

LP Finance

Designing a synthetic asset for leveraged strategies

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Abstract

Synthetic assets have been a popular narrative in the DeFi space as it provides a route for users to perform swap with zero slippage thanks to the global-debt pool. Synthetic assets are backed by collateral tokens and usually have a stability fee to ensure users repay their loans to prevent the price from depegging. LP Finance focuses on leveraged strategies using synthetic assets to provide the best yields without harming peg-stability and scalability. New mechanisms such as incentivized liquidity providers and protocol debt vault are implemented to maximize protocol revenue and user yields.

1. Introduction to zSOL

LP Finance is a synthetic asset issuance protocol that allows users to lock collateral and mint synthetic tokens. zSOL is a Solana-pegged synthetic asset which allows users to leverage liquid staking yields and short-selling.

Accepted collateral for zSOL is as follows.

- mSOL (Marinade Staked SOL)
- stSOL (Lido Staked SOL)
- SOL (Solana)
- UXD (UXD Stablecoin)
- SAMO (Samoyed Coin)

Collaterals should meet the following requirements.

- Should be Solana native (Not bridged)
- Should not be controlled or backed by centralized entity
- \$35,000 value swapped to mSOL should have less than 5% price impact

zSOL can be minted/borrowed at 1.5% APY stability fee and this value could change over time by the DAO's decision.

LP Finance expects zSOL to be used for leveraged liquid staking (mSOL - zSOL loop) or short-selling (UXD - zSOL loop). As these strategies are expected to bring high selling pressure on zSOL, a mechanism to ensure peg-stability is required.

2. Incentivized LPs

Incentivizing liquidity providers is the most straightforward to enhance the peg-stability and scalability of zSOL. However, incentivizing via liquidity mining might cause future scalability issues as it might cause huge inflation on the governance token.

For zSOL- $\{token\}$ LPs are incentivized by the stability fee zSOL borrowers pay.

2.1 LP Token Staking

Multiple LP tokens can be staked on LP staking pool to earn stability fees. Expected LP pairs are as follows.

- zSOL - mSOL (Enhance leveraged liquid staking experience)
- zSOL - stSOL (Enhance leveraged liquid staking experience)
- zSOL - UXD (Enhance short selling experience)

The protocol used to mint LP tokens could vary. For example, zSOL - mSOL from Lifinity and Raydium could be both staked.

Every 24h, zSOL borrower's debt amount is updated (+0.000041%) and corresponding amount of zSOL is minted and distributed to the LP staking pool.

Estimated APY staked LPs could expect is as follows

$$LP \text{ Staking APY} = \frac{\text{Total Borrowed zSOL (USD)}}{\text{Total Staked LP Value (USD)}} \times 1.5\%$$

For example, if \$10M zSOL is borrowed and total \$ 1M LPs are staked, the staking APY would be 15%.

By incentivizing LPs with additional "Real Yields", zSOL would be able to scale linearly with the demand.

2.2 Stability Fee Gauges

As mentioned above, multiple LP tokens can be staked to earn zSOL. In this case, stability fee cannot be distributed equally to all LP tokens. Some pools demand higher liquidity than others, and this should be properly balanced to enhance zSOL's scalability.

Once LP token is registered on the staking registry, LPFi token (LP Finance Governance) is used to vote for the gauge weight for each pool. Top two pools would be selected for incentives, and the other pools would not earn any stability fees unless it is on the top two pool on the next voting period.

3. Protocol Debt Vault

Protocol Debt Vault (PDV) is an account owned by LP Finance. PDV operates like all other accounts on LP Finance, which allows the DAO to deposit, borrow, withdraw, and repay. However, it has unique configurations.

- Non-liquidatable
- Can borrow up to 100% LTV
- Any user can repay/withdraw or deposit/borrow on PDV

PDV acquires a profitable debt position in order to maximize the protocol's revenue.

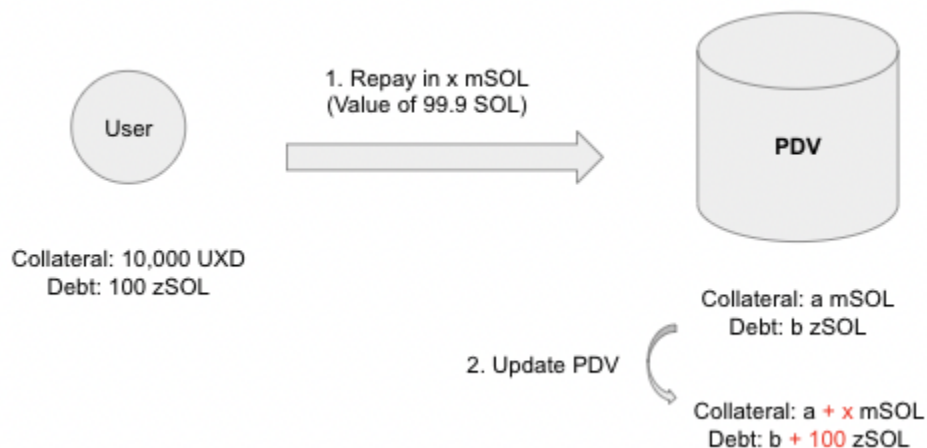
Following is one example of a profitable debt position.

- Collateral: mSOL and stSOL
- Debt: zSOL

Typeless repayment, PSM, and liquidation mechanism allow PDV to acquire debt positions while providing users easy-to-use services.

3.1 Typeless Repayment

Typeless repayment allows users to repay zSOL debt in mSOL and stSOL. By doing so, users can repay at a 0.1% discount. The process is as follows.



1. User repays x mSOL
2. Repaid x mSOL added to PDV collateral
3. User's debt added to PDV debt

By the steps above, user repaid at a discount and PDV acquired the user's debt position. Repaid token is added to collateral and the user's debt is now PDV's debt. Initially, PDV takes a loss of 0.1%, which makes the added position undercollateralized. However, as mSOL and stSOL increase in value compared to SOL, this debt position would earn 4.2% APY (Assuming staking yield is 5.7% APY).

As LP Finance continues to encourage typeless repayment, revenue from staking yields without investment risks would increase.

3.2 Peg-stability Module

Peg-stability module (PSM) is common for stablecoin issuance protocols. PSM allows users to swap between the protocol's stablecoin and other stablecoins at a 1:1 ratio without price impact.

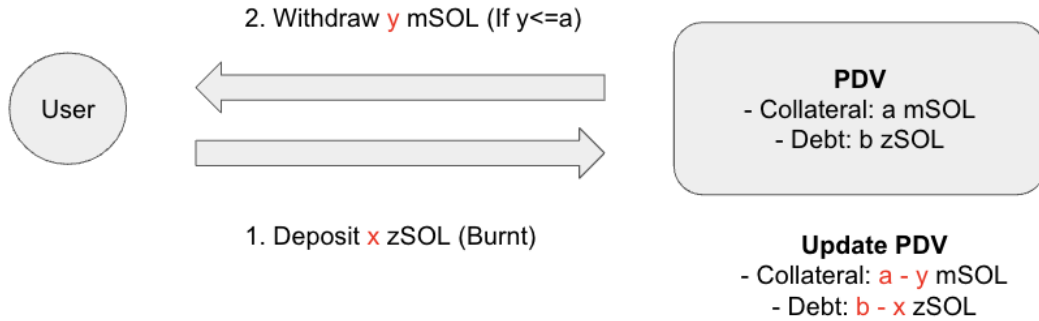
For example, DAI has a PSM which allows users to swap between USDC and DAI. If USDC → DAI swap occurs, USDC is now backing DAI at 1:1 ratio. The opposite route, DAI → USDC can only happen when enough USDC is in the PSM contract. However, this introduces a centralization risk as a portion of DAI is now backed by USDC.

zSOL is pegged to SOL, therefore does not carry the risk above for PSM. However for PSM, the swap pair would not be SOL, but mSOL and stSOL. The quantity would be determined by the oracle price.

zSOL PSM does not exist as a separate program but is integrated into PDV. Here are examples of PSM swaps.

- **Swap zSOL → mSOL || stSOL**

Following are steps for PSM swap from zSOL to mSOL or stSOL.



1. User deposits (burns) x zSOL to PDV (Used for repayment)
2. User withdraws y mSOL (value of x SOL) from PDV (Withdraw PDV collateral)
3. PDV updated

To make this simple, the user is repaying PDV's debt and withdrawing the corresponding amount of collateral. As this action reduces the debt position of PDV, which would lead to less revenue, 0.5% swap fee is applied.

- **Swap mSOL || stSOL → zSOL**

Following are steps for PSM swap from mSOL or stSOL to zSOL.



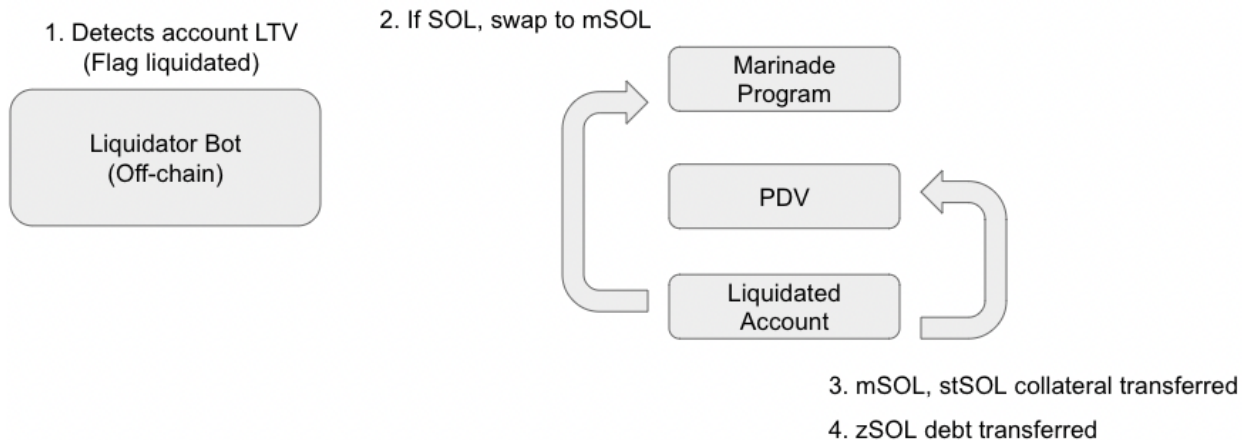
1. User deposits x mSOL to PDV (Added to PDV collateral)
2. User withdraws (mints) y zSOL from PDV (Borrow zSOL on behalf of PDV)
3. PDV updated

In this process, user is depositing mSOL or stSOL as collateral to PDV and borrowing zSOL. As this action increases the debt position, which leads to higher protocol revenue, 0% swap fee is applied.

3.3 Liquidation for Pegged Assets

Liquidation in synthetic asset issuance protocol often involves stability pools. Any users can deposit protocol's stablecoin and this would be continuously used to liquidate positions to repay/burn debt and purchase collateral at a discount. However, LP Finance does not buy back and burn zSOL to repay a debt to liquidate positions.

If zSOL liquidity is thin, the liquidation mechanism mentioned above will have a large price impact, which causes loss for liquidators. Therefore, LP Finance's liquidator swaps collateral to mSOL and transfers the debt position to PDV. As mSOL has a thick liquidity, large price impact is not likely to happen. However, for pegged assets, the process of swapping to mSOL is not even needed. Following are the steps of liquidating pegged assets (SOL, mSOL, stSOL).



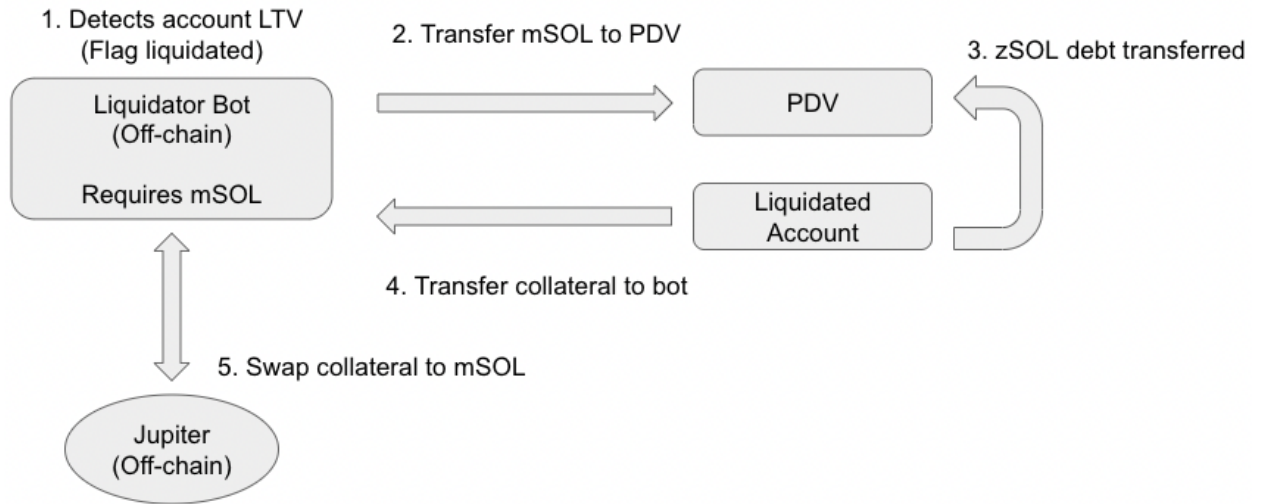
1. Liquidator bot flags the target account (User cannot perform actions)
2. If collateral has SOL, swap to mSOL via CPI call
3. mSOL, stSOL collateral added to PDV's collateral
4. zSOL debt added to PDV's collateral
5. Nullify liquidated account

To run a liquidator bot for pegged-assets, lamports for transaction fees are required. After each liquidation, the account can redeem 1% of the amount of mSOL collateral transferred via the corresponding account.

As this liquidation mechanism does not buy back and burn zSOL, the peg-stability might be affected. However, as the amount is added to PDV, arbitragers can easily purchase zSOL at a discount on the market and redeem mSOL at a 1:1 ratio via PSM which would bring an equal effect without liquidators experiencing price impact.

3.4 Liquidation for Non-pegged Assets

Liquidation for non-pegged assets (UXD, SAMO) has an additional step. Here are the steps.



1. Liquidator bot flags the target account (User cannot perform actions)
2. mSOL transferred from liquidator to PDV (Add as collateral)
3. zSOL debt transferred to PDV
4. Transfer target account collateral to liquidator (Nullify liquidated account)
5. Swap collateral to mSOL via Jupiter Aggregator (Not required or can be modified)

To run a liquidator bot for non-pegged assets, lamports and mSOL are required.

Liquidator's performance depends on the amount of mSOL. If there are insufficient mSOL, it needs to go through multiple loops to fully liquidate an account.

Same as pegged asset liquidator, the account can redeem 1% of the amount of mSOL collateral transferred. One of the risks that this liquidator carries is price impact at step 5, swapping collateral to mSOL. Liquidators can modify step 5 in order to enhance performance.

As liquidators do not require a huge amount of mSOL to run a bot, the entry point is relatively lower compared to other protocols. Additionally, PDV earns liquidation fees, which thickens liquidity for PSM, enhancing peg-stability of zSOL.

4. LP Finance Escrowed MNDE

As explained above, zSOL has a deep relationship with liquid staking SOL. In order to further enhance the scalability and growth of zSOL, participating in Marinade Finance governance is crucial.

4.1 Governance Structure and Liquidity Gauges

Marinade Finance governance involves unique components. Here are some of them.

- MNDE should be locked into NFT to gain voting power (veMNDE)
- Locked MNDE does not receive emissions or incentives
- MNDE locked if NFT can be unlocked after 30 days period

Protocols can acquire veMNDE in order to participate in liquidity gauges. Liquidity gauges allow protocols that grow mSOL usage (liquidity pools, collateral) to gain MNDE tokens every week to incentivize mSOL users via liquidity mining. Larger stake allows more MNDE emissions, which would bring more liquidity to the protocol.

4.2 lpMNDE and Incentives

LP Finance allows users to mint lpMNDE (LP Finance Escrowed MNDE) which brings higher voting power to LP Finance. The mechanism mimics how Convex Finance is advancing veCRV, but there are limits as veMNDE has different mechanisms.

Here are the steps on how lpMNDE can be used.

1. User deposits MNDE and mints an equal amount of lpMNDE (Irreversible)
2. User stakes lpMNDE and earns LPFi emissions + mSOL deposit fees
3. Users can swap lpMNDE to MNDE via liquidity pool (Can't unstake)

Deposited MNDE would be used to vote for liquidity gauges to incentivize mSOL collateral and zSOL - mSOL pool. In return, staked lpMNDE earns LPFi emissions and mSOL deposit fees. LPFi emission would be adjusted by the DAO to meet the demand.

4.3 Voting with locked MNDE

All deposited MNDE would be instantly locked into an NFT to vote for the following gauges.

- mSOL collateral (LP Finance)
- zSOL - mSOL LPs (Nazare, Raydium)
- zSOL - UXD LPs (Lifinity, Raydium)

LPFi tokens can be used to determine which gauge to vote for. Similar to stability fee gauges, only the top two gauges would be selected and other votes would be voided. This vote is separate from stability fee gauges so the voting power cannot be reused.

lpMNDE allows users to transfer voting rights to LP Finance and earn rewards, which is not possible when holding MNDE. Also, the voting mechanism allows demand for LPFi to increase as zSOL scales. LP Finance DAO's decision on emission would be crucial to maximize zSOL adoption without creating large inflation on LPFi.

5. Involved Parties and Expectations

- **zSOL Borrowers**
 - Can create a leveraged strategy at 1.5% APY stability fee (better yields)
- **Staked LPs**
 - Can earn stability fee + MNDE emissions on top of swap fees
- **LPFi (LP Finance DAO token)**
 - Can vote for stability fee gauges and lpMNDE gauges
 - Generated fees (except mSOL) are used to burn LPFi (decrease supply)
- **Staked lpMNDE**
 - Can earn LPFi emissions + mSOL deposit fees
- **LP Finance DAO**
 - As activity increases and zSOL scales, PDV generates higher revenue without investment risks