UniLend v2 core contracts are partly upgradeable with some parameters controlled by governance.

1.2 Problem

No matter the decentralized finance project, the user's journey usually starts with locking value in a smart contract. As of this writing, the total value locked in DeFi on various blockchains like Ethereum, Polygon, BSC, Polkadot exceeds $80 billion [1]. This is a tenfold increase from mid-summer 2020, but the DeFi market potential is still far from being reached as most of the crypto assets are excluded from the defi ecosystem. This chapter considers the three most significant challenges for decentralized finance, which UniLend is overcoming with its innovations.

1.3 Solution

The current players in lending DeFi have limited the assets on their protocol, but UniLend Finance being a permissionless protocol, allows thousands of assets to start lending and borrowing pools for money markets. UniLend presents itself as a base layer where many innovations will occur in the DeFi industry.

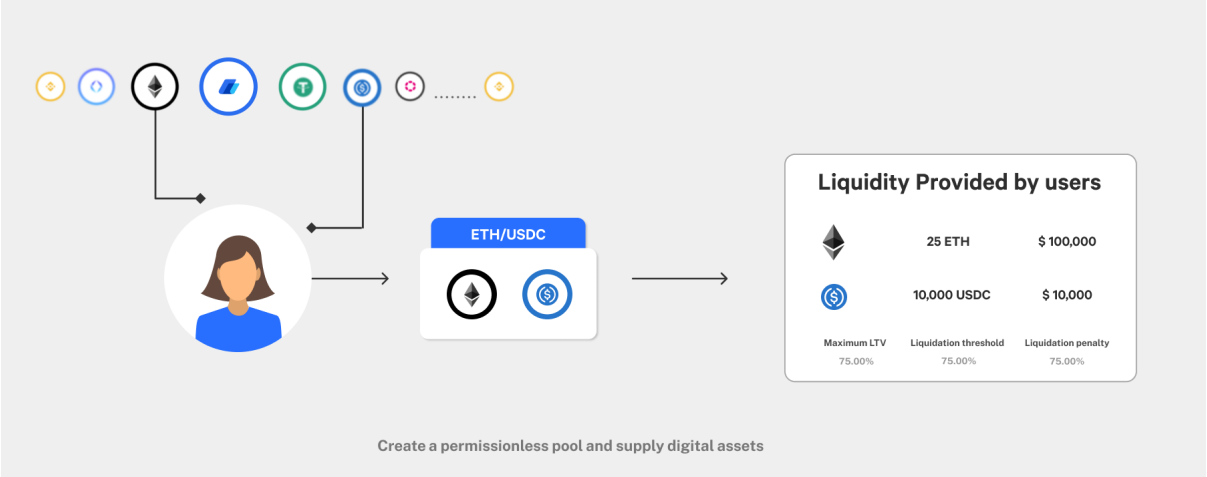
2. Products and Services

2.1 Supply

The UniLend Protocol uses a dual asset pool-based strategy in a permissionless nature. As a result, UniLend Finance users can supply any ERC20 asset (and similar standards across multiple blockchains) and earn variable-based interest rates depending on the market and pool interest model.

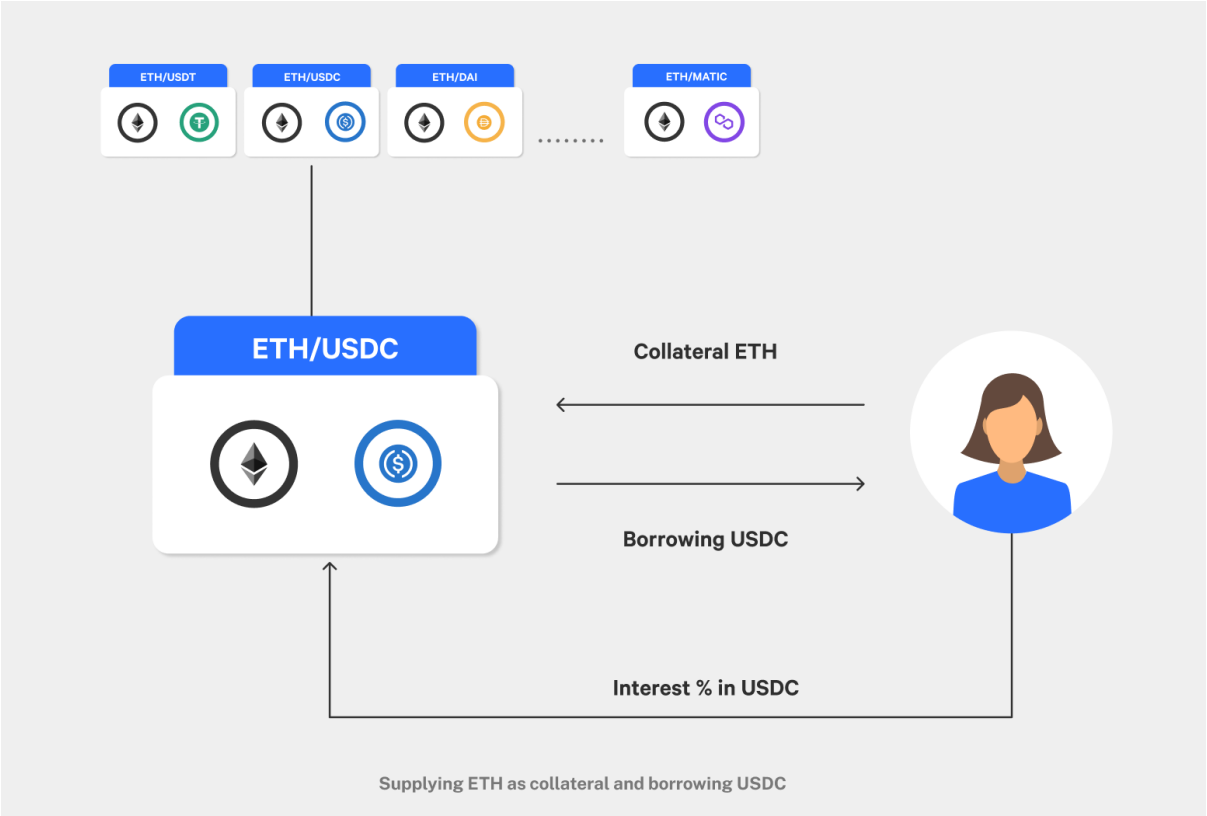
Users who supply their assets receive liquidity positions as the Non-Fungible Token, which will be used to redeem the lent assets from the pool and represent their borrowed positions. The Non-Fungibility Nature of these liquidity positions allows the unique position for users to leverage the secondary markets.

We have also covered the primary difficulty lenders face and overcome the depletion of lendable assets and the inability of lenders to redeem their assets. In addition, we use third-party and automated liquidation programs that act as cushioning to the entire system. This allows UniLend Finance to build a system of checks and balances to incentivize market participants and make sure the liquidity in any given asset isn't scarce, given current levels of borrowing.



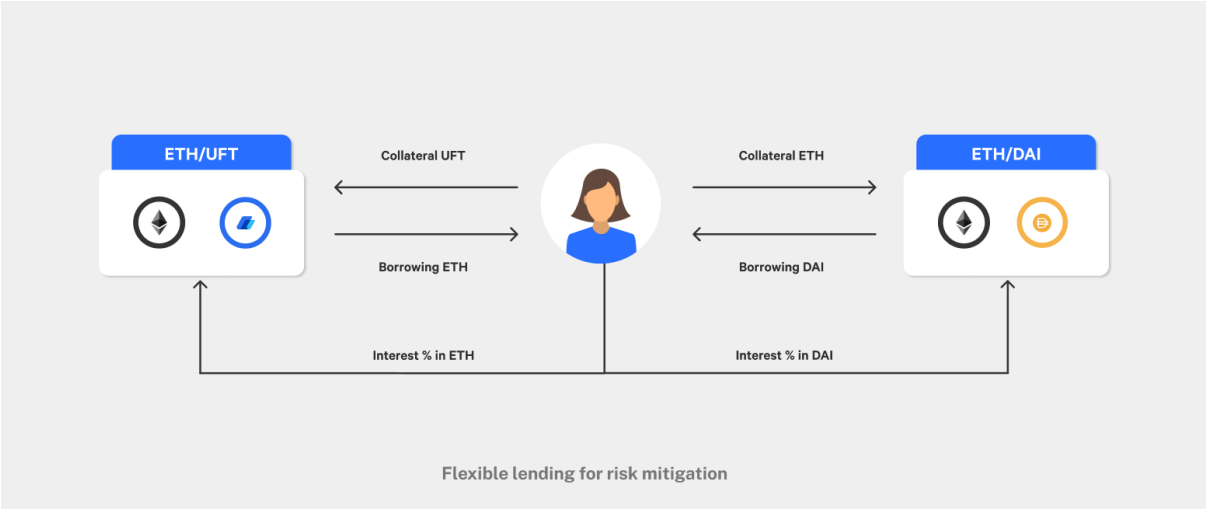
2.2 Borrowing

Users who wish to borrow any supported digital assets from UniLend must pledge collateral to be locked in the protocol. This is done using the same mint function used for supplying assets. Collateral earns interest while in the protocol; however, users cannot redeem or transfer assets when used as collateral. These assets must be overcollateralized, and the collateralization ratios are determined by the protocol, which can be controlled through the governance process.



Supplying ETH as collateral and borrowing USDC

Once the assets are lent, the user can borrow based on the collateral factor of that asset. Thus, users will have a compound interest rate applied per block on these assets and have no monthly payment obligations.



Flexible lending for risk mitigation

The Borrow Rate

Borrowers owe an interest rate of the asset they are borrowing, which keeps adding to the user's borrow balance every block. So while a borrow is open, the borrow balance keeps increasing.

The Borrow Balance
This represents the total amount borrowed by the user in addition to the interest that needs to be repaid. This is calculated with a function in each NFT liquidity contract.

Collateral Factor
There is a maximum amount that users can borrow for their collateral which is defined by Collateral Factor. Let's say, a user lends 100 USDT in a USDT/XYZ pool, and the decided collateral factor for USDT is 80%, then the user can only borrow 80 USDT worth of XYZ tokens at any given time. Collateral factors can vary for different assets and are subject to change via governance.

Reserve Factor
UniLend finance converts a certain portion of borrow interests into reserves. These reserves may be used for incentives, liquidation protection, emergencies, etc.

Reserve Factor is the percentage of fees paid to UniLend Finance. Reserve Factor is new to UniLend V2 and will be used to sustain the protocol and pay protocol contributors. If the reserve factor of your borrowed asset is x, it implies that x% of the interest paid on that asset is for UniLend treasury.

Initially the reserve factor will remain 0 and will be subject to governance upon the launch.

Liquidation Threshold
It is defined as the percentage at which a borrowed position is considered undercollateralized. For instance, a Liquidation Threshold of 75% would indicate that if the value rises above 75% of the collateral, the position is undercollateralized and could be liquidated.

Health Factor
The Health Factor is a numeric depiction of the security of your lent assets against the borrowed assets and their basic worth. A higher value of Health Factor represents the more secure state of your funds against a liquidation scenario.

Utilization Rate
Utilization Rate represents the percentage of the amount a user has borrowed from his allowed borrow balance against collateral. For instance, if a user lends 100 USDT and wishes to borrow ETH, which has a collateral factor of 80%, the maximum a user can borrow is 80 USDT worth ETH. Now if the user borrows 40 USDT worth of ETH, then the Utilization Rate comes out to be 50% which is half of the maximum borrow limit for the user.

2.3 Flash Loans

UniLend introduced Flash Loans to our money markets. One unfortunate aspect of previous iterations of flash loans has always been that these existing protocols were only able to offer

users flash loans in a limited array because their protocol only supports limited tokens. UniLend, however, is truly permissionless. This means we're able to unlock flash loans functionality for every token on the market.

Flash loans enable uncollateralized loans, given that the borrowed amount and the fee are returned within the same transaction. In case borrowed liquidity is not returned within one transaction block, the whole transaction is reversed in order to undo the actions initiated until that point.

UniLend's Flash Loans offer a wide range of use cases, including arbitrage, collateral swap, interest rate swap, and market-making.

Features of UniLend's Flash Loans:

- UniLend's flash loans are cheaper than existing options. UniLend's flash loan fee is set to 0.05% currently which we plan to remove/update through our governance
- 70% of the fees collected from Flash Loans are distributed to lenders of that asset as rewards.
- 30% of the fee goes to UniLend reserves.
- UniLend's Flash Loans support innovative token technologies such as synthetic tokens.

3. Architecture

3.1 Dual Asset Pool

Permissionless listing of UniLend's lending and borrowing is powered by Dual Asset Pool model where any user can create any ERC20/ERC20 pool to begin lending and borrowing for those assets. This kind of isolated model ensures a higher level of security where the volatility of one asset doesn't affect the entire protocol (unlike Aave, Compound, or other money markets which have a cross-pool mechanism) and is limited to a single (or few) pool.

This dual asset pool model combined with the dynamic interest rate model also incentivizes users based on the pool to lend their assets to. In addition, Unilend sets a proportional risk-reward ratio for lending an asset absent from a multi-asset single pool currently shared among significant protocols.

3.2 Interest Rate Model

UniLend utilizes an interest rate model to achieve an efficient interest rate equilibrium, in every lending & borrowing pool, based on the supply and demand of the respective assets.
The utilization ratio U for each dual asset pool x unifies demand and supply into one variable:

$$U_x = Borrow_x / (Borrow_x + Cash_x)$$

The interest rate is directly proportional to the demand of assets; when demand is low, interest rates are low, and when demand increases, so do the interest rates. The demand curve is expressed as a function of utilization and is subject to governance. The borrowing interest rate is represented by the following equation:

$$Borrowing\ Interest\ Rate_x = 10\% + U_x * 30\%$$

To make the protocol sustainable and to avoid economic attacks, the amount of interest earned by suppliers has to be less than the total interest product by borrowers. Hence, the supply interest rate in a function of the borrowing interest rate and includes a *Spread* representing the economic profit of the protocol:

$$Supply\ Interest\ Rate_x = Borrowing\ Interest\ Rate_x * U_x * (1 - S)$$

3.3 On-chain Price Oracles

UniLend protocol will support price feeds from various sources including Chainlink, Band Protocol, Uniswap V3 TWAP oracle.

Chainlink and Band Protocol will be the primary source of price data for mature assets listed on multiple centralized and decentralized exchanges. As for new assets which are primarily being traded on the Ethereum chain, we will employ Uniswap V3 TWAP Oracle.

UniLend is not just using the most successful oracles available in the market but also adding innovative approaches to make them more reliable. Unilend V2 is flexible to adapt to the changing market and innovations done in this space and the protocol can support such oracles without changing the core architecture of our money market protocol.

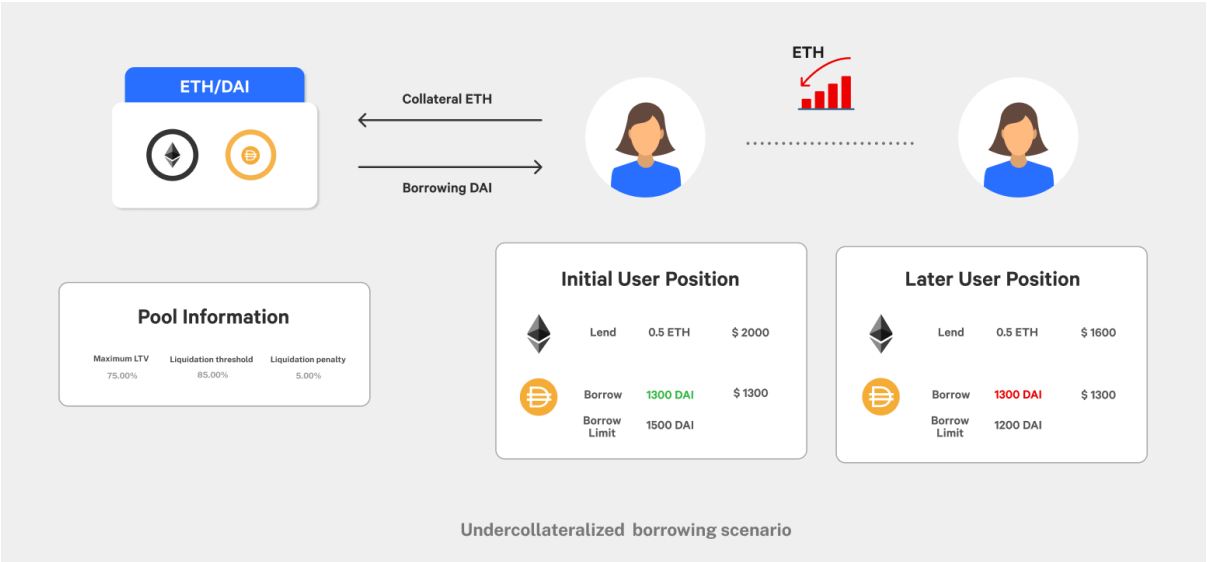
3.4 Liquidation

Debt entails the risk of liquidation, the process of selling the debt collateral at a discount to liquidators. During this process the borrower's health factor reduces below 1 as the collateral value does not cover the proper loan/debt value.

To keep the system active and stable the DeFi protocols rely on a distributed network of **liquidators** independently to keep the overall protocol healthy.

This incentivises the liquidators by acting in their own interest (to receive the discounted collateral) and as a result, ensure loans are sufficiently collateralised.

For example: During 2019, $10,375,064 was repaid by liquidators using Compound version 2, resulting in a total of $518,752 profit for liquidators.



And while the DeFi money market has evolved over the years, the liquidation mechanism also needs to evolve to keep up with the market. The UniLend team has worked on an innovative approach to solve the problem of a large number of liquidations that are supposed to take place during a market crash, maintaining the system.

The team has created a new concept of **Concentrated Liquidations**, where a liquidator can potentially liquidate multiple eligible loans within the same transaction rather than doing it on an address-to-address basis. The fundamental idea behind the liquidation remains the same with one added functionality:

- A bot that is monitoring pending transactions on-chain, finding loans eligible for liquidation
- A DEX that can be used to sell off the liquidated collateral to gain instant profits
- A smart contract that allows the liquidation *of all eligible loans* and the sale of the collateral in a single transaction

Liquidators have the freedom to optimize their strategy by switching between Concentrated liquidation as well as traditional liquidation mechanisms as per requirements.

3.5 Non-Fungible Liquidity

Liquidity positions in UniLend V2 are no longer fungible and not represented as ERC20 tokens. Instead, they will now be represented by Non-Fungible Tokens. UniLend V2 will implement these NFTs as certificated for equities. Lenders on UniLend V2 will receive an NFT to represent their right to withdraw funds from the pool. The descriptive nature of NFTs is better suited to manage higher dimension variables associated with lending and borrowing such as maturity, interest rate, liquidation, etc.

NFTs on UniLend V2 will store multiple data points including the token addresses, lending & borrowing balances of the digital assets in an isolated dual asset pool. In V2, both lenders and borrowers will receive their liquidity position in the form of non-fungible tokens. These NFTs will determine users' positions in the pool and are transferable should users decide to trade their positions in secondary markets.

4. Conclusion

UniLend V2 Relies on a Dual Asset Lending Pool model to offer risk mitigation and flexible lending options. All loans are backed by collateral and represented by Non-Fungible Tokens, which accrue the interests. Various protocol parameters such as collateralization ratio and interest rate vary for different assets.

UniLend Finance introduces three key innovations to the lending ecosystem:

1. **Dual Asset Pools** to help lenders and borrowers mitigate risk with flexible lending options.
2. **Concentrated Liquidations** to solve the illiquidity issue for small cap assets and improve the experience for liquidators by managing multiple liquidations in a single transaction.
3. **Permissionless Flash Loans** to borrow any sum of an asset without any collateral.

UniLend is dedicated to bringing true decentralization to the DeFi ecosystem. Following the V2 mainnet launch there will be multiple additional features to be worked upon including and not limited to on-chain Governance.

While the development of UniLend V2 is complete, we have started working upon the ideas for UniLend V3 with some major groundbreaking features in development.

References

[1] https://compound.finance/documents/Compound.Whitepaper.v04.pdf

[2] https://uniswap.org/whitepaper-v3.pdf