

Alchemix

Alchemical Synthetic Tokens Backed by Future Yield

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Abstract

Alchemix is a platform for the creation of yield-backed synthetic tokens that users can acquire for no cost in exchange for locking collateral in the Alchemix system. It gives users the ability to get an advance on their future yield immediately. These Alchemical Synthetic Tokens are a powerful DeFi primitive and a new way to make derivatives based on yield instead of debt.

1 Decentralized/Open Finance

The set of lending, borrowing, trading, and derivatives applications on the Ethereum blockchain is commonly referred to as “DeFi.”. At its most basic level, users post collateral or liquidity in order to gain yield on their assets. Some just supply liquidity and are fine with interest rates or fees generated by their deposits, while others take a more active strategy by leveraging their positions or buying options.

1.1 Lending Platforms

In 2018, Compound [1] launched the first of its kind algorithmic money market. Users deposit into it and immediately earn interest, which is paid by other users who borrow the liquidity in the system. They further innovated by tokenizing the deposits by making cTokens, which allow you to have an interest earning token you can freely transfer. A few other algorithmic money markets have also been built out, most notably AAVE [2]. AAVE especially has innovated with their flash loans, credit delegation, stable borrowing interest rates, and the ability to use a broad selection of collateral types. Furthermore, since now there are several lending and borrowing markets, yield bouncers have been built that move your deposits across protocols to achieve the best possible yields.

1.2 Yield Farming

Recently, the “Yield Farming” trend has gained popularity. DeFi protocols are incentivizing liquidity and certain user behavior by offering rewards in the form of their governance token. This idea was started by the popular synthetic asset application, Synthetix [3], as a way to incentivize creation of Synths and to provide liquidity bridges into and out of their system. Then, the trend hit a tipping point when Compound incentivized lending and borrowing by rewarding their COMP token. Surprisingly, these governance tokens have achieved high valuations, so if one factors in the price of the governance tokens they receive, their yield jumps dramatically, often to 20% or higher APY. The second order effect of this is that lending and borrowing demand and rates have increased along with these incentives.

1.3 Automated Market Makers

One of the key applications of the DeFi stack is Automated Market Makers (AMMs). The four premier AMMs are Uniswap [4], Curve [5], Sushi [6], and Balancer [7]. The idea is that users deposit liquidity to both sides of a trading pair into these decentralized exchanges and then earn fees when people trade using their liquidity. Uniswap pioneered the concept in 2018 by using ETH as the base trading pair for all tokens on Uniswap, and their latest version allows for any arbitrary two-token pools and smart routing to connect the liquidity in the system. Curve is an AMM that specializes in soft-pegged assets, for example stable coins and the various implementations of Bitcoin on Ethereum. They chose to use soft-pegged assets because users would not be affected by trading pairs deviating significantly from their initial price ratios (a problem known as impermanent loss). Sushi started as a fork of Uniswap, but is rapidly differentiating itself as an innovative AMM with powerful features and incentives. Balancer is similar to Uniswap, but instead of having pools that only consist of two tokens, it can have up to eight tokens in a pool with arbitrary weights assigned to the assets in the pool. In effect, Balancer is an automated ETF creation platform. Each AMM has its own strengths and weaknesses in comparison to each other. In totality though, AMMs have proven to be a powerful tool in the DeFi stack.

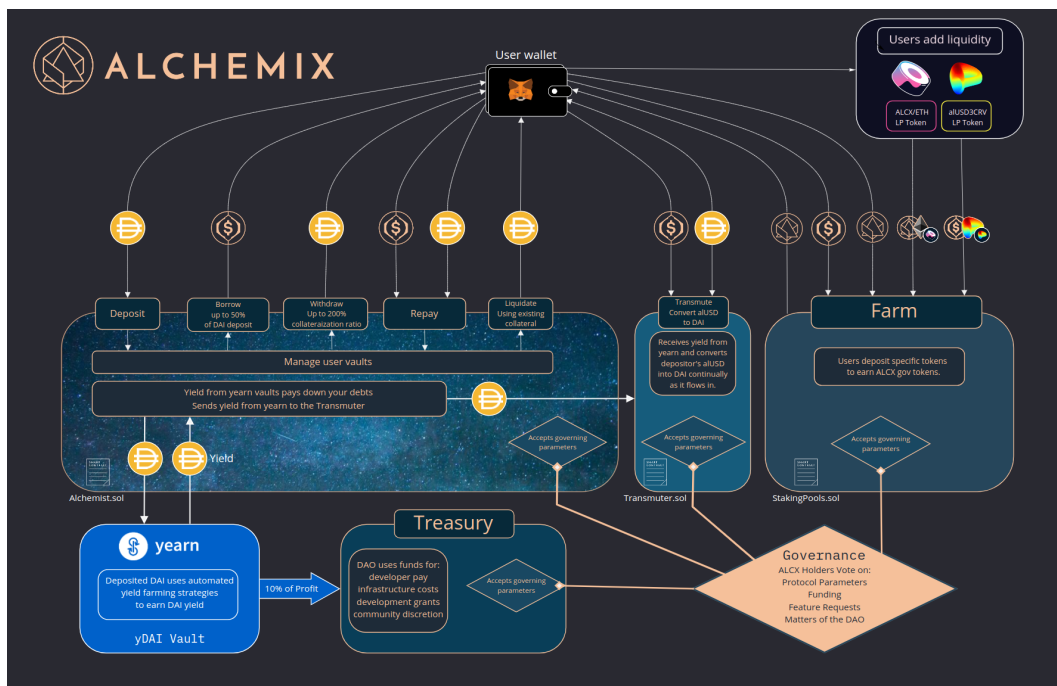
1.4 Yield Aggregators

One recent innovation in the DeFi space is the advent of yield aggregators, created and popularized by yEarn with their yVaults [8]. These products work by depositing your token into a vault contract. The vault then gives you an ERC20 that represents your share of the pooled tokens in it. From there, the tokens are deployed to a strategy that tries to use the deposited tokens to farm yield, which is usually done by farming DAO tokens such as COMP and CRV. The strategy then takes the DAO tokens and sells them for the underlying tokens in the vault, thus increasing the amount of tokens your vault shares lay claim to. These strategies are not always the best for getting returns

as the strategies they use are crafted to limit any downside risk, but are often much better yield than just depositing on lending markets.

2 Alchemix

Alchemix is a platform to create yield-backed synthetic tokens. The requirements for creating such a synthetic token is that any existing token, such as stablecoins or ERC20s, must already have a yield generating mechanism on chain. This could be lending markets, such as Compound or AAVE, or vault-like products, such as the yvDAI Vault, or aLINK Vault. The Alchemix team are targeting stablecoins for our first synthetic token, which will be called aUSD (the al denoting the Alchemix platform). The plan is for aUSD to be mintable from several stablecoins, but the protocol will initially only support DAI. The examples in the following sections for aUSD will apply to other al-Tokens in a near identical way. The dApp contains the following components: Vaults, Transmuter, Farming, and Treasury.



2.1 Vaults

Vaults are how users manage their yield advance positions. First, users deposit DAI into the contract. DAI is then deployed by the Alchemix contract to earn yield in the Yearn yvDAI Vault. Users can mint aUSD up to 50% of the amount of DAI they have deposited (eg. if a user deposits 1000 DAI, they can generate up to 500 aUSD). As yield is harvested from the yvDAI Vault, users will see their aUSD debt decrease, and if they wait long enough, it will be completely paid off by the Alchemix protocol. In other words, the loan pays itself off.

There are many options for users to manage their Vault once it is opened. If at any point a user is more than 200% collateralised, they can withdraw DAI or mint aUSD until their vault reaches a 200% collateralisation ratio. As the protocol repays users debt, they can withdraw more DAI or mint more aUSD as desired. Needing to commit to a long lockup time may be unappealing for some DeFi users, or users may have a time when they need to access their underlying collateral, so it is possible for users to settle their Vaults early. Users can repay their aUSD debt using aUSD and/or DAI. The Alchemist.sol contract treats aUSD and DAI the same, so a 1000 aUSD debt could be paid with 1000 aUSD, 1000 DAI, or any mix of the two. Furthermore, if a user is short of funds to repay the debt, they can liquidate their collateral to pay off their debt. Once a user has 0 aUSD debt remaining, they are free to withdraw all of their deposited collateral, and if they forget to withdraw their collateral, they will be credited aUSD with the generated yield for that period until they withdraw.

As the Alchemix protocol evolves, aUSD will be backed by a basket of future yield from several stablecoins. In doing so, it presents some additional risk if one of the supported stablecoin's peg breaks. Without safeguards, users could exploit the system in a fashion that would allow them to essentially swap a token worth less than aUSD for aUSD. To combat this, Alchemix uses Chainlink oracles of price feeds for the various supported stablecoins. If the value of a stablecoin is below a certain threshold, then minting aUSD, repaying with the base asset, and liquidating collateral will all be disabled. Should the peg be restored, these functions will be restored. Even with this system in place, a supported stablecoin losing significant value would still hurt the price of aUSD. As such, to bolster safety, each stablecoin added will have a limit for how much aUSD it can mint. This limit will dampen the effects of a stablecoin's peg breaking. Which stablecoins to add and their aUSD limit will ultimately be decided together with the Alchemix community, through governance.

A Vault's flexibility also provides strong pegging mechanisms. Since aUSD debt is repayable in aUSD and/or DAI, if aUSD is under the DAI peg, users can buy it off the market and repay their debt at a discount. If aUSD is over the peg, users can mint and sell aUSD to arbitrage the price down or can repay their debt using DAI. Additionally, when multi-asset aUSD is live, users

of Alchemix can take advantage of the difference in stablecoin prices by minting aUSD with the less expensive stablecoin to pay off debt minted from a more expensive stablecoin. If enough people rebalance their debt this way, it will contribute to keeping the supported stablecoins closer in value to each other.

2.2 Transmuter

The Alchemix dApp calls a harvest function on a regular basis, which collects the yield generated by all the deposits into the system. The collected yield counts towards the maturation of your Vault and is then transferred into the Transmuter pool. Users can stake aUSD in the Transmuter and their tokens will be converted into the base asset over time as the yield flows in. When users go to transmute and claim their converted tokens, an equal amount of aUSD tokens will be burned. So if a user has 1200 aUSD staked and 400 DAI has been allocated to their staking position, when they claim this, 400 of their aUSD will be converted into DAI, resulting in a balance of 800 aUSD and 400 DAI for the user. In effect, staked aUSD behaves like a bond, and eventually matures into its base asset. Depending on the amount of total aUSD staked in the transmuter, this conversion rate may be much higher than the generated yield from the protocol and presents a new DeFi primitive.

The transmuter is mostly automated, but it does rely on users to make economic decisions to facilitate its smooth operation. This is mainly because a staking position can be overfilled. When this happens, it presents an economic opportunity to other aUSD stakers by allowing them to force-transmute an overfilled position. If a 1000 aUSD position is filled to 1050 DAI, then the person who forces that position to be transmuted will have the surplus 50 DAI instantly applied to their transmuter position. If the user who force-transmutes is not staking aUSD, then the DAI-overflow will be distributed globally to all stakers. This presents a win-win scenario, with baked-in incentives for cron-jobs and what amounts to gasless conversions for stakers should this happen to their staking position.

2.3 Treasury

Every time yield is collected, 90% of it goes towards the maturation of the positions in Vaults and is sent to the Transmuter pool. The remaining 10% of the collected yield will go to the Alchemix DAO treasury. These funds will be used in multiple ways, including supporting the ongoing development of the Alchemix protocol, paying the developers and core supporting team members, and paying for server costs and other ongoing expenses. Holders of ALCX will have direct input via Alchemix DAO governance on the allocation of these funds. The Alchemix team was originally inspired to make a no-loss gaming token that uses DeFi primitives to give the tokens value. Even though the protocol has evolved considerably since the original vision, the same principle still holds. aUSD is,

at its heart, a currency that anyone can acquire at no cost if they are willing to lock their collateral until their aUSD matures. Our team intends to develop additional dApps that will use aUSD in their token economies, giving it value beyond a new kind of DeFi primitive. The DAO Treasury will support any initiative, whether from the core founding team or a community member, to increase adoption and to expand the ecosystem of Alchemix.

The treasury will help us to expand and improve the ecosystem beyond what the core team can do. One of the key functions of the treasury is to offer grants to developers who wish to build dApps that use our al-Tokens. We encourage developers to reach out to the Alchemix team and community to pitch ideas to help us expand our ecosystem. Developers can submit proposals for potential dApps or ecosystem/infrastructure applications and, if approved, will get funds to help them deliver their vision.

The core Alchemix team will have control over the treasury in the days and weeks following the launch of the dApp via a multisig wallet, but in time, it is our goal to hand over control of the treasury to a DAO, so that the community can best decide how to use the funding. The next section discusses the farming of Alchemix-DAO tokens. The early roadmap for this process is in phase one. The team will consult the community in discord and our forums for how to best proceed with using the funds. In phase two we will add Snapshot, a popular DAO voting platform that allows users to vote for DAO decisions without having to pay gas. Finally in phase three, we will transition into a full, on-chain DAO, with all treasury decisions being handled by trustless code. The Alchemix team is actively researching and designing models that we think are fair for community members and that will pass the test of time.

2.4 Farming

Alchemix will offer yield farming to fulfill a number of objectives for the protocol. Farmers will be rewarded ALCX tokens, which will have governance voting rights in the ecosystem. Additional utility for the ALCX token may be added by the community. The core team members are strong believers in the fair launch philosophy, and as such the 60% of ALCX tokens will go to the community. The DAO will receive 15% of the supply to be controlled by the community. The DAO will receive an additional 5% of the supply of ALCX tokens to be reserved for bug bounties. The rest of the token distribution will be allocated to farming. Yield farming participants will have 60% of the supply allocated to them for staking select tokens and LP tokens. The development team will have access to an exclusive mining pool that receives 20% of the tokens. This is an alternative to doing a vested premine for the founders, and provides a powerful incentive for onboarding more developers into the Alchemix ecosystem. These figures represent the emissions after three years of distribution. After that there will be minimally-viable tail inflation of ALCX. To start, there will be four incentivised

pools. The first one is a simple alUSD pool, where users can stake alUSD and receive ALCX tokens. This is to encourage the minting of alUSD, and gives users a very low barrier to entry to start earning ALCX tokens. The second pool is for alUSD-3CRV pool tokens. This yield farming pool will incentivise having deep liquidity and a strong peg for alUSD on the popular Curve AMM DEX, thus maximizing its utility as a DeFi primitive in the greater DeFi ecosystem. The third pool is for ALCX/ETH Sushiswap tokens. The purpose of this pool is to bootstrap liquidity for ALCX. The fourth pool is just for simple staking of ALCX, and provides an opportunity for ALCX holders to accumulate more via holding. As more al-tokens are added, corresponding pools to incentivise their liquidity will be added to the farming system.

When examining recent yield farms, many of them destroy the value of their tokens by inflating the supply too fast without any clear plan for future emissions. With this in mind, the team has decided to model our inflation schedule closely after the leading DeFi dApp, Synthetix. We will start with an initial first week distribution of 22,344 ALCX tokens, and reduce this amount weekly by 130 ALCX tokens for three years. After the three year mark, we will have a flat emission of 2200 ALCX tokens per week to support ongoing needs for incentivising ecosystem behaviors. This model progressively decreases inflation until the three year mark, and then slowly pushes it towards zero. The weekly reductions also prevent a reward collapse, so farmers should barely notice the differences from week to week. Having a known inflation schedule will also reduce economic uncertainty with regard to the ALCX token, allowing participants to make better decisions in the process.

3 Summary

Alchemix is a system for creating a new kind of yield-backed synthetic asset. These al-tokens provide DeFi users and DeFi protocols a powerful new primitive to utilize and build upon. al-tokens have multiple pegging mechanisms: the Transmutation pool, settlement of Vaults with al-tokens and or their base equivalents (eg. alUSD and DAI), incentivised pooling of pairs on AMMs, and pushing for adoption of al-tokens in the broader Ethereum and DeFi ecosystem. The Alchemix DAO Treasury will support developers and drive value to the Alchemix and broader Ethereum ecosystems.

4 References

1. Compound Protocol: <https://compound.finance/documents/Compound.Whitepaper.pdf>
2. AAVE Protocol: https://github.com/aave/aave-protocol/blob/master/docs/Aave_Protocol_Whitepaper_v1_0.pdf
3. Synthetix Protocol: <https://docs.synthetix.io/litepaper/>
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