VADER PROTOCOL:
Stablecoin Anchored Automated Market Maker with Protocol Owned Liquidity

Abstract. VADER is a liquidity protocol that combines a hybrid algorithimic-collateralized stablecoin with liquidity pools enhanced via synthetic assets. The stablecoin, USDV, is issued by burning VADER tokens and Liquidity pools use USDV as the settlement asset. VADER liquidity incentives finance impermanent loss protection guarantees, thus making VADER pools more attractive to capital. It also enables the purchase of Protocol Owned Liquidity via Bond Sales. Synthetic assets are minted from liquidity pool shares which allow for single side staking with no impermanent loss.

Introduction

Stablecoins and synthetic assets are a noble problem to solve. The key problem is a matter of liquidity and sensing the correct purchasing power of assets at all times. In addition, the use of incentives can ensure the maximum uptake of the system and the fast bootstrapping of capital especially via Protocol Owned Liquidity. Existing stablecoins and synthetic asset designs fall short because they are reliant on Price Oracles that are not liquidity sensitive, vulnerable to manipulation, and do not properly incentivise the makers of liquidity.

VADER is a new form of liquidity protocol that seeks to be self-serving. It uses its own liquidity and awareness of asset purchasing power to support the creation of a collateralized stablecoin. It also is capable of using liquidity units as collateral for synthetic assets, of which it will always have guaranteed redemption liquidity for. It has a fair and transparent incentive strategy to maximise the depth of liquidity pools and adoption of synthetic assets.

Key Features

The following are the key features of VADER Protocol:

1) Uses a stablecoin settlement asset
2) An ability to expand and contract the supply of both VADER and USDV
3) Impermanent Loss protection for Liquidity Providers in the pools
4) Continuous liquidity pool incentives
5) An ability to mint synthetic assets from pool liquidity
6) Liquidity incentives that fund Protocol Owned Liquidity to reduce rent-seeking costs over time

Architecture

The system uses a TWAP function to sense the price of VADER in USD allowing for the burn-to-mint of the USDV stablecoin. The Vader Protocol AMM uses USDV as the base asset, which drives liquidity and demand of the stablecoin from launch. Part of the fee it generates from its operations funds a reserve to provide for Impermanent Loss Protection and allows the minting of Synthetic assets. USDV becomes increasingly collateralized over time as the protocol expands its treasury from Bond Sales and fees.

VADER Contract

VADER has extra functions to ERC20:

1) VADER is minted if VETH is burnt, 10,000:1 via a Merkle snapshot with 50% upfront and 50% vested over 1 year.
2) VADER is minted if USDV is burnt, in accordance with the TWAP price

USDV Contract

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1) USDV is minted if VADER is burnt, in accordance with the TWAP price

VADER Token

VADER and the TWAP function transmits the "anchor" price of VADER in USD. This allows anyone to burn VADER to mint USDV at 1:1 the TWAP price.

VADER is issued 10,000:1 for holders of Vether (VETH) - which itself is distributed via a fair process of Proof-of-Value. Since VETH is acquired only by the provable burning of ETH via a daily auction; it is sybil-resistant, decentralised and has unforgeable costliness.

VADER has a maximum supply of 25bn. 7.5bn is claimed by the holders of VETH, and the additional 12.5 bn is paid out as liquidity incentives, 2.5bn for partnerships and 2.5bn for the team linearly vested over 2 years.

VADER contains a Fee-On-Transfer which is proportional to the current supply, but increases linearly the closer VADER is to its Maximum Supply in the range from 0 to 100 Basis Points.

Liquidity Incentives

Liquidity Incentives are paid out to fund Bond sales that allow for Protocol Owned Liquidity. This ensures long term sustainability as an AMM. Protocol Owned Liquidity is used productively when Slip-based fees generated by LP tokens generate fees and goes to backing the purchasing power of the stablecoin.

Impermanent Loss Protection

The deposit value for each member is recorded when they deposit. When they go to withdraw, the redemption value is computed. If it is less than the deposit value, the member is paid the deficit from the reserve. The protection issued increases from 0 to 100% linearly for 100 days. Coverage is given by the following equation:

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coverage = (V0 - V1) + (A0 - A1) * V1/A1
V0: USDVDeposited; A0: assetDeposited;
V1: USDVToRedeem; A1: assetToRedeem;
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Liquidity Pools

Liquidity Pools use USDV as the common settlement asset. This allows the system to accurately price any pool, as well as sensing purchasing power of its assets. Using USDV as a common settlement asset in Asset pools takes away any friction for requiring users to hold exposure to a particular asset. In fact, all of the VADER Liquidity Pools are stablecoin-paired pools, making Impermanent Loss easy to reason about.

The liquidity model includes a liquidity-sensitive slip-based fee. This maximises revenue for liquidity providers under high demand of liquidity, and prevents manipulation. It is also necessary to support liquidations of collateral. The algorithm is:

$$y = \frac{x*X*Y}{(x+X)^2}$$

```
x: input; X: Input Balance;
y: output; Y: Output Balance;
```

Slip-based fees break path-independence and a member can theoretically achieve better price execution by making smaller trades. This characteristic is actually favourable - smaller trades slow down the rate at which a price can change, and the base-layer gas fee paid (fixed in cost) provides a lower-level threshold of tolerance.

Synthetic Assets

Synths are issued from swapping from any other asset into Synths across the pool. Instead of the paired asset being emitted, the incoming base asset is added to the pool as liquidity, liquidity units are issued to account for the new capital and assigned to the protocol, and the synth is minted. When synths are swapped back to a token, they are burnt, a pro-rata share of units are deleted, and the base asset is moved out. Even though capital is added and removed, the liquidity units that are issued and deleted account for the capital such that other passive LPs are not affected.

$$units = \frac{P * b}{2(b+B)}$$

```
P: existingUnits;
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`b: inputBase; B: baseBalance;`

Since synths always have 1:1 purchasing power they do not accrue Impermanent Loss or Yield. In fact, any loss or gain is absorbed by the other passive LPs.

With Impermanent Loss Protection, other passive LPs should never be affected by this.

Since synths are 50% collateralized by the real assets and 50% collateralized by USDV, heavy adoption of synths deepens the liquidity pools and allows the system to naturally scale (or contract).

Governance

System parameters can be tweaked by DAO Governance, but this is strictly limited. The DAO can be purged by itself if the system is stable and no more parameters need tweaking. During the bootstrap period, the DEPLOYER will retain the ability to skip DAO governance, which will eventually deprecate to transition into a full DAO governed model. A liquidity limit will be in place at the same time to help stabilize the protocol in its early stages.

Conclusion

VADER is an incentivised, governance-minimal and cohesive liquidity protocol that can scale itself sustainably. A stablecoin is issued by burning VADER, which itself is priced against a TWAP across multiple pools. This stablecoin is the settlement asset in all of its liquidity pools. Liquidity providers are entitled to Impermanent Loss protection whilst they are in the pools. Daily liquidity incentives go towards purchasing Protocol Owned Liquidity for long term sustainability.