PerlinX Whitepaper

1. Introduction

PerlinX is a decentralized synthetic liquidity pool for Decentralised Finance (**DeFi**). The aim is to support the creation and trade of synthetic assets, including cryptocurrencies, commodities, fiat currencies and equities. Organisations and individuals can participate as either the supply-side or the demand-side as long as they meet the collateralization requirements. The overarching goal is to allow more uniform access to trading opportunities, making more efficient trading risk management possible for everyone.

Perlin PERL token holders are incentivised to stake their tokens as they are paid a pro-rata portion of fees generated through activity on PerlinX, based on their contribution to the network. The value of the PERL token is derived from the right to participate in liquidity provision and capture fees. Trading on PerlinX does not require the trader to hold PERL. Governance is managed by PERL token holders.

Through a combination of synthetic asset generation protocols and automated market makers on Ethereum, synthetic commodities of any kind (such as carbon, gold, oil etc) can be generated by over-collateralizing those synthetics using the PERL token.

2. System Architecture

The system can be broken down into 3 core components, (i) synthetic assets, (ii) automatic market-maker and the corresponding liquidity pool, and (iii) Data Verification Mechanism (**DVM**).

2.1 Synthetic asset (from UMA)

Perlin X utilises UMA protocol, which allows individuals to create synthetic assets backed by another asset. Each asset must have its own price feed, which is powered by UMA's DVM, which is essentially an oracle. Each synthetic asset must be overcollateralized by another asset.

In UMA protocol, all derivatives minted by token sponsors represent a long in that direction. (e.g. Minting of PX.Gold means that the user is holding a long position in gold, and are required to sell it to a counterparty if he wishes to have a short position in gold).

Synthetic tokens created with UMA protocol are tradable like normal ERC20 tokens until the contract comes to an end. For a synthetic asset created by PerlinX (i.e. PX.Commodity), the

staked amount of PERL will be split between token takers/holders (**Token Takers**) and token sponsors/makers/stakers (**Token Sponsor**) (see below for more detail). If the value of the commodity has gone up at the close of the contract, the Token Taker will receive a profit on what they paid for it. If it hasn't gone up at the close of the contract, the Token Sponsor will earn a profit on that original sale as the contract releases more PERL back to them.

2.1.1 Roles in PX.Commodity Minting/Trading

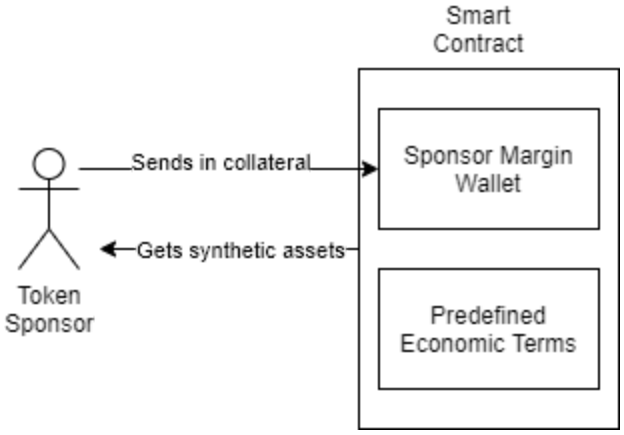
The protocol involves 5 main actors in the process of generating synthetic assets and providing liquidity.

1. **Token Sponsor**: The party that is staking PERL to mint synthetics as a maker or sponsor.
2. **Token Taker**: The counterparty to the Token Sponsors, purchasing synthetics from the Token Sponsor directly, or from the Liquidity Pool.
3. **External Broker**: An off-chain platform where equivalent synthetics are traded, which can serve as a platform for Stakers to hedge their position, or even as a price feed.
4. **Liquidity Pool**: Liquidity pools are powered by algorithmic market-makers, which allows Token Takers to trade with it, or Token Sponsors to provide liquidity to it. It will be described in a later part of the paper.
5. **Smart Contract**: The smart contract will be created by PerlinX, which will include all the economic terms (e.g. collateralization ratio, ability to terminate prematurely) relevant to the specific synthetics to be minted.

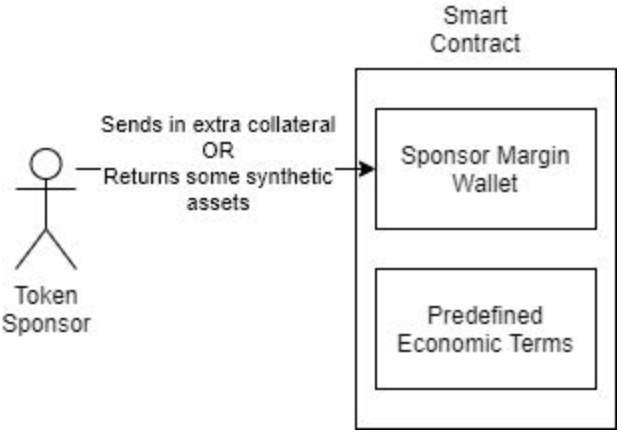
2.1.2. Actions

The UMA protocol allows the creation, maintenance and settlement of any synthetic assets.

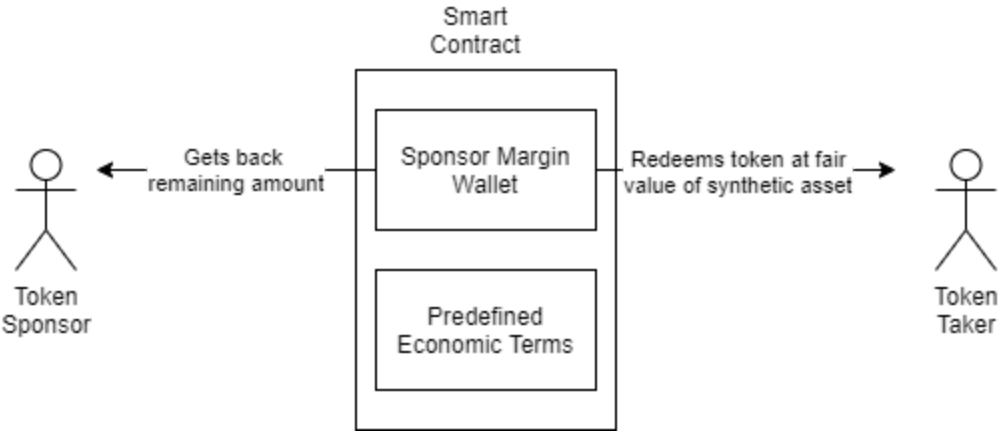
1. **Creation/Minting**
   The Token Sponsor will send in collateral to a margin wallet that is specific to him. **He will be able to create/mint the synthetic asset specified by the smart contract as long as it meets the collateralization ratio. The creation will only be approved if the minting of a new token doesn't decrease the global collateralization ratio.**



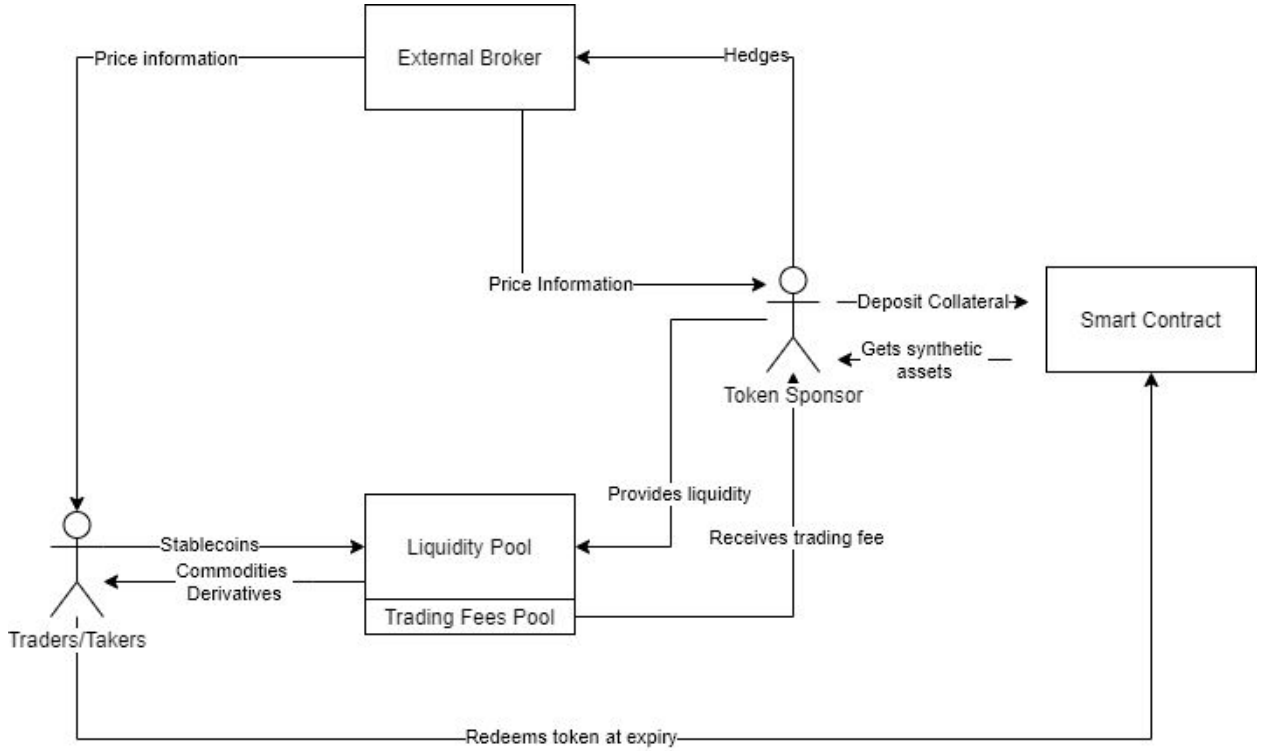
1. **Maintenance**
   In the event that the synthetics generated go down in value, the collateralization value will decrease. To prevent the position from being liquidated, the Token Sponsor can send in extra collateral, or return some of the synthetic assets created.



2. **Settlement**
   As the derivatives expire without liquidation, settlement occurs. The Token Taker would be able to redeem the synthetic assets from the margin wallet, and the remaining amount will be distributed back to the Token Sponsor.



The diagram below shows an example relationship of how various parties might interact with each other.



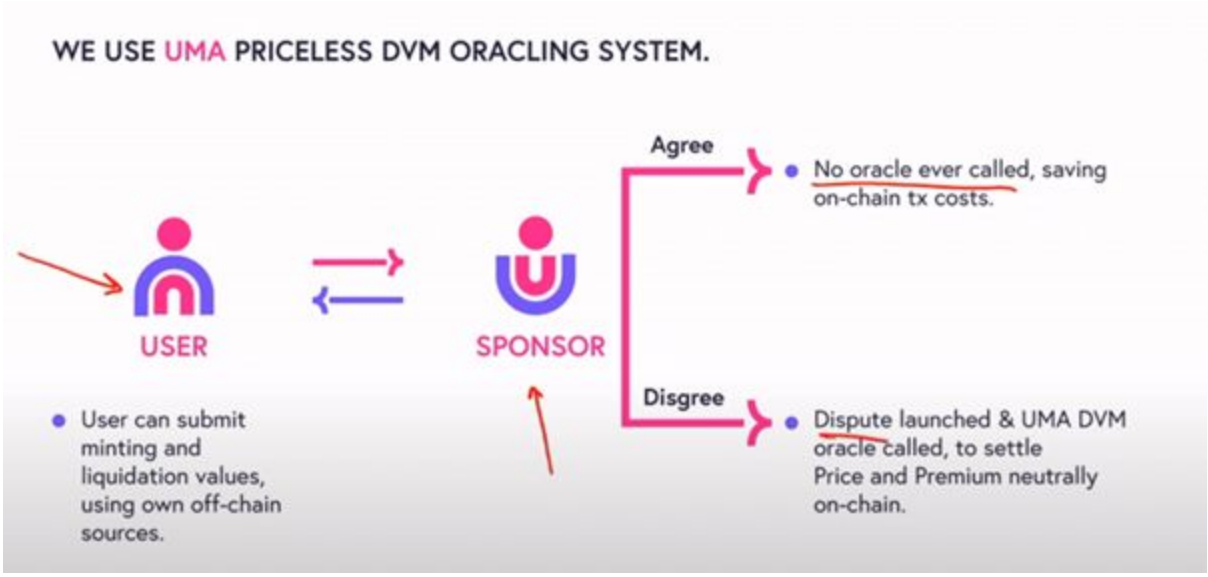
2.2 DVM Oracling System (from UMA)

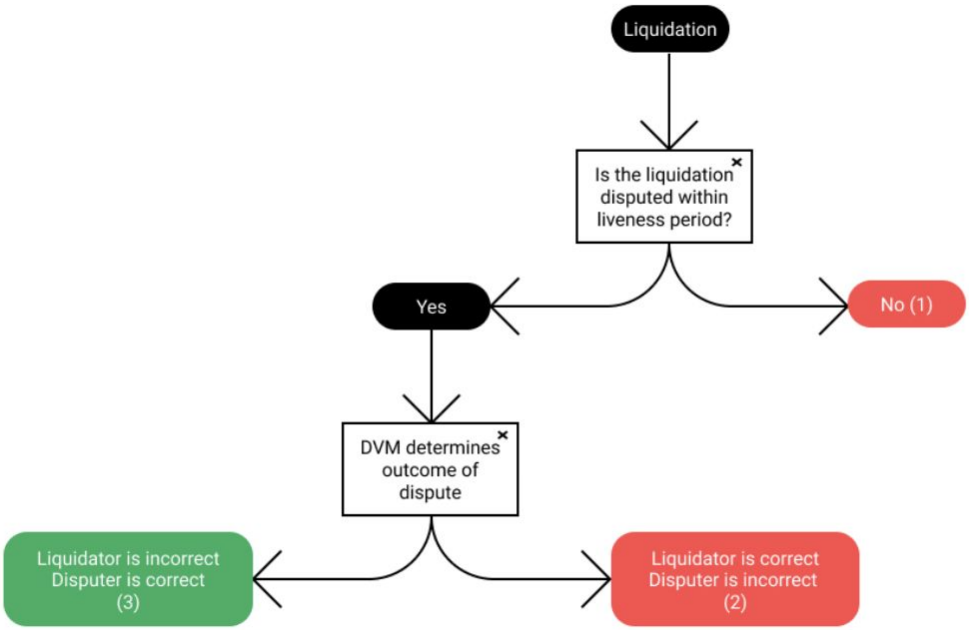
UMA protocol pioneers priceless synthetic tokens (i.e. price oracles are not used), by using a mechanism called the Data Verification Mechanism (**DVM**). An incentive system is structured to minimize oracle usage while keeping the entire system correctly collateralized.

2.2.1 Architecture

The DVM includes a liquidation and dispute process that allows Token Takers to be rewarded for identifying improperly collateralized Token Sponsor positions. The dispute process relies on an oracle, the UMA DVM, to settle disputes regarding liquidations.

To ensure that the rewards for liquidations and disputes are economical (i.e. worth the gas/transaction cost to liquidate or dispute), deployers of this financial contract template can set a minimum sponsor size for Token Sponsors. This is the minimum number of PERL that a Token Sponsor must have created against the contract. Any action that would reduce a Token Sponsor's position to below this threshold is disallowed and will revert. This includes (i) partial liquidations that leave the Token Sponsor's position smaller than the minimum size, (ii) token redemptions that bring the position below the minimum size, and (iii) new position creations that request to mint fewer than the minimum number of tokens.





The decision tree for a liquidated position. See the technical explainer for more details.

This allows the system to function properly with proper collateral.

2.1 Liquidation and Dispute

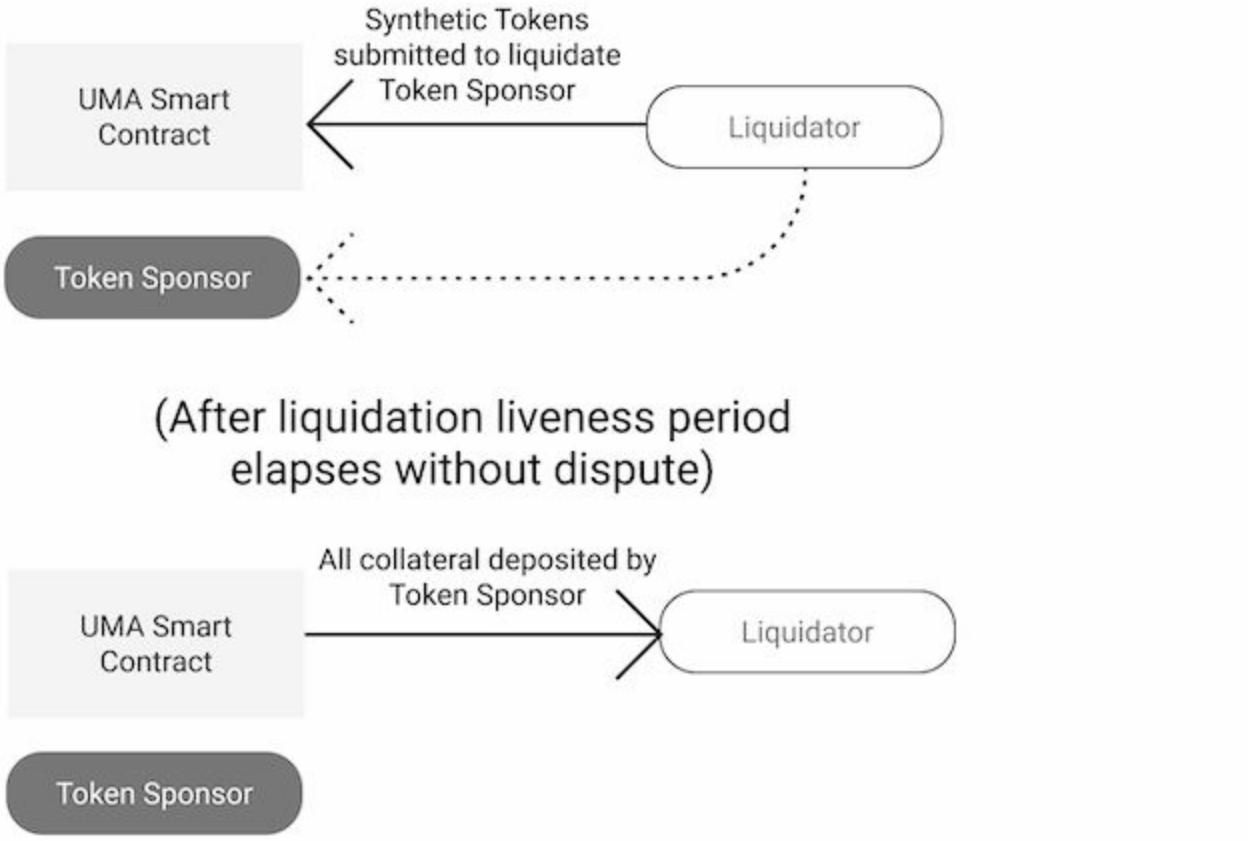
At any time, a Token Taker may liquidate a Token Sponsor's position. Liquidations happen immediately without calling the oracle. Anyone may dispute a liquidation within the "liquidation liveness period".

To liquidate a Token Sponsor position, a Token Taker submits tokens to the contract and posts a liquidation bond. The liquidation bond covers the cost of calling the DVM if the liquidation is disputed. If the liquidation is not disputed, the liquidation bond is returned to the liquidator. The tokens are submitted for 3 purposes: (i) to indicate the size of the position to be liquidated, (ii) to close the Token Sponsor's position, and (iii) to attest to the liquidator's belief that the Token Sponsor's position should be liquidated. The liquidator will lose a portion of the collateral corresponding to the tokens if their liquidation is disputed and found to be invalid.

Here are three ways in which a liquidation can be resolved:

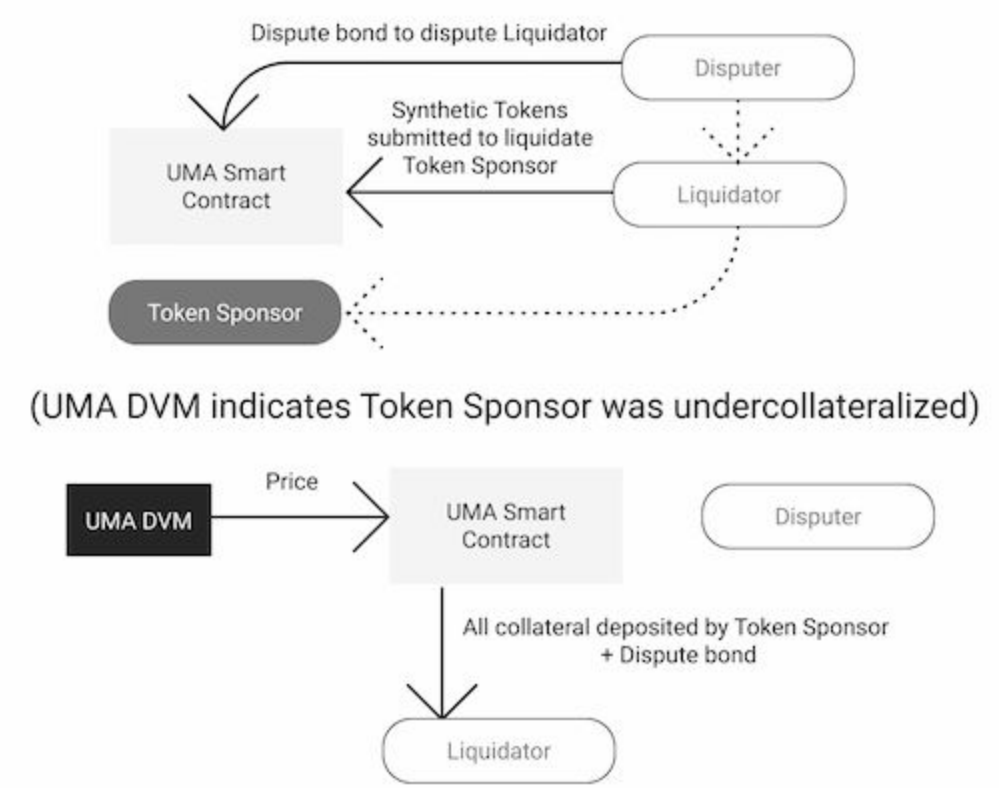
1. No one disputes the liquidation during the liquidation liveness period. After the liquidation liveness period ends, collateral deposited by the Token Sponsor is returned to the liquidator, proportional to the number of synthetic tokens the liquidator has submitted in

liquidation. As a numerical example, assume a Token Sponsor has deposited 150 PERL of collateral to create 100 synthetic tokens, which they then sold to the market. Later, a liquidator submits 30 synthetic tokens to liquidate the Token Sponsor. If no one disputes the liquidation, the liquidator will receive 30% of the Token Sponsor's collateral, or 45 PERL.



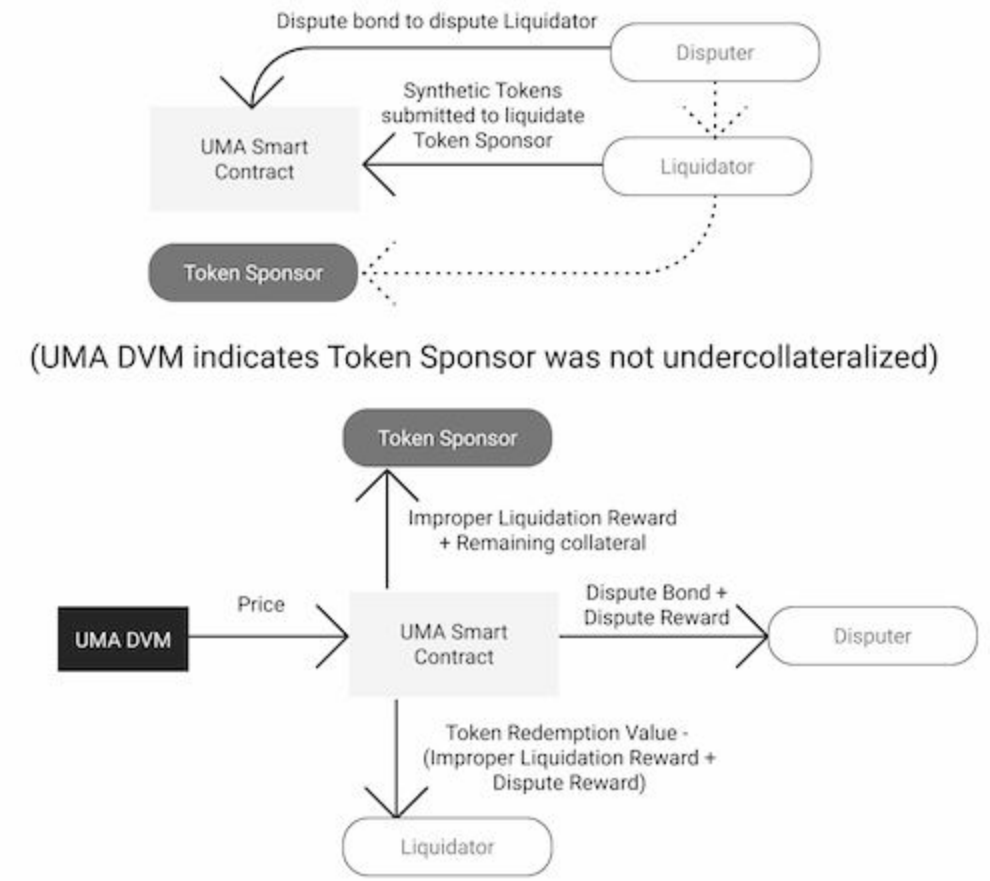
2. Someone disputes the liquidation during the liquidation liveness period. To do this, the disputer must post a bond. Once the dispute is raised, a price request is made to the UMA DVM. This price request will return the value of the price identifier at the time of the liquidation, which will determine if the Token Sponsor was undercollateralized and resolve the "dispute".
    - If the price returned by the DVM indicates that the Token Sponsor was undercollateralized at the time of the liquidation:
        - The disputer will lose their bond.
        - The liquidator will receive all of the Token Sponsor's position collateral.

- The Token Sponsor will not receive any of the collateral they have previously deposited into the position.



- If the price returned by the DVM indicates that the Token Sponsor was not undercollateralized at the time of the liquidation:
  - The disputer will receive back their dispute bond and a dispute reward.
  - The liquidator will receive collateral equalling: (i) the value of the token at the time of liquidation as determined by the DVM, less (ii) the dispute reward paid to the disputer, less (iii) the improper liquidation reward paid to the original Token Sponsor.

- The Token Sponsor will receive any remaining collateral and a reward for the improper liquidation.



A table summarizing these payouts is below:

	Token Sponsor	**Liquidator**	**Disputer**
Liquidation was not disputed	0	Token Sponsor's collateral + Liquidator bond	0
Token Sponsor was over-collateralized(invalid liquidation)	Token Sponsor's collateral - Value of tokens + Improper liquidation reward	Value of tokens - Dispute reward - Improper liquidation reward	Dispute bond + Dispute reward
Token Sponsor was under-collateralized (valid liquidation)	0	Token Sponsor's collateral + Dispute bond + Liquidator bond	0

2.3 Automatic Market Token Sponsor & Liquidity Pool

2.3.1 Automatic Market Token Sponsor

Uniswap is an automated market-maker protocol living entirely in smart contracts. Uniswap allows the creation of an asset pair for trading on Uniswap by depositing asset A and B into the pool. The price for someone to buy this asset is algorithmically determined. By depositing assets into the pool and becoming a liquidity provider, you are entitled to trading fees of each trade within the pool.

2.3.2 Liquidity pool

Liquidity Pools allow two or more assets to be bonded algorithmically such that anyone can buy/ sell into the pool and the pool will handle the swap.

The pool brings three people together:

* People who can provide liquidity (stake assets in pools)
* People who need liquidity (want to swap one asset for another)
* People who can maintain liquidity (arbitrage between markets)

1) This is all done via Peer-To-Contract (P2C) with almost no governance or operator input. The pools algorithmically balance out. Pools also provide “always-on-liquidity” such that anyone can buy or sell any amount at all times.

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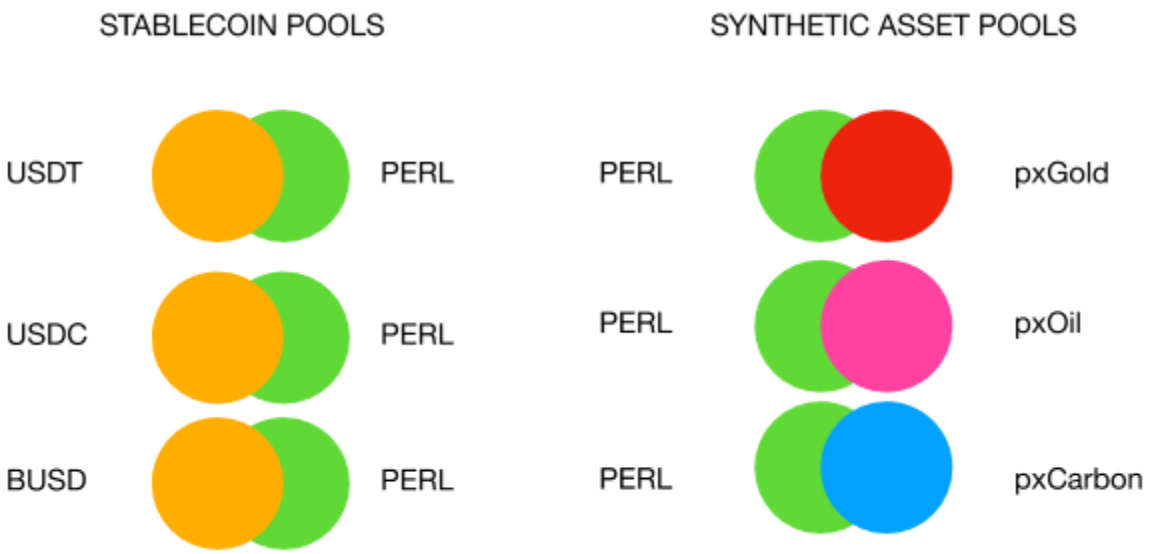

3. Tokenomics

The use cases intended for PERL tokens include but are not limited to:

- Incentivise participation of liquidity providers
- Use as collateral to create synthetics of various assets

3.1 Pilot Incentive Structure

Duration: 12 weeks

Total reward: 2% of total tokens (20,664,000 PERL), distributed weekly (1,722,000 PERL/week).

Fee period: Each PX incentive period will be one week at the beginning.

POOL	PERL Depth	Share	Reward Share
USDT	12,000,000	46.2%	794,769.2
USDC	8,000,000	30.8%	529,846.2
pxGold	4,000,000	15.4%	264,923.1

pxOil	2,000,000	7.7%	132,461.5
TOTAL	**26,000,000**		**1,722,000.0**

STAKER	LP Tokens	Share	Reward Share
Staker1	12,345	12.7%	100,754.0
Staker2	34,345	35.3%	280,307.6
Staker3	1,345	1.4%	10,977.3
Staker4	49,345	50.7%	402,730.4
TOTAL	**97,380**		**794,769.2**

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3.2 PERL/PX value capture mechanism

Liquidity Pool fees are generated whenever a user swaps a synthetic asset for anything through PX.Liquidity Pools. Perlin Foundation will bootstrap the initial Liquidity Pool, and distribute all the fees collected to the participating liquidity providers in the beginning.

4. Comparison

There are a few competitors providing similar functionality but they all require trust in a counterparty to achieve the same outcome.

For example, with Synthetix (SNX token), whilst it is claimed that no counterparty is required to open any trading position, it is essentially a repricing of debt, and you are trading against other parties in the debt pool, which are formed by other SNX stakers. While there's an advantage for pooling the liquidity (e.g. spillover effect from a highly sought after derivatives), much higher collateralization ratios are required, lowering the efficiency of capital deployed.

	Synthetix	**PX**	**dYdX**	**Market Protocol**
Expiry	No Expiry	Expire	No Expiry	Expire
Token	Yes	Yes	No	Yes
Liquidity	Pooled(Across asset)	Siloed to specific asset	Siloed to specific asset	Siloed to specific asset
Over collateralization	Yes	Yes	Yes	No

5. Risks & Considerations

1. PERL liquidity (since PERL is not inflationary, is this model sustainable?).
2. Price oracles.
3. Liquidity & collateral redemption.
4. Smart contract security flaws.
5. Inability to attract arbitrageurs.

6. Timeline

Mid July - Legal Review completes.

Mid August/September - Platform Launch.

7. Future Work

The current whitepaper only outlines the role of PERL to incentivise bootstrapping of liquidity of PX.Liquidity Pool

Future work is needed to explore the possibility of PERL to serve the following functions:

1. To enable and coordinate decentralised governance.
2. To enable a more liquid stablecoin structure.
3. Possible trading platform for carbon assets minted on Perlin’s CarbonDAO.

8. Conclusion

PX.Liquidity Pool supports trading of synthetic commodities such as synthetic cryptocurrencies, commodities, fiat currencies and equities on a blockchain platform in a decentralised and trustless manner. Organisations and individuals can participate as either the supply-side or the demand-side as long as they meet the collateralization requirements.

The overarching goal is to allow more uniform access to trading opportunities, making more efficient trading risk management possible for everyone.