xBacked Litepaper

Version: 1.4

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Overview

xBacked is building Algorands first decentralized stablecoin; no central entity controls the issuance of xUSD and other tokens the xBacked protocol will build in the future. Building a decentralized stablecoin on Algorand makes a lot of sense. It is a PPoS Layer 1 protocol with instant finality, 4.5s block times and is moving to a decentralized governance model by the end of 2021. Their barrier to entry for running a node is also very low compared to Layer 1s like Solana.

No other blockchain ecosystem can offer these unique properties - which means we can build something unique.

Token Issuance

100M X Governance tokens will be minted.

Allocation

Aa Name	# % Allocation	≡ Vesting
Community, Marketing & Growth	53%	3-5 year distribution
Core Contributors	20%	3 years linear, can opt for longer lockup
1st Seed Round	10%	2 years linear, can opt for longer lockup
Pre-seed Allocation	5%	2 year linear vesting, can opt for longer lockup
2nd Seed Round	5%	2 years linear, can opt for longer lockup
Advisors	4%	3 year linear, can opt for longer lockup
Initial Token Sale	3%	Subject to change
Untitled		

System Diagram

> 💡 This is only for fiat pegs. If xBacked were to do something like the Float Protocol in the future, the mechanics would be different.

USD Only POC Peg
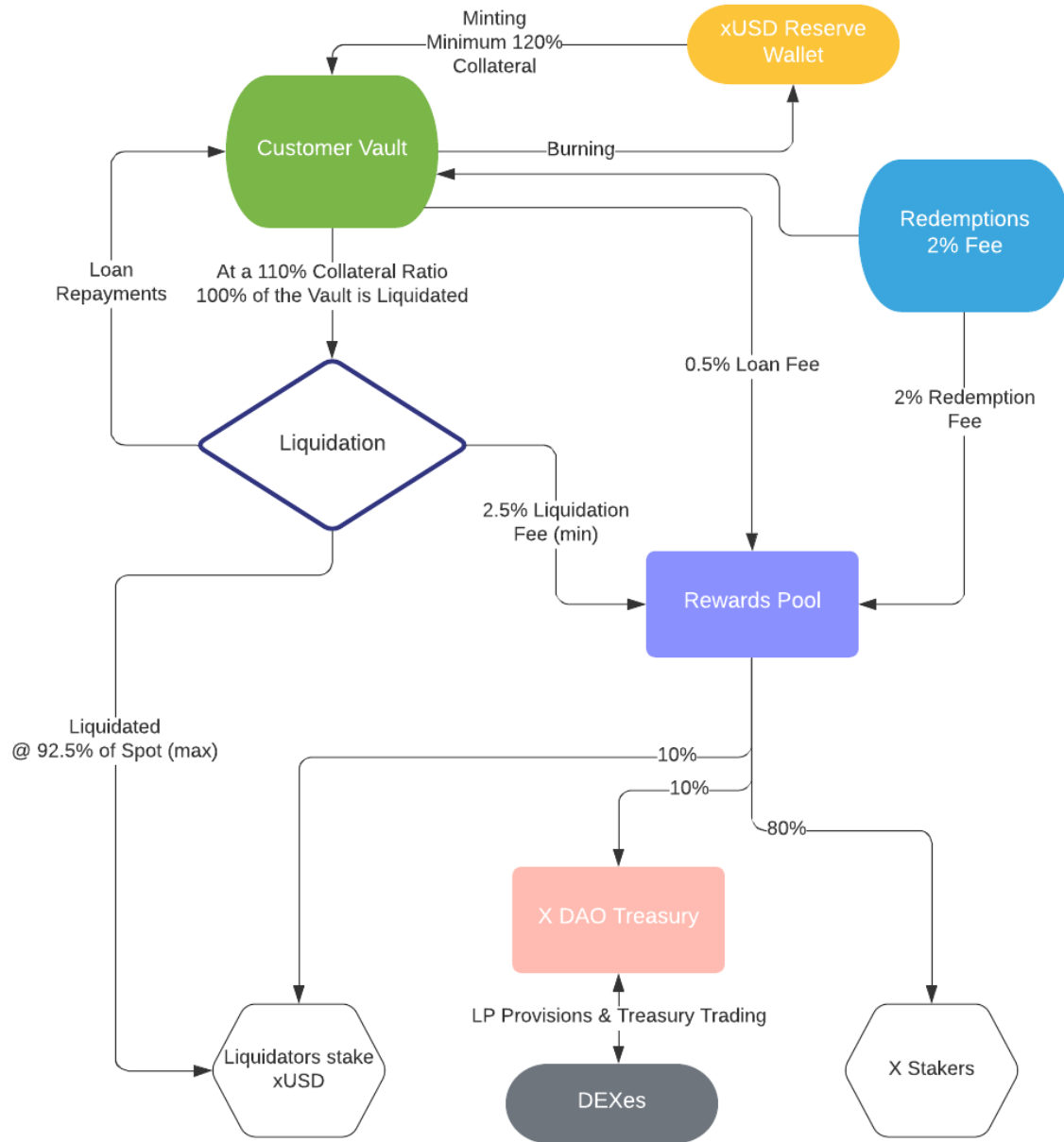
Core principle: the system uses xUSD to represent debt & fees, not dollars.

Example

```
Alice deposits $100 USD worth of ALGO.
Alice mints 50 xUSD tokens, and receives 49.75 xUSD worth $49.75 USD
0.25 has been taken as a fee for the protocol.
```

```
After fees, Alice still has $100 USD worth of ALGO in her vault.
Alice must repay 49.75 xUSD tokens, regardless of the dollar value of xUSD.
```

Earnings

Earnings of the platform come in the form of fees, not interest (at least to begin with).

Fee Structure

- Liquidation fee: 2.5%

- Redemption Fee: 2% of redemption amount

  - Incentive: discourage redemption in times of low market volatility

  - Also creates a floor to the xUSD price. Redemption will only make sense when xUSD is worth less than $0.98 USD.

- Minting fee: 0.5% of desired amount

  - The user pays this from the xUSD they want to mint

  - DAO earnings: ensures the DAO is compensated up front for mint.

Distribution of earnings in xUSD

- 80% to staked governance token holders

- 10% to DAO treasury

- 10% to Liquidators staking xUSD

Stability target: +/- 2% of $1 USD.

Minting, Repayments & Withdrawal

Users of the xBacked smart contracts will be able to deposit collateral into a Vault. Vaults are smart contracts that are unique to a user, and the cost of deploying them is paid for by the user.

Vaults have a collateral ratio (c-ratio), and the system requires c-ratio to be `110%`. As outlined in the Appendix, a Health Factor (HF) of 1 demonstrates this minimum required c-ratio. When the HF of an individual vault falls below 1, the entire vault becomes available for liquidation.

Vaults have the following limits

- Must be created with a `120%` c-ratio.

- Cannot withdraw funds with a c-ratio less than `120%`. This creates a strong incentive to repay debt so that the user can withdraw collateral.

When a user creates mints xUSD, they must pay a one-time fee of `0.5%` of the desired amount.

Example

```
Alice has deposited $100 USD worth of ALGO into a Vault.
Alice would like to initialise mint 80 xUSD.
```

```
She is able to receive an mint of 79.6 xUSD tokens, paying a one-time 0.5% fee
This fee is 0.4 xUSD and her c-ratio is 125.6%

If the value of Alice's collateral drops to $87.55 USD, her HF would be 0.99
With the HF under 1, the collateral becomes available for liquidation.
```

At any point, a user is able to withdraw their collateral, **as long as their c-ratio is above 120%**.

Example

```
Alice deposits $100 USD worth of ALGO as collateral
She mints of 49.75 xUSD tokens after paying a 0.5% fee.
With this, her Vault c-ratio is 201%.
Alice is able to withdraw up to $40.3 USD worth of her ALGO, leaving $59.7
in collateral, and the CR is 120%
```

Furthermore, if the collateral value increases, Alice could either withdraw the asset or create mint more xUSD.

Example

```
Alice deposits $100 USD worth of ALGO as collateral
She mints 49.75 xUSD tokens after paying the 0.5% fee.
With this, her Vault c-ratio is 201%, and the HF is 1.81
Alice is able to withdraw up to $40.3 USD worth of her ALGO.

The price of ALGO goes up, and Alice's collateral is now worth $120 USD.
The c-ratio is 241%, and HF is 2.17.

Alice could now withdraw an extra $60.3 USD worth of her ALGO, or she could
mint $58.25 xUSD - 0.5% fee (57.95 xUSD).
```

When repaying a debt, the user must do so in-kind with the stablecoin. As the platform currently mints xUSD, all users must repay with xUSD. There is no fee for repaying xUSD.

Example

```
Alice deposits $100 USD worth of ALGO as collateral
She mints of 49.75 xUSD tokens and pays the one time fee
With this, her Vault c-ratio is 201%

Alice comes back a month later, and still has a system debt of 49.75 xUSD.
In this time she has bought more xUSD from Liquidity Pools and now has a
balance of 100 xUSD in her wallet.
Alice uses 49.75 xUSD to repay her debt.

Alice now has no xUSD outstanding, and has $100 USD worth of ALGO in her
vault and 51.25 xUSD in her wallet.
```

Liquidation

As stated before, Vaults will have a Health Factor (HF) that represents the collateral ratio (c-ratio), where an HF of 1 is equal to the minimum c-ratio of `110%`. If an individual Vault drops below an HF of 1, the entire Vault becomes available for liquidation.

How do Liquidations work?

xBacked will rely on xUSD staked by Liquidators to perform liquidations. Liquidators stake xUSD and receive a pro-rata share of `10%` of all platform earnings. This staked xUSD is then used to liquidate risky vaults. Over time, this results in xUSD participants stake being swapped for ALGO at the specified discount. Initially, the xBacked protocol will perform these liquidations, and in the future the protocol may also support liquidations by external actors.

Staked xUSD will be in a global pool, and it will be used pro-rata for liquidations based on the stacked share.

Example

```
The liquidation fee is 2.5%, and the discount on the collateral is the spread
between the collateral price & the debt.

Alice stakes 20,000 xUSD in the liquidator pool, which has 200,000 xUSD.
Alice owns 10% of the pool.

Bob's vault hits a c-ratio of 109%, and his $1000 worth of ALGO is now available
for liquidation. Bob's debt is 910 xUSD.

910 xUSD is transferred from the pool to repay Bob's debt.
An extra 22.75 xUSD is required due to the 2.5% liquidation fee.
In total, the liquidation pool pays 932.75 xUSD to liquidate Bob's vault.
The collateral is transferred to the liquidator pool for distribution.

Alice pays 93.275 xUSD and receives $100 worth of ALGO.
Alice now has 19,906.725 xUSD staked in the liquidator pool, and can claim
$100 worth of ALGO.

Alice could now sell the $100 of ALGO on a DEX at a premium to what
xUSD she used in liquidations, leaving her with 20,006.725 xUSD

Bob's debt of 910 xUSD is paid, and 22.75 xUSD is distributed to the protocol
reward pool. 10% of the 22.75 xUSD gets transferred into the pool giving
Alice another 2.275 xUSD
```

Redemption

Redemption is a separate mechanism to withdrawal. Redemption **guarantees** that 1 xUSD token can be redeemed for $1 USD of underlying collateral from the **riskiest vault(s)** in the system. The fee for this mechanism is `2%`. This redemption mechanism creates a hard peg, and a floor to the xUSD price.

This redemption feature also creates a strong incentive for users to ensure their vault has a healthy c-ratio, as the riskiest vaults will experience the highest risk of redemption..

Example

```
Alice has 100 xUSD that are worth $97 (xUSD is trading at $0.97).
The redemption fee is 2 xUSD (2%).
Alice redeems all of her xUSD tokens, paying an extra 2 xUSD as the fee.
In total Alice pays 102 xUSD, worth $98.94
Alice receives $100 USD worth of ALGO.
```

Alternatively in this scenario, Alice is able to buy undervalued xUSD to repay xUSD at a cheaper rate.

Important to note: this only becomes worthwhile once xUSD is worth less than $0.98.

What happens if the redemption is > total collateral?

xUSD can **only be minted when backed by ALGO**. For example, the total amount of xUSD minted is $1m. This would be backed by (at minimum) $1.1m ALGO.

The peg would need to be trading at a significant discount for someone to be able to get enough xUSD. Even then, they would need to own **a majority** of the xUSD minted, and buying more of it would effect the price and bring it back to the target.

```
1m xUSD has been minted, backed by at least $1.1m of ALGO (110% TCR)
xUSD is trading at $0.9.

An individual malicious trader could redeem 1m xUSD for $900,000, and
receive $1m of ALGO. However they would need to buy all of the
xUSD issued.

Perhaps instead, some of the largest vaults could collude and redeem
750,000 xUSD for $750,000 worth of ALGO. They would make a profit of $75,000.

If this did happen the peg should be maintained as designed.

The system would have 250,000 xUSD minted, backed by $350k worth of ALGO
(excl. fees)
```

What happens if multiple vaults need to be redeemed?

In this event the riskiest vaults would just be fully liquidated, rather than partially liquidated

```
Vault 1 has $10,000 of ALGO, c-ratio is 111%
Vault 2 has $50,000 of ALGO, c-ratio is 111.5%
Vault 3 has $40,000 of ALGO, c-ratio is 112.1%

Someone redeems 75,000 xUSD.
Vault 1 & 2 are liquidated.
Vault 3 is left with $25,000 worth of ALGO, and the debt is partially paid off
```

Staking

Users of the xBacked protocol are able to stake the xBacked governance token for a pro-rata share in the earnings of the platform. Simply holding governance tokens will not accrue earnings.

Earnings are distributed once per month.

Example

```
Alice stakes 10 of her governance tokens, totaling $100 USD.
The platform has 1,000 staked governance tokens, totaling $10k USD.

Alice has a 1% share of the staked governance tokens.

Over the next month, xBacked generates $10k in fees. $8000 of this is
distributed to staked governance token holders.
```

```
Alice receives a pro-rata share in the earnings of the xBacked platform.
She receives $80 xUSD for staking.
```

Governance

Governance tokens must be staked for at least 1 month prior to voting, and staked for at least 1 month to receive an earnings distribution.

This incentivizes people to stake for the long term; and discourages people buying up governance tokens to vote or create proposals in a short term way.

Debt Oversupply

In the event there is an oversupply of debt in the system, the peg will be under the target of $1 USD. To counteract this, there are several controls in place. Protocol c-ratio in this scenario will be less than `110%` target. At this point, vaults will be liquidated but there are other forces too.

Arbitrage

People are able to repay their xUSD at a reduced rate, contracting the supply of debt in the system. At the same time, people would be able to take advantage of arbitrage opportunities presented on exchanges.

Example

```
Alice as a debt of 100 xUSD, which was worth $100 USD at the time
Alice sees the price of xUSD is $0.9 USD.
Alice buys 100 xUSD on a DEX for $90
Alice repays her xUSD for $10 less than the original amount.
```

Staked Governance Backstop

⚠️ May not be included in V1

In a severe case, Staked Governance tokens will be used to maintain the peg. In this scenario, staked governance tokens will be used to pay off system debt. Stakers are compensated for this risk with the `80%` earnings distribution to them. This is only done when there is **not enough collateral in the system**.

Example

```
Alice has staked 10 governance tokens, worth $10 each for a toal value of $100
Alice has received a share in the earnings of xBacked over time, and has earned
$50 xUSD.
The xUSD peg has broken and xUSD is under the $1 USD target.
A portion of Alice's staked governance tokens have been sold to repay
system debt.
```

This would require LPs for X/xUSD.

Redemption

It is in this kind of scenario where users will likely use the redemption functionality more than they usually would. This is explained in detail above.

Debt Shortage

In the event that there is a shortage of debt in the system, the peg will be over the target of $1 USD. To counter this, the system will partially liquidate risky vaults, until the system achieves a healthy c-ratio.

Market participants will also take advantage of this arbitrage opportunity. They will mint xUSD, and then sell this xUSD for a profit in a DEX.

Example

```
Alice sees that xUSD price is currently $1.10
Alice mints 100 xUSD, worth $110 instead of $100.
Alice sells this on a DEX for a profit.
```

Appendix

Why xUSD is not DAI

In 2020, the DAI peg broke due to a multitude of reasons, the largest of which is that the system became congested & transaction fees soared. This prevented users from paying off debt, and prevented Keepers participating in auctions in a timely manner. Algorand does not have these problems, but the Oracles might...

Further, xBacked has a redemption functionality built in. **This promises that 1 xUSD can always be exchanged for $1 USD worth of collateral**. This creates a floor to the price, and is a much stronger mechanism than interest rates.

Competitor Comparisons

Some brief points on the differences and similarities to other protocols.

xBacked vs Maker DAO

Maker DAO built the DAI stablecoin for the Ethereum ecosystem. Maker's architecture was designed within a set of constraints that Algorand simply does not have.

These major constraints are:

- High transaction fees

- Network congestion

- Front running

On Algorand, transaction fees are 0.001 ALGO, and the network can scale up to 46,000 transactions per second, while maintaining instant finality.

Core differences in protocol design

xBacked has

- 0% interest, and instead uses fees

- 110% collateral ratio: not 150%

- Does not rely on external keepers [yet] - this is our own constraint, due to the maturity of the Algorand ecosystem. It is better we are more self contained

- Redemption: we ensure users of the protocol are always able to redeem 1 xUSD for $1 of underlying collateral

- Liquidations: people stake xUSD to act as liquidators, and set their own discount rate. Liquidators with a lower discount rate are preferred as that is more beneficial for all participants in the protocol.

Similarities

- Eventually, governance token stakers may be used as a backstop for the system

- Both operate as DAOs

- Both are pegged to the US Dollar using over collaterization of debt

xBacked vs FRAX & other algorithmic stablecoins

Frax is a very unique protocol; instead of being fully collaterized they are under collaterized and use algorithms to maintain their peg. xBacked **is not an algorithmic stablecoin** but instead over collaterized at all times.

Other stablecoin projects are backed by nothing, or are under collaterized and rely heavily on Algorithms to maintain stablility (see ESD & IRON)

Core differences in protocol design

xBacked has

- Over collaterized debt to ensure stability

- Minimal use of algorithms to maintain a peg

xBacked vs Olympus

Olympus is not building a stablecoin; they are building a token that is **backed** by an underlying basket of assets, but it is not **pegged** to a certain price. The goal of the project is that their OHM tokens maintain purchasing power over time for the **ecosystem** not necessarily in fiat.

For example, 100 OHM tokens now should be able to buy the same amount as 1000 OHM tokens in the future.

Core differences in protocol design

xBacked assets will be pegged to fiat currency values.

Variable Definitions

Liquidation Threshold (LT): The amount of the collateral that can be minted against. xBacked has this set at 90% (for a healthy c-ratio target of `110%`)

Liquidation Spread (LS): The discount on the asset being liquidated. This is dynamic, and is simply expressed as the difference between the spot value of collateral, and the xUSD debt.

Close Factor (CF): The maximum proportion of the debt allowed to be repaid in a liquidation. xBacked has this set at `100%` .

Minimum Withdrawal CR = `120%`

$$Collateralization\ Ratio\ (CR) = \frac{\sum Value\ of\ Collateral}{\sum Value\ of\ Debt}$$

$$Minting\ Capacity\ (BC) = \sum Value\ of\ Collateral\ \times Liquidation\ Threshold$$

$$Maximum\ Mint\ Amount = BC\ -\ Value\ of Debt$$

$$Health\ Factor\ (HF) = \frac{BC}{\sum Value\ of\ Debt}$$

$$Maxiumum\ Withdrawal = Collateral - (Value\ of\ debt \times Minimum\ Withdrawal\ CR)$$

$$Value\ of\ Collateral\ to\ Claim = Value\ of\ Debt\ to\ repay\ \times\ (1 - LS)$$