Helio™

The revolutionary
USD Destablecoin
backed by **BNB**

Whitepaper

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01 Abstract

Helio Protocol is an open-source liquidity protocol for borrowing and earning yield on HAY destablecoin — a new asset class that is over-collateralized with liquid staked asset BNB. The protocol aims to position HAY as the leading destablecoin in the BNB Chain ecosystem, by leveraging Proof-of-Stake (PoS) rewards, liquid staking and yield-bearing assets.
Helio Protocol will operate as a DAO, where the community will govern the protocol's treasury, revenue pool and future direction.

02 Introduction

Stablecoins have become one of the most significant breakthroughs in the cryptocurrency industry. Since its initial issuance in 2014, USD-pegged stablecoins, in particular, have seen massive adoption, with their supply reaching USD $153 billion as of July 2022. These stablecoins were thought to be the gateway to mass cryptocurrency adoption as it offers a stable store of value compared to more volatile assets such as BTC. The downside however is that it functions almost entirely like fiat due to its centralized control system and vulnerability to inflation. Even though fiat-backed, centralized stablecoins like USDC, USDT, and BUSD have been the most popular, other types of stablecoins promising to solve these inadequacies have also risen in prominence.

The main alternative to the fiat-backed stablecoins are crypto-backed stablecoins . These stablecoins typically utilize a unique combination of behavioral economics, smart contracts and carefully designed algorithms to maintain the peg to fiat currencies without the control of a centralized custodian. To varying extents, crypto-backed stablecoins offer far more capital efficiency and decentralization than fiat-based stablecoins. These projects also usually incorporate some form of financial incentives, promising an asset class of digital currency that is not just decentralized and stable, but also potentially lucrative. Unfortunately, the extent of financial rewards can sometimes act as a double-edged sword, as there is also increased risk borne by the user. An example of this would be UST, which leveraged on an under-collateralized model and a burn-and-mint algorithm to maintain its peg while promising attractive liquid staking yields.

Despite the substantial amount of promises and solutions that stablecoins promise to bring, the market still lacks a clearly defined leader. A fine balance between risk, reward and stability must be achieved to not just drive mass consumer adoption, but also long-term sustainability.

A Sustainable Model for the Stablecoin Market

Over the past few years, the emergence of several decentralized stablecoin projects have created a highly intense, and competitive environment with the goal to gain market share. This competitive dynamic has resulted in projects offering more ambitious promises and yields than the next player should users choose to invest. To make matters worse, the lack of a clear leader and historical best practices have prevented users from doing their own research and discerning effectively between the influx of new stablecoin projects. Individuals become attracted to stablecoin projects offering high yet unsustainable liquid staking APYs of at times, over 20% - and when the bubble bursts, the more discerning retail investor would have learnt a lesson, and the less discerning would have lost a sizable chunk of their life savings. Unsustainable projects can deeply hurt the confidence of both retail and institutional investors,

and also bring about unwarranted regulatory scrutiny that detriments the development of decentralized stablecoins. In a bid to acquire users in the short-term, many projects have neglected their long-term viability, and that has undoubtedly set back the goal of mass market adoption significantly.

After highlighting the importance of sustainability within the stablecoin industry, it would be important to note that the current stablecoin industry is not all that dire, with some relatively successful projects gaining significant traction. An example of a project that has achieved relatively high adoption and multiple use-cases would be the MakerDAO and its crypto-backed stablecoin, DAI. With a current market cap of about USD $7.5 billion (as of July 2022), DAI has become a household name amongst decentralized stablecoin projects, leveraging on a safer, over-collateralized model to protect its peg. With multiple growing use cases in GameFi, working capital and cross-border transactions, to name a few, DAI appears to be the frontrunner within the stablecoin industry. Needless to say, it does not mean that the MakerDAO is perfect without room for further improvement. While MakerDAO has achieved a decent balance of stability, safety and profitability, there is more that can be done to further optimize this balance.

On top of that, most of these projects, including MakerDAO, are built on the Ethereum blockchain, which still utilizes a proof-of-work concept that is arguably both inefficient and expensive. The BNB Chain has the potential to offer the same maturity and scale of Ethereum, but with lower cost and far greater efficiency. Yet, there is currently still a lack of a dominant stablecoin that is decentralized and safe for users within the BNB ecosystem. This therefore creates a gap in the market for a sustainable yet lucrative stablecoin project which Helio Protocol plans on closing. The intent behind Helio Protocol is to propose a sustainable solution to the capital efficiency problem that over-collateralized stablecoins (such as DAI) typically experience by allowing users to leverage their funds with a collateral debt position (CDP). Through a combination of liquid staking, the functionality of the MakerDAO model and additional liquidity from LPs on DEXs, Helio protocol will avoid issues such as frozen funds (fiat-backed) or held value loss (algorithmic) because of price instability.

Destablecoins — A New Asset Class

Helio Protocol introduces the notion of “Destablecoins”, which is a new type of asset class within the crypto space that seek to more accurately represent a new model in the current stablecoin landscape. The term “destablecoins” helps to achieve the following purposes.

Firstly, and more purposefully, the prefix “de” in “destablecoins” stands for decentralized, and that is to clearly distinguish products such as HAY from other legacy stablecoin products such

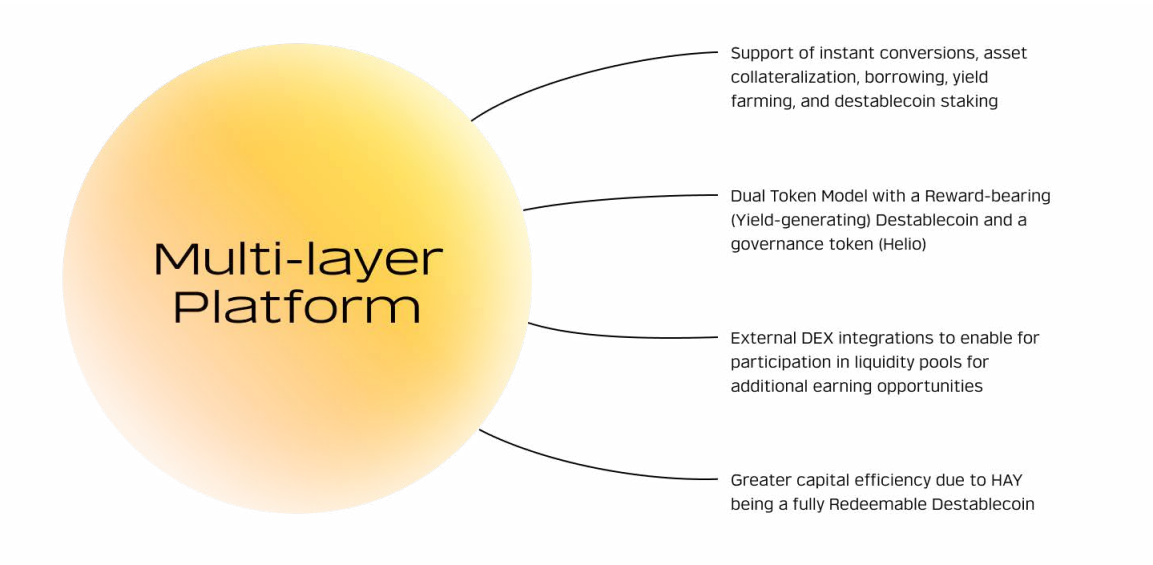
as BUSD and USDC, which is controlled by a centralized custodian. This also helps mark the progression of stablecoins from being centralized to decentralized, and the DeFi industry as a whole.

Secondly, destablecoins aims to achieve stability broadly without an absolute peg to the fiat currencies. All currencies are different and have varying reference rates, so price fluctuations should be considered a norm defined by the open market instead of aiming for a sense of absolute price stability at all cost. Similarly with destablecoins, it does not aim to achieve absolute price parity with US $1 as a primary objective nor rely on fiat assets as the backed collateral.

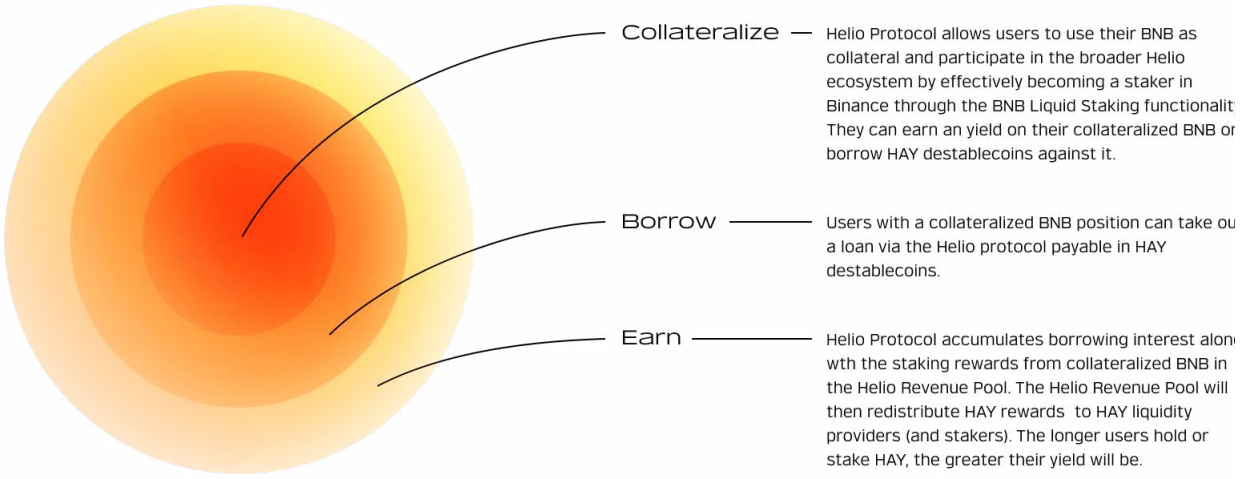
Lastly, the term “stablecoin” or even “algorithmic stablecoin” is generally a misnomer, as all stablecoins, including fiat-backed ones, have potential to de-peg, albeit to a much lower extent. The stablecoin industry is under constant scrutiny due to many retail investors over-investing under the allure of constant stability and becoming vulnerable to significant financial loss during such an event. Using the term “destablecoins” signals the underlying risk of stablecoins and encourages users to invest more responsibly, building a far healthier and more sustainable ecosystem of users.

03 Helio Protocol

Developed on the BNB Chain, Helio Protocol is an open-source liquidity protocol, which consists of a dual token model and mechanisms that support instant conversions, asset overcollateralization, borrowing, yield farming, and staking. Helio Protocol aims to deliver an improved version of already successful destablecoin projects by further optimizing on safety and capital efficiency with a novel model.



At a high level, the Helio Protocol can be summarized in 3 components:

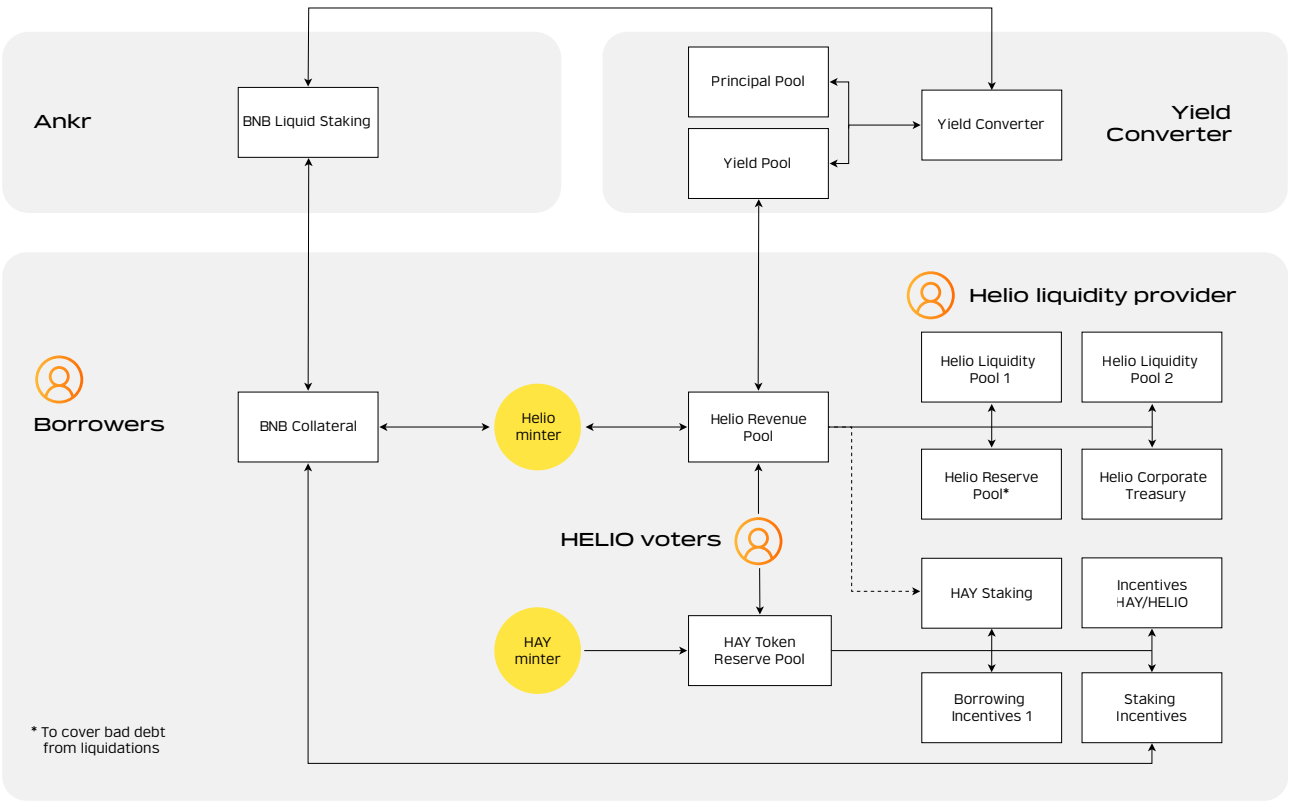


Core Components

Helio Protocol functions as a set of smart contracts that interact with other blockchains and contracts. The main components that make up Helio Protocol are:

- **MakerDAO set —** the Maker Protocol, also known as the Multi-Collateral Dai (MCD) system, allowing users to generate HAY by leveraging collateralized assets. HAY is a decentralized, unbiased, collateral-backed cryptocurrency soft-pegged to the US Dollar.
  - ABACI — price decrease function for Dutch auctions during the liquidation process of user's assets.
  - CLIP — liquidation v2.0 mechanics.
  - DOG — starts Dutch auctions during the liquidation process of user's assets.
  - JUG — collects Helio's borrowing interest for lending HAY to the user.
  - JAR — stakes and unstakes HAY, mints and burn hHAY token (token–deposit receipt for staked HAY).
  - JOIN — BEP-20 token adapters:
    - HayJoin — adapter between MakerDAO and HAY via which adapter which withdraws internal HAY from the system into a standard ERC20 token when user borrows HAY tokens or burns ERC20 when user repays their HAY loan to Helio.
    - ceaBNBcJoin — adapter between MakerDAO and HelioProvider that allows user assets to be deposited in the system for collateralization.
  - SPOT — oracle that fetches the price of ankrBNB, which is an intermediate token used during the process of collateralizing user's assets.
  - VAT — core vault for collateralized debt positions (CDP).
  - VOW — vault balance sheet. Keeps track of debt or surplus of HAY.
- **CurveProxyForDeposit —** add liquidity to the StableSwap pool, get LP tokens, deposit LP tokens for Farming smart contract.
- **Farming —** deposit or withdraw farmed tokens, distribute rewards in HAY to the depositors.
- **IncentiveVoting —** distribute rewards among the internat pools (in the Farming contract) or external pools (e.g. Ellipsis, Wombat, and so on), depending on the votes, which depend on the staked HELIO governance tokens (future functionality).
- **StableCoinStrategyCurve —** swap PancakeSwap farming rewards (CAKE) into HAY and BUSD, add them to the StableSwap liquidity pool, get LP tokens, add these LP tokens to the user share in the pool.
- **HelioRewards —** rewards distribution, in the HELIO rewards token.
- **HelioToken —** BEP-20 compatible rewards token given to the user for borrowing HAY.
- **HelioOracle —** oracle for the HELIO rewards token.
- **HelioProvider —** wraps BNB into ceABNBc via cerosRouter.
- **cerosRouter —** finds the best way to obtain ankrBNB, which is an intermediate token used during the process of collateralizing user's assets.

- **CeToken** — ceABNBc, which is the underlying collateral token inside MakerDAO.
- **CeVault** — stores obtained ankrBNB, which is an intermediate token used during the process of collateralizing user's assets.
- **Interaction** — proxy for the MakerDAO contracts. Provides deposit, withdraw, borrow, payback, and liquidation functions to the end users.
- **AuctionProxy** — entrypoint for Dutch auction methods, which is part of the liquidation process of user's assets. Allow users to start and participate in auctions.
- **ankrBNB** — liquid yield-bearing token used during the process of collateralizing user's assets.
- **hBNB** — token minted for the user as a deposit receipt for their collateral.



In addition to these contracts, the Helio Protocol interacts with smart contracts to extract the yield from the reward bearing tokens it uses and PancakeSwap as well as other stableswap DEXes — to for the swap exchange of tokens with low fees and low slippage.

Interacting with Helio Protocol

For more information on the interaction, refer to the Helio Protocol documentation page.

STEP 1

Collateralizing BNB

To collateralize their assets, the user sends a set amount of BNB via the HelioProvider::provide() smart contract. The assets will be locked inside MakerDAO via the VAT::frob() smart contract effectively collateralizing them. Intermediate ankrBNB and ceABNBc tokens are applied in the internal Helio Protocol logic in the process.

STEP 2

Borrowing HAY against the Collateralized BNB

To borrow HAY against the collateralized assets, the user sends a transaction to Interaction::borrow() smart contract in order to generate a specific amount of HAY in exchange for keeping their collateral locked in the ceVault. The Helio Protocol calculates the current HAY value inside MakerDAO. The calculation takes into consideration the borrowing limit, which is the price of the total assets collateralized by the user * collateral ratio (fixed amount set by the Helio Protocol).

The collateral ratio is bar for the price of collateralized user asset in relation to the price of the borrowed HAY. The current value is 66% of the collateral value. The collateral ratio is used in triggering the liquidation process when the borrowed HAY value becomes higher than the 66% of the current worth of the user's collateral with safety margin.

Helio Protocol indebts the user via VAT::frob() for the borrowed HAY amount. Then sends the borrowed HAY to the user via Join::exit().

STEP 3

Claiming Rewards for Borrowed HAY

Users who borrowed HAY are minted rewards in HELIO token and can claim them anytime.

To claim the HELIO tokens to their wallet, they send a transaction to the HelioRewards::claim() smart contract. HelioRewards updates the rewards pool size and rewards rate, and transfers the pending user rewards to the user's wallet via HelioToken::transfer().

STEP 4

Farming HAY–BUSD (PancakeSwap — StableSwap Pool)

Users who want to gain additional yield on their borrowed HAY tokens, can farm. They let CurveProxyForDeposit access their HAY and BUSD tokens and deposit them into the StableSwap liquidity pool via CurveProxyForDeposit::depositToFarming(). In return, it gets

the user minted LP tokens, which it deposits to Farming. Farming transfers the LP tokens to StableCoinStrategyCurve, which deposits them to MasterChefV2.

Helio then adds to the user farming rewards, making them compound. Users can then claim their farming rewards via Farming::claim().

STEP 5

Withdraw LP from Farming (PancakeSwap — StableSwap Pool)

To initiate an unfarming action and withdraw their LP, users call Farming::withdraw().

STEP 6

Withdraw HAY–BUSD from Farming (PancakeSwap — StableSwap Pool)

Users who want to withdraw their HAY–BUSD from the StableSwap pool, need to visit the StableSwap pool on PancakeSwap and withdraw their liquidity (HAY and BUSD) manually.

STEP 7

Stake HAY

Users who prefer simpler yield gain on their borrowed HAY tokens, can stake their HAY via JAR::join().

STEP 8

Unstake HAY

Users who want to unstake their HAY, can unstake them via JAR::exit().

STEP 9

Repaying Debt and the Accumulated Interest

To repay the borrowed HAY along with the accumulated interest, the user send a HAY to the Interaction::payback() smart contract, which in turn transfers HAY to the MarkerDAO vault via HAYJoin::join() and subtracts the repaid HAY amount from the user's debt via VAT::frob().

STEP 10

Withdrawing Collateral

With the HAY returned and the interest paid, the user can withdraw all or some of their BNB collateral back to their wallet. Once all HAY is completely repaid, the user can send a transaction to HelioProvider::release() initiating the withdrawal process. HelioProvider gets ceABNBc via Interaction::withdraw(), which unlocks the assets via VAT::frob() and transfers the assets from the CDP engine to the MakerDAO vault via VAT::flux(). Then HelioProvider exchanges ceABNBc to aBNBc and unstakes the aBNBc to release BNB to the user.

STEP 11

Liquidation

When the current worth of collateral with safety margin falls down to 66% of the borrowed amount of HAY, the liquidation process can be triggered by anybody via Interaction::startAuction(). The liquidator who triggers the Dutch auction, aka the liquidation process, gets a reward (*tip* + *chip*) for doing it. *tip* and *chip* are set by Helio governance and are currently 5HAY and 0% of amount of debt in the auction respectively.

Helio sets the starting auction price for the liquidated collateral to be equal *(current_collaterral_unit_price * buf)*, where buf is a param similar to the liquidation penalty, is set by Helio governance, and is currently 2% of the collateral value.

Helio Protocol then lets liquidators come and buy via buyFromAuction() to buy any amount > than dust (currently 1 USD). If the liquidator's proposed price is >= *current_auction collateral_unit_price*, Helio Protocol sells the requested amount of the user's collateral to the liquidator, exchanging ceABNBc for ankrBNB and sending ankrBNB to the liquidator's wallet. Effectively, the liquidator buys ankrBNB that they can later exchange for BNB or hold to accumulate more BNB as ankrBNB grows in value to BNB with time.

Helio Protocol incrementally lowers the auction price while letting anybody buy still. The reason for decreasing from a higher price is because of bots and change of collateral price from oracle to avoid any sudden loss. The auction lasts a fixed amount of time set by Helio governance. The price is recalculated every second of the auction.

When the auction time limit is reached or the price decrease has reached a certain threshold (the limits are set by Helio governance; currently 40% from the start auction price), Helio Protocol pauses the auction and waits for a liquidator to come and restart the auction. The liquidator who restarts the auction gets a reward (*tip* + *chip*) for it.

Finally, the Helio Protocol covers the user's debt and keeps profit (borrowed amount + (borrow interest + liquidation penalty)). Then it calculates the remainder (price paid - debt - profit) and sends it to the user's wallet.

Collateral Assets

HAY is generated and backed, through collateral assets that are deposited into Helio Protocol (CeVault). Upon launch, the accepted collateral asset to mint HAY is BNB.

In collateralizing their BNB, users will be investing in the broader Helio ecosystem and can borrow HAY to gain yield from staking it.

In borrowing HAY from the Helio Protocol, users will receive rewards paid out in HELIO — the native governance token. Rewards are calculated dynamically, which are determined based on the rewards rate and total user's debt in HAY. The rewards rate is determined and is fixed amount set by Helio Protocol initially, this is subject to change upon late stage once DAO governance is introduced

Users can liquidate their holdings if they see a liquidation process is due, as the borrowed HAY value becomes higher than the current worth of user's collateral with safety margin, and receive a flat fee (tip) and a dynamic percentage (chip) simply for starting a Dutch auction, which is the core component of the liquidation process. It is an opportunity arising in the liquidation process, and any Helio user can do it. Besides this opportunity, anybody who restarts the Dutch auction receives the same reward (chip + tip) for doing it.

Liquid Staking

The BNB Liquid Staking mechanism is an enhanced version of staking on the BNB Chain. Typically, it is the Proof-of-Stake (PoS) network that allows users to take advantage of the BNB Chain's features. But BNB Liquid Staking eliminates the need for them to lock their assets up with a central node. This removes the risk of having assets that are now "illiquid" and can't be spent or earned in other places. Liquid Staking solves the problem of locked up liquidity when staking assets on Proof-of-Stake networks.

Staking rewards from PoS networks can be one of the most stable streams of income available (in percentage terms). However, typically users have to wait until the end of the staking period to get your staking rewards.

Liquid Staking provides instant liquidity for staked assets in the form of Liquid Staking tokens.

Liquid Staking tokens represent the value of your staked assets but the tokens are portable, accessible and thus liquid. They can now be utilized in a number of ways.

The main components of BNB Liquid Staking will be:

- Liquidity mining opportunities are enabled by providing liquidity for pools on decentralized exchanges. The first main liquidity pools are expected to be ankrBNB/BNB.
- Farming rewards for liquidity providers. Liquid Staking presents several yield farming strategies for users to contribute to liquidity pools and gain a share of the trading fees and governance tokens. These new LP tokens can be used to generate yet another layer of earnings.
- Staking rewards on farmed tokens. After using yield farming strategies, users can also reinvest their farmed LP tokens into more staking opportunities. This is a highly repeatable process as layers of rewards from farming and staking will quickly stack up.

- Yield aggregators/vaults can automate yield farming rewards and enable compounding returns with close to zero efforts from users. This is a great method to maximize users' passive income.
- More trading opportunities thanks to the elastic supply nature of ankrBNB, meaning that users' could potentially buy ankrBNB at a discount on a decentralized exchange and redeem it (unstake it) to extract its fair value back in up to 7–14 days (the BNB Liquid Staking unbonding period).

BNB Liquid Staking will not be using preferred validator nodes to stake the BNB from users. In selecting several suitable and reliable BNB Chain validators, the protocol will make BNB Liquid Staking more decentralized one validator at a time.

The BNB to ankrBNB process

1. User sends BNB to HelioProvider
2. HelioProvider mints hBNB for the user (as a notarial receipt)
3. HelioProvider sends BNB to the yield converter router and the converter exchanges them to ankrBNB
4. The converter sends ankrBNB to CeVault for storage and accumulation of staking rewards
5. CeVault mints ceABNBc for HelioProvider
6. HelioProvider collateralizes ceABNBc through Interaction

Yield-bearing Tokens

Yield-bearing tokens are a relatively new development in DeFi. Several blockchains support composability with regard to projects building in their ecosystem. This speaks to the interoperability of teams and projects that develop protocols, platforms and products on top of each other and their capacity to exchange data across protocols and platforms. For this reason, many DeFi projects host a variety of vaults or pools where users can deposit and receive a token, called LP token, in return.

Helio Protocol deploys the principle of yield-bearing tokens to allow users to take advantage of their interest-bearing position by borrowing against it. In staking the collateralized BNB in the Helio Protocol, it automatically converts BNB to ankrBNB (yield-bearing tokens). These tokens increase in value over time to reflect staking rewards, meaning 1 ankrBNB will grow in value when compared to BNB.

The accumulated staking rewards and borrowing interest go back to the Helio Revenue Pool, where the community governance (Helio DAO) decides how it will be used such as buyback-and-burns, fund 3rd party risk assessment consultancy service, held as a reserve pool for risk management, further incentivize active users who borrow and further stake HAY in the protocol, or liquidity providers in DEXes.

Improved Capital Efficiency

To benefit from Helio's yield, the protocol converts user BNB into ankrBNB that accumulates liquid staking rewards.

During this phase, Helio Protocol will offer a compelling alternative to existing protocols and serve as a digital system for a wide variety of decentralized financial operations.

Users with a collateralized BNB position can take out a loan via the Helio Protocol payable in HAY destablecoins. The collected borrowing interest along with the liquid staking rewards from collateralized BNB will be deposited and held in the Helio Revenue Pool. The Helio Revenue Pool will be subject to community governance via the Helio DAO to redistribute its liquidity accordingly.

Helio Protocol is able to provide greater capital efficiency due to HAY being a fully redeemable destablecoin with a strategy to generate yield against BNB collateral while minimizing risk via liquid staking. At any time, the protocol allows holders to redeem their HAY for the underlying BNB collateral along with any additional yield that has been generated. The standard waiting time for withdrawal of the BNB collateral is between 7–15 days. Alternatively, users may choose to withdraw the corresponding ankrBNB at any time instead.

04 Tokenomics

The Helio Protocol consists of a dual token model, a destablecoin (HAY) and governance token (HELIO).

HAY Destablecoin

HAY is an overcollateralized destablecoin backed by liquid staked BNB and is redeemable for $1 USD value of crypto currency. The Helio Protocol is able to ensure HAY is redeemable following the scenarios below:

SCENARIO 1 **When HAY > $1, the supply of HAY will have to be increased.**

- Since HAY is at a premium, borrowers are incentivized to borrow more HAY to sell for other assets for arbitrage opportunities.
- To reduce demand for HAY farming, Helio will reduce HAY farming rewards by decreasing HAY borrowing interest.

SCENARIO 2 **When HAY < $1, the supply of HAY will have to be reduced.**

- Since HAY is at a discount, borrowers are incentivized to buy HAY from the market to pay back the debt.
- To decrease HAY borrowing demand, Helio will increase HAY borrowing interest, which increases HAY farming rewards

Upon launch, HAY will be issued as a BEP-20 compatible token. Its use cases include the following:

- Borrowing HAY
  - Users who have deposit BNB on the Helio Protocol (CeVault) are eligible to borrow HAY
  - The operations of borrowing HAY, repaying the loan and withdrawing the original collaterals are all governed by a set of smart contracts.
- Liquidity Mining: Via 3rd party LPs on DEXes.

Payment: As means to transfer value, purchase goods & services.

HELIO Governance Token

HELIO is the governance token of Helio Protocol under the Helio DAO. The token generation event (TGE) is to be determined at a later date, but upon launch HELIO will be issued as a BEP-20 compatible token. Its use cases include the following:

- Governance
- Borrowing Incentives
- Liquidity Mining

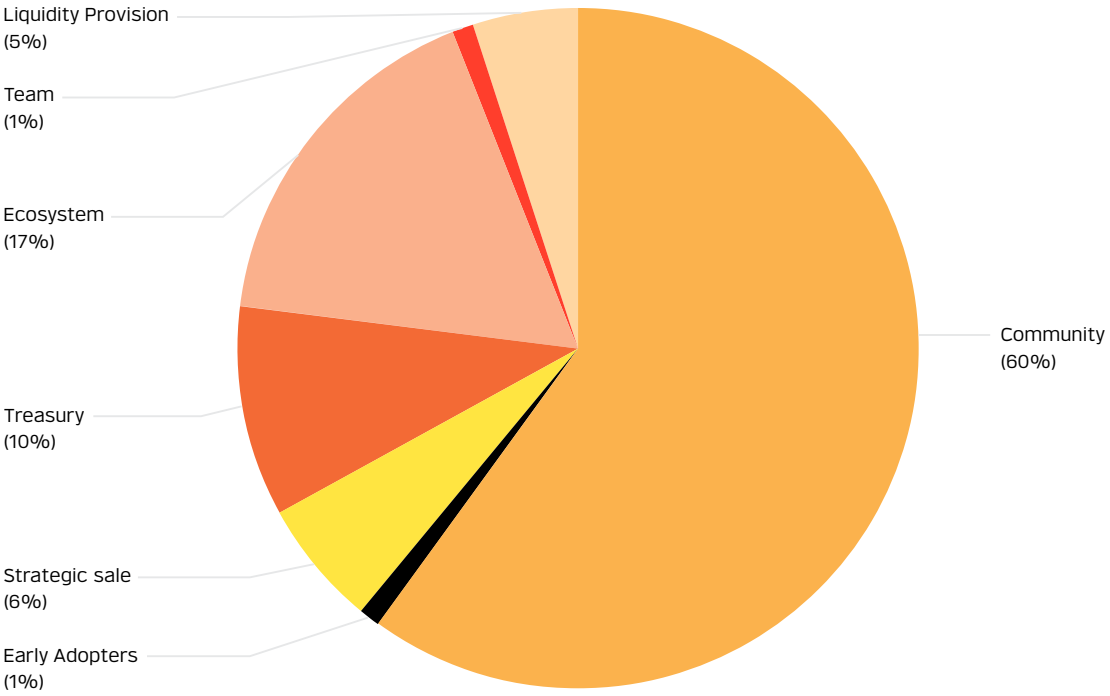
Helio DAO

Helio Protocol is expected to operate as a DAO, once the HELIO token has completed its TGE and is circulating in the secondary markets. The Helio DAO will be governed by the community, where proposals can be created and collectively vote on decisions regarding the Helio Protocol, such as treasury funds, protocol revenue pool, new features and potential technical upgrades. Proposals that achieve predefined level of consensus (over ~50%) are then accepted and enforced by the rules instantiated within the smart contract.

Token Allocation

The maximum supply for Helio Protocol's governance token (HELIO) is 1,000,000,000.
Token allocation is as follows:

- **Community (60%):** No cliff, 5-year vesting.
- **Ecosystem (17%):** No cliff, 8-year vesting.
- **Treasury (10%):** No cliff, 8-year vesting.
- **Liquidity Provision (5%):** No cliff, 8-year vesting.
- **Strategic sale (6%):** 1-year cliff, 7-year vesting.
- **Team (1%):** 1-year cliff, 7-year vesting.
- **Early Adopters (1%):** Airdropped to early network participants.



Liquidity Pools (LPs)

Both HAY and HELIO can be staked or swapped via liquidity pools (LPs) on DEXes. Besides earning trading fees for being a liquidity provider to LPs, the Helio Protocol intends to further incentivize LPs with either HAY or HELIO as farming rewards, the amount of rewards will vary with DEXes and the participation in LPs. Upon launch, users will be able to provide liquidity or swap tokens in LPs on BNB native DEXes.

Liquid staking tokens are automatically issued when users successfully stake assets such as HAY and BNB, becoming hHAY and hBNB respectively. For example:

1. hHAY/BNB pairs can be used to provide liquidity to hHAY/BNB liquidity pools on DEXs. As more people trade, users can earn a share of transaction fees, on top of their HAY staking rewards from hHAY.
2. By providing liquidity, users may receive farming rewards on top of LP tokens, representing their share of the LPs on DEXes.
3. Once users harvest the farmed tokens, they can further stake those tokens to earn more yield, or simply sell them to buy more HAY and HELIO to generate more yield. Repeating this operation periodically will add a compounding effect on their yield.

When staking HAY and receiving Liquid Staking tokens (hHAY), the main benefit comes from the liquidity of the hHAY tokens since it is not possible to unstake HAY for the moment.

Helio Protocol will continue to increase HAY adoptions by partnering with DeFi protocols on the BNB Chain and use the native token of various DeFi protocols to influence rewards emission. The team will also actively use HELIO to incentivize HAY liquidity pools across DEXes to maintain its redeemable value of $1 USD.

DeFi composability would enable HAY liquidity providers, and at a later stage, HAY stakers as well, to further boost yield in a sustainable manner thanks to the integration with other lending platforms.

HAY and HELIO holders can combine these strategies while using the Helio Protocol to maximize their returns even further.

05 Risk Management

Oracles

The BNB price data is provided by the Chainlink oracle and an in-house developed oracle (based on BNB native DEXes) for HELIO token price data after TGE. The Helio Protocol continues to integrate additional oracles as a contingency measure.

	Helio Protocol	MakerDAO	Aave	Compound
Main Price Oracle	Chainlink	Oracle Module (In-house)	Chainlink	Chainlink
Price Calculation	**Median & Time-weighted (~6-hours price delay)**	Median & Oracle Security Module (~1-hour price delay)	Median & Time-weighted (~6-hours price delay)	Median & Time-weighted (~6-hours price delay)
Backup Price Oracle	**To be announced**	Customized Medianizer	Fallback Price Oracle	Uniswap V2 TWAP

Debt Ceiling

HAY will have a maximum minting cap, which is set at 5% of the collateral's total market cap (BNB) for the initial launch and subject to change upon late stage once DAO governance is introduced. To maintain a sustainable growth upon launch, there will be a smaller initial minting cap, this will increase in increments until the maximum minting cap of 5% of the total BNB market cap, this will be controlled by the Helio Protocol initially.

As of 8/1/2022	Helio Protocol (HAY)	MakerDAO (DAI)	TronDAO (USDD)	TerraClassicUSD (USTC)
Maximum Mint Cap	**Yes**	Yes	Yes	No
Mint cap Mechanism	**Centralized Control initially** (Transition to DAO governance later)	Only for Flash Mint Module (DAO Governance)	Centralized Control	None, Mint-and-burn mechanism (USTC & LUNC)
Total Stablecoin/ Destablecoin Minted Supply	—	~$7.5B	~$724MM	~$353MM
Total Stablecoin/ Destablecoin Minting cap	**~5% BNB market cap**	None, for total DAI minting cap. But there is a ~$500MM cap per flash loan.	~$2B	None

Loan-to-Value (LTV)

HAY is an over-collateralized destablecoin with a Loan-to-Value (LTV) of ~66% or a collateral ratio of ~152%. For instance if users were to deposit ~$100 USD worth of BNB, they are only able to mint ~66 HAY at maximum. In essence, the HAY market cap will never surpass its total collateral staked in the protocol (BNB marketcap).

As of 08/01/2022	Helio Protocol	MakerDAO	Aave	Compound
Collateral	BNB	ETH		
Collateral Total Market cap	~$43B	~$187B		
Collateral in Protocol (% of Total Market cap)	~$2.2B (~5%)	~$2.4B (~1.3%)	~$900MM (~0.5%)	~$829MM (~0.4%)
Loan-to-Value (LTV) / Collateral Ratio	~66% LTV (~152%)	~66% LTV (~152%)	~80% LTV (~125%)	~80% LTV (~122%)

Liquidation Model

Helio Protocol will be using the Collateral Auction mechanism as the liquidation model. Example of liquidation process below.

Price of 1 unit of collateral	$2
Collateral ratio	66%
Collateral price based on liquidation ratio	$1.32
Assume User deposit 10 units collateral	10*2 = $20
Borrow limit	user_deposit * collateral_ratio = 20 * 0.66 = $13.2
Assume User borrows $13.2 of HAY	13.2 $HAY
Assume Price of 1 unit of collateral decreases to	$1.8
Collateral unit price with safety margin	current_collateral_unit_price * collateral_ratio = 1.8 * 0.66 = $1.188
Current worth of collateral with safety margin	price_of_colatteral * amount_of_collateral= 1.188 * 10 = $11.88
Positive diff puts user under liquidation line	borrowed_amount - current_total_colateral_ borrow_limit = 13.2 - 11.88 = $1.32
Amount of collateral that goes to Dutch auction	10
Liquidation penalty (fixed by Helio governance)	13% of Debt
Debt to cover in the auction	borrowed amount * liquidation penalty = 13.2 * 1.13 = $14.916

Buf (percentage similar to liquidation penalty, fixed by Helio governance)	2%
Starting auction price (top)	current_collaterral_unit_price * buf = 1.8 * 1.02 = $1.836
Somebody triggers auction and gets tip + chip as a reward for doing it	
Auction starts and the price gradually decreases. Liquidator can participate to buy customized amount of liquidated collateral	
Tau (time until price is 0; fixed by Helio governance))	e.g. 3600
Dur (fixed by Helio governance)	time in seconds elapsed since the auction start, e.g. 600
Linear decrease of price (subject to be disrupted at the below event)	top * ((tau - dur) / tau) = 1.836 * ((3600 - 600) / 3600) = $1.53
Pause auction because of one of two conditions: — tail (specific amount of time elapsed; fixed by Helio governance) OR — cusp (% of price drop; 40% start auction price; fixed by Helio governance)	Either requirement is met, the auction will be restarted
Wait till someone restarts auction	
Tip (flat fee; fixed by Helio governance))	$300
Chip (dynamic fee; fixed by Helio governance))	0.1% of amount of debt in the auction
Restarter gets tip + chip as a reward	

To limit the risk of liquidation, users are recommended to:

- Borrow with caution and borrow under suggested liquidation ratio (~66%).
- Periodically monitor borrowed position & account balance, to either repay back the loan or deposit more collateral.
- Subscribe to Helio Protocol's Liquidation Alert System (LAS).

Liquidation Alert System (LAS)

The Liquidation Alert System (LAS) will send users a warning if their borrowed positions are at a critical liquidation threshold. To receive the alert, users will need to subscribe to LAS by providing their preferred contact details (either Email address or Telegram Handle). Once subscribed, the alert will be sent if the following occurs:

- The collateral price experiences significant volatility and is a certain percentage above the liquidation price, users will receive warning text to take actions.
- When the collateral hits liquidation price, users will receive the alert to take action on their position.

Emergency Shutdown Mechanism

The Helio Protocol is a smart-contract system that backs and stabilizes the value of HAY through a dynamic combination of Vaults, autonomous system of smart contracts, and appropriately incentivized external actors. HAY will always be redeemable to at least $1 worth of crypto assets. The shutdown process will be used as a last resort to directly enforce the $1 USD redeemable value to HAY holders and the Vaults, as well as protecting the Helio Protocol against attacks on its infrastructure. The shutdown stops and settles the Helio Protocol while ensuring that all users, both HAY and Vault holders, receive the net value of assets they are entitled to. The Helio Protocol follows MakerDAO's emergency shutdown process and will intend to provide more details in the technical documentation.

06 Conclusion

This whitepaper introduces a new destablecoin asset class designation alongside the open-source liquidity protocol, which is an improved version of already successful overcollateralized crypto-backed projects by further optimizing on safety and capital efficiency. The Helio Protocol is designed to provide users an alternative to generate sustainable yield and unlock liquidity for their locked crypto assets. The protocol lends out HAY to borrowers who use liquid staked BNB as collateral, in return receives a competitive interest rate against their collateralized assets through HAY staking and providing liquidity on DEXes.

Helio Protocol aims to become the leading destablecoin and trusted reference rate enabler in the BNB Chain ecosystem. The yield-generating function is the first step toward incentivizing liquidity provision, which enables further growth of Helio Protocol's functionality. In holding and borrowing HAY, users will be investing in the broader Helio ecosystem with the goal of making it the go-to settlement layer across the broader crypto space.

Helio™