



Whitepaper

Abstract

This whitepaper will provide insight into how the d-loop protocol functions on a technical level while introducing new features unique to the d-loop governance model. We aim to showcase d-loop and the d-loop governance models, protocol, their design function, and the mathematics employed. We introduce new concepts and incentive layers for both investors and liquidity providers (LP's).

Disclaimer

All of the information presented in this whitepaper is tentative and is subject to change at any time. None of the information herein should be construed as legal, accounting, or investment advice of any kind. This document does not represent a solicitation for investment, nor does it represent an offering or sale, public or private, of any kind of financial instrument, security or otherwise, in any jurisdiction. This whitepaper is provided for informational purposes only, with the intention to describe d-loop's prospective protocol and governance model

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1. Introduction

In the fast-moving world of tokenized asset management, market turbulence calls for decentralized asset management solutions that can withstand risks, volatility, regulatory uncertainties, and continuous market operations. That's where d-loop comes in offering a revolutionary solution that redefines institutional crypto and digital asset management.

Designed to cater to the needs of traditional institutions and regulated entities seeking to enter the digital asset management space securely and compliantly, d-loop provides a wide range of innovative features. These include advanced modules for institutions, support for short positions, inverse indexes, and fully on-chain auto-rebalancing indexes that can optimize and adapt to market demands.

d-loop has an Alliance Partnership program to further enhance its offering, encouraging established protocols to join forces and collaborate with d-loop. This initiative aims to provide market signals, open up new use cases, improve market traction, and ensure that d-loop remains at the center of the decentralized ecosystem.

d-loop Ventures bridges the divide between institutional and decentralized worlds by providing a gateway for institutional partners to connect with the d-loop DAO. By doing so, d-loop Ventures brings the expertise of institutional partners to the open and decentralized systems, further fueling the decentralized ecosystem's growth, development, and maturity.

1.1 d-loop Market Segments

d-loop is designed to meet the evolving needs of institutions and regulated entities by offering a versatile and compliant platform for creating and managing digital asset index funds. By addressing emerging market opportunities such as Real World Assets (RWA), and enabling market-specific index types with assets such as commodities and private equity, d-loop is positioned at the forefront of the emergent digital asset management and tokenization sector.

The flexibility provided by customizable 'regulated modules' ensures that d-loop can adapt to emergent digital asset classes and address specific regulatory requirements.

Accessing Opportunities and Addressing Challenges

By offering regulated modules, d-loop enables institutional investors to engage with digital assets confidently, knowing that their products and investments adhere to stringent compliance standards.

d-loop's structure includes both decentralized and centralized components. The d-loop DAO oversees decentralized governance, ensuring that decisions are made transparently.

Meanwhile, d-loop Ventures provides a centralized entity that issues software licenses to regulated institutions and conducts necessary compliance checks. This dual approach guarantees that regulated entities can meet their regulatory requirements in a secure, compliant, and private manner while leveraging the advantages of decentralization.

Expanding Market Reach

d-loop's innovative approach allows it to tap into a broad spectrum of institutional market segments, including:

- **Banks and Financial Institutions:** Offering secure and compliant gateways to digital asset investments.
- **Hedge Funds and Asset Managers:** Providing sophisticated tools for optimized portfolio management and risk mitigation.
- **Crypto Custodians and Exchanges:** Enhancing service offerings with integrated asset management solutions.
- **Fintech Platforms:** Expanding their service spectrum by tapping into the decentralized finance (DeFi) ecosystem.

By addressing the unique needs of these segments, d-loop ensures that institutional players can navigate the digital asset landscape efficiently and securely. Its comprehensive suite of tools and services positions d-loop as a critical enabler of digital asset adoption in the institutional market.

d-loop's ability to bridge traditional and decentralized finance, while maintaining regulatory compliance, makes it an essential platform for institutions seeking to capitalize on emerging digital asset opportunities.

1.2 The d-loop Protocol

d-loop is a platform that allows institutional and decentralized index funds to be created and managed. The platform comprises two entities separated by a "regulatory firewall": the *d-loop DAO* and *d-loop Ventures*.

d-loop DAO is fully decentralized and is the ultimate arbiter of all ecosystem decisions. The DAO governs platform and organization decisions that impact the ecosystem, such as protocol upgrades. *DLOOP* is the governance token that regulates the d-loop DAO.

d-loop Ventures is a centralized entity that issues software licenses to regulated institutions and conducts compliance checks. It is governed by the *veDLOOP* token, the vested escrow version of the *DLOOP* token, specific to regulated entities. It also maintains the smart contracts that govern the conversion of *DLOOP* tokens to *veDLOOP*.

d-loop introduces two new assets to the Ethereum and Optimism ecosystems:

- The DLOOP token
- The vested escrow veDLOOP governance token

DLOOP is a utility token used to operate the d-loop DAO. The DLOOP tokens are issued exclusively to licensed organizations that have undergone KYC and compliance checks conducted by d-loop Ventures, a centralized and regulated entity created for this purpose. Indexes generated on the d-loop platform can be administered and supervised either within secure data center environments or decentralized, depending on preference. Each index operates with its distinct governance process, utilizing both internal and external data sources to define portfolio composition.

Additionally, each index is associated with a token that signifies a share of the asset basket's value, conferring governance rights specific to that index.

Institutions and traditional finance partners can centrally create and manage their indexes, leveraging internal data sources to inform index composition.

The protocol consists of three primary components:

- An asset management suite, which includes an automated liquidity protocol and asset governance model designed to democratize and optimize portfolio management. Each index issues a basket coin representing a portion of the index's value, which may be optionally used for localized governance.
- Regulated modules that enable institutions to import traditional finance index investing into the 24/7 DeFi market. d-loop Indexes can securely use internal and private data sources while accessing collective intelligence from multiple sources, interfacing with decentralized protocols while meeting their regulatory compliance requirements.
- Governance platform (DAO) which employs a governance model that allows D-LOOP token holders to guide the development of the platform

Through d-loop, consumer clients gain access to multiple index composition protocols, and institutional entities leverage the power of decentralization while remaining compliant. DLOOP governance token holders, Alliance Partners, and holders of institutional veDLOOP governance tokens benefit from the performance fees generated.

1.3 d-loop Ventures and d-loop DAO

d-loop DAO is fully decentralized and is the ultimate arbiter of all ecosystem decisions. The DAO governs platform and organization decisions that impact the ecosystem, such as protocol upgrades.

d-loop Ventures operates as a centralized entity that issues software licenses to Institutions, conducts compliance checks, and maintains the smart contracts that govern the conversion of DLOOP tokens to veDLOOP

1.4 Institutional Partners

Institutional entities can utilize d-loop's solutions with 'regulated modules' and a restricted version of the d-loop token. The automated asset management system invests and rebalances automatically depending on market conditions. It uses collective intelligence from multiple sources, including several DeFi protocols, to complement internal data sources to outperform the market – whether bull or bear.

This allows traditional finance partners to harness the power of decentralization in a compliant manner while leveraging private data sources, with risk management, regulatory reporting, and regulated custodian and decentralized vaults, while building solutions relevant to their customer base.

Moreover, d-loop will have a premium module store, allowing indexes to add functionality such as KYC, professional investor validation, risk management tools, and more. Overall, d-loop is a revolutionary solution offering a powerful combination of decentralized and centralized asset management capabilities for hedge funds and institutions.

Some use cases for d-loop's solutions include:

- **Hedge funds & asset managers:** d-loop can enable hedge funds and asset managers to offer their clients a more sophisticated investment solution while reducing operational costs and increasing risk management capabilities.
- **Private banks:** Private banks can leverage d-loop's solution to offer clients tokenized investment portfolios with a regulated platform's added security and compliance benefits.
- **Crypto custodians:** Crypto custodians deploy d-loop expand services and client offerings by integrating d-loop into their existing asset management solutions

- **Crypto exchanges:** Crypto exchanges can use d-loop's technology to offer optimized asset portfolios to retail clients, improving returns, reducing risk, and streamlining fees
- **Fintech Platforms:** Fintech Platforms can integrate d-loop to leverage existing infrastructure to expand services and client offerings.

Overall, d-loop's unique approach to active management at passive prices provides institutions with a comprehensive, secure, and customizable solution for their private asset management needs.

1.5 Alliance Partners

d-loop is an alliance of projects, formally partnered with the d-loop DAO. This allows for multiple data aggregations to be used to inform index composition. The decentralized suite provides 'partner slots' that enable Alliance Partners to develop modules that integrate with the protocol.

Alliance Partners are voted in as per the d-loop DAO's governance mechanisms. They benefit from new use cases to existing tokens, protocols, and governance mechanisms and are rewarded in USDC for data provision.

Alliance Partner data can be used to complement internal data sources for D-LOOP licence holders where crypto asset indexes are deployed.

1.6 d-loop Indexes

d-loop enables the creation of digital and crypto asset indexes, each with a fully asset-backed unique index token. Participants exchange stablecoins in return for the respective index tokens, with the proceeds used to acquire portfolio assets.

In order to create an index, the creator or creators lock an amount of DLOOP initially determined via governance vote through the d-loop DAO. These locked tokens remain locked during the existence of the index but for no less than four years.

Portfolio allocations of each index are automatically rebalanced and optimized using market signals provided by the Partner DAOs, supplemented with signals from subscribed premium modules.

d-loop is a DAO, and the DLOOP token is its top-level governance layer, enabling transparent and collective decision-making in relation to the launch of new indexes, the

introduction or withdrawal of premium services or providers, and the wider operation of d-loop.

DLOOP token holders can also monitor and remediate undesired activity, such as bugs in automated modules or changes to existing index strategies, and call for voting and taking action.

A d-loop smart contract enables users to launch and govern their own fully backed indexes, subject to a governance vote, as per the d-loop DAO's requirements.

1.7 Index Governance

Each index defines its investment strategy, the range of assets it supports, and any restrictions or participation thresholds. The composition of the index portfolio is determined either by voting through the index governance or by external sources approved by the index governance. Periodically, the index receives signals, and the smart contract rebalances the portfolio so that the strategy is followed precisely.

Governance of the index is independent of the d-loop DAO and achieved using the native index token that represents the participation and value of an individual's position in a particular index fund. An index can include tokens from other indexes as well.

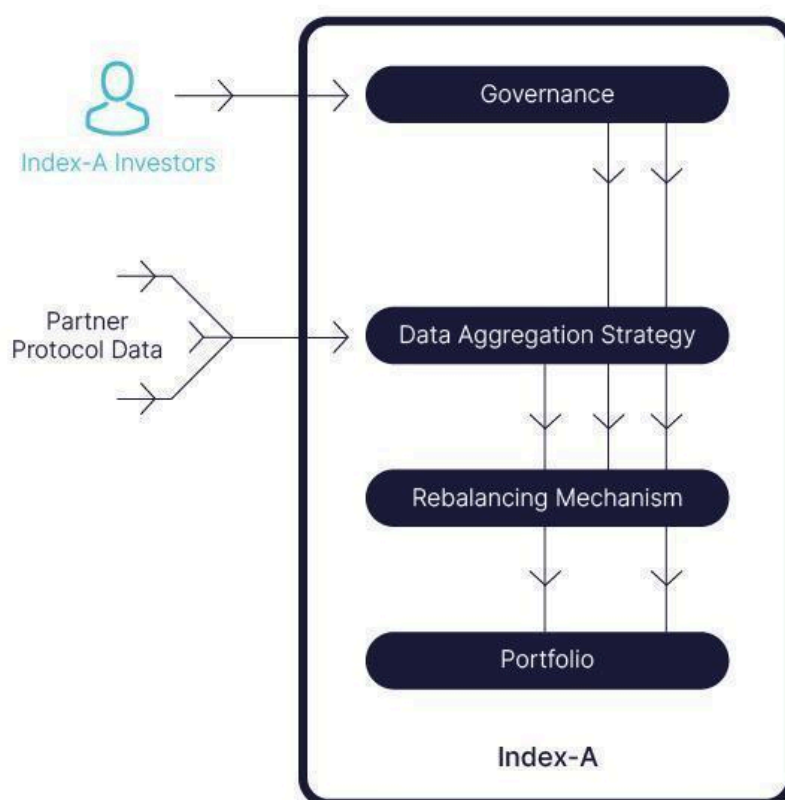


Figure 1.

In order to rebalance, indexes use decentralized exchanges (DEXs) and other liquidity providers to buy and sell assets, with the type and number of venues determined by each index. Other portfolio rebalancing approaches can be added in the future, provided the index governance process votes to do so. Multi-chain asset solutions to optimize gas fee usage and other improvements will also likely be added.

1.8 d-loop Inverse Indexes and Shorts

d-loop Indexes allow for an approximation to shorts using overcollateralized loans. This feature is activated via governance whereby index token holders decide which assets should be supported and the type of shorting mechanisms deployed. Short signals are aggregated from supported protocols. Once activated, short positions are actualized by lending assets on DeFi protocols such as Aave or Compound.

Through this mechanism, assets are efficiently sold and repurchased when the price has decreased below a predefined value.

The excess transforms into a profit for the Index. The index is designed to automatically rebalance its positions to avoid the loan liquidating against the collateral.

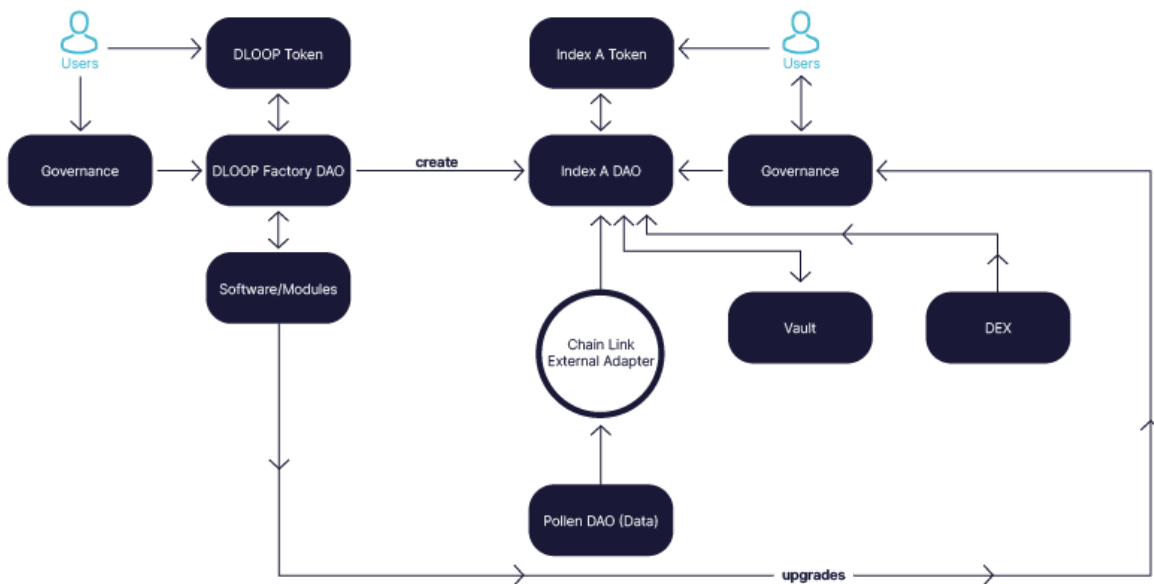


Figure 2. Detailed architecture diagram for Decentralized and Institutional Indexes

1.9 Decentralized Partner Modules

The composition of d-loop indexes is designed to be informed by multiple protocols and methods that enable multiple composition strategies, e.g., prediction markets, AI, and governance protocols. Decentralized partner modules harness the power of proven decentralized protocols to provide data and index composition signals to complement institutional clients data sources.

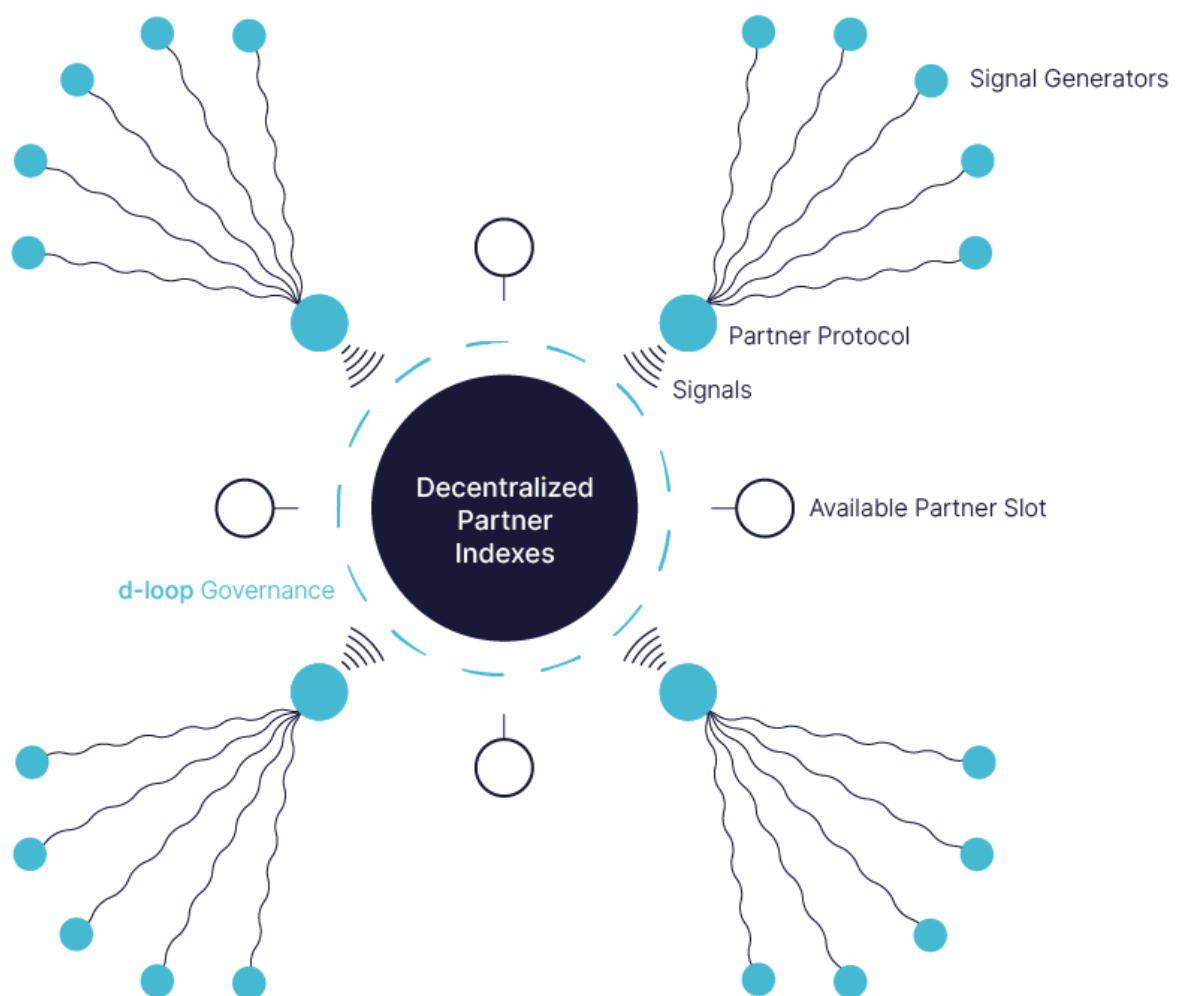


Figure 3. Alliance Partners supply decentralized data sources that may be used to determine portfolio composition. d-loop encourages participation by setting aside partner grants and slots to grow the decentralized ecosystem.

1.10 Institutional Partner Modules

Regulated modules allow traditional finance partners to build bespoke software solutions tailored to their business needs, allowing them to harness the power of decentralization in a compliant manner while building solutions relevant to their customer base.

A premium module store is provided, the objective of which is to allow partners to add additional functionality if required, including risk management, regulatory reporting, and institutional custodian vaults

Decentralized data sources from Alliance Partners are made available to complement internal data sources to inform index composition. Internal data sources made available via custom modules are never exposed on-chain.

This hybrid approach allows institutions to take advantage of the best breed and choose what data to expose on-chain.

d-loop is to host a premium module store offering optional functionalities provided by partners that work with and complement existing processes, including KYC, professional investor validation, anti-money laundering mechanisms, risk management tools, advanced stop-losses, and regulatory reporting.

Institutional partners can leverage centralized data sources to inform fully decentralized indexes while protecting customer data. Additionally, institutional partners are permissioned and benefit from vested veDLOOP tokens, the ability to develop software modules, and access to decentralized partner modules.

1.11 Vested Escrow Rewards for Institutional Entities

The protocol offers pro-rata rewards to institutional entities to incentivize long-term support. Pro-rata rewards are for the first 1,406 days from the protocol launch. The longer the users lock their veDLOOP into a vested-escrow contract, the more rewards they receive. veDLOOP holders can also vote on d-loop DAO proposals and receive performance fees.

2. d-loop Framework, Stakeholders & Rewards

The d-loop framework is designed to reduce barriers in digital asset index creation and management by seamlessly integrating portfolio allocation data, supporting services, and providing access to investors.

Decentralized Partner Slots enable index composition to draw insights from additional data offered by various protocols and methods, allowing for implementing multiple strategies such as prediction markets, AIs, and governance protocols. In return for financial support, partners contribute supplementary data.

A *dApp Store* is a premium module store to be made available, providing access to software modules created to expand d-loop's functionality. Index Creators can subscribe to preferred data sources and gain access to additional add-on software modules designed to enhance d-loop's feature set.

Partner Protocols and software module providers are rewarded through one-time payments or recurring subscription-like arrangements.

- **Index Creators:** an asset management suite is provided, which includes an automated liquidity protocol and an asset governance model designed to optimize portfolio management. Indexes adopt a governance model empowering index token holders to influence the composition of the index portfolio and choose external data sources (Partner Protocols) through voting on governance proposals. Each index issues a basket coin, representing a share of the index's value, and this coin is subsequently employed for localized governance.
- **Module Providers:** Modules made available via a *dApp Store* are designed to expand the functionality of Indexes and provide additional data sources via Partner Protocols. Solutions provided include modules for risk management, reporting, custody vaults, efficient transaction execution, inverse indexes, and shorts, among other add-on functions.
- **Index Participants:** use stablecoins to buy into an Index. In exchange, they receive an Index token that represents and is backed by the underlying basket.

2.1 DLOOP Staking

Solution providers such as Alliance Partner Protocols, Index Creators, and Module Providers can acquire and stake a minimum amount of DLOOP/veDLOOP tokens to participate actively in the ecosystem. They can also list their products/tokens in the dApp Store or offer their solutions to Index Participants.

The staking mechanism is pivotal in determining the rewards allocated to each Solution Provider (refer to the next section for details). The amount of DLOOP/veDLOOP tokens staked is categorized into tiers, with each tier defining the "influence" a Solution Provider can exert. This, in turn, directly influences the entitlement to rewards for each Solution Provider.

The Table below describes each tier.

Tier	Stake (DLOOP)	Cap
1	10'000	- Alliance Partners and Module Providers can have up to 10 subscribers ; - Index Creator can have up to US\$100 K in AUM.
2	25'000	- Alliance Partners and Module Providers can have up to 25 subscribers ; - Index Creator can have up to US\$250 K in AUM.
3	50'000	- Alliance Partners and Module Providers can have up to 50 subscribers ; - Index Creator can have up to US\$500 K in AUM.

Solution Providers are subject to a withdrawal cooldown period lasting at least 30 days when unstaking tokens. This ensures that subscribers have ample time to transition between providers. Once DLOOP/veDLOOP holdings are unstaked, both Partner Protocols and Module Providers cease delivering services to their subscribers.

It is anticipated that Index Creators will stake their DLOOP/veDLOOP to the Index governance system, ensuring that the community collectively determines any decision to exit from d-loop.

2.3 Rewards calculation

Each Solution Provider is free to cost the services they provide. This section considers only the performance rewards granted by the DAO to DLOOP/veDLOOP token holders. Rewards are paid in governance tokens (DLOOP/veDLOOP) and stablecoins.

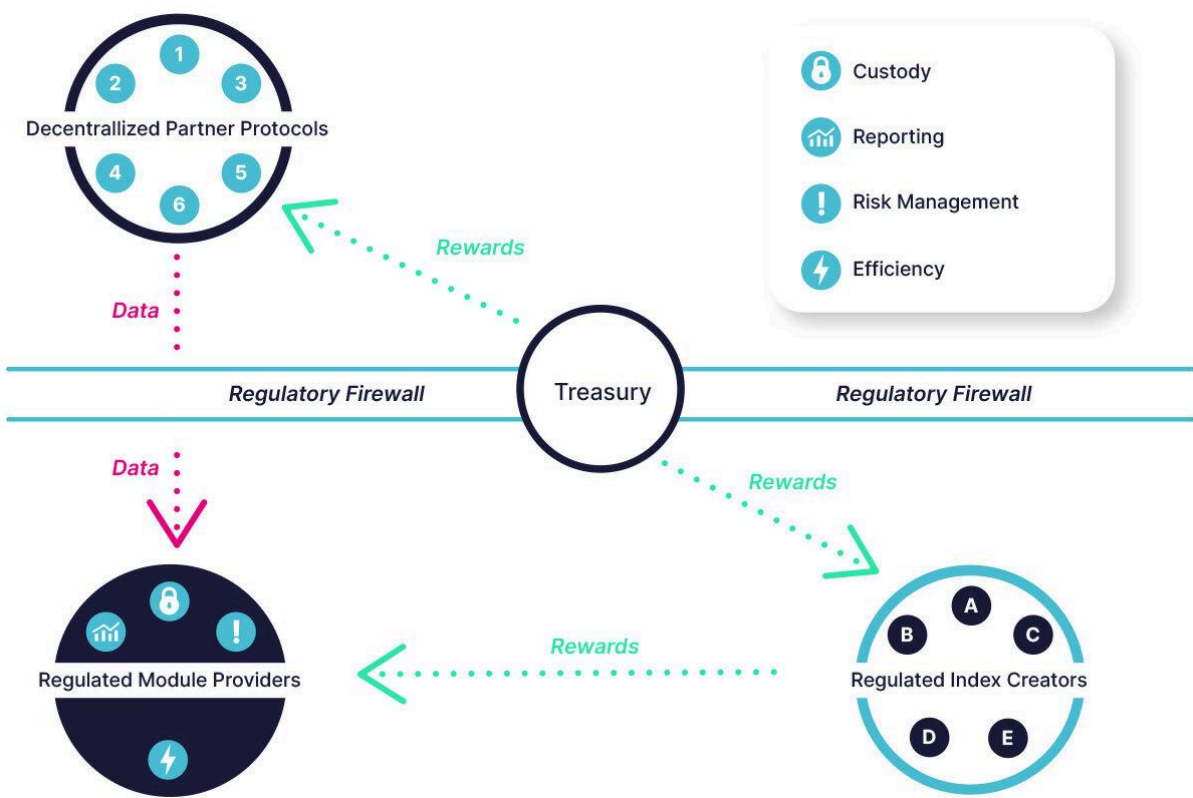


Figure 2: Distribution of governance and stablecoins rewards.

As Indexes consist of a collection of Alliance Partner Protocols (data providers) and, optionally, a group of Module Providers, the d-loop DAO can structure rewards based on Index performance, ensuring an equitable rewards system.

Whenever DLOOP is issued for rewards, the performance of each Index is evaluated in relation to the most recent issuance event. Governance tokens are then distributed among the Indexes, employing a weighted average approach. This ensures that the most successful Indices receive a higher share of tokens, while less successful ones receive a reduced or no allocation of tokens.

The Table below exemplifies how an Index would split a reward of 100 DLOOP. The “Stake” column specifies how many DLOOP tokens each solution provider has staked. Given that

there are a total of 95,000 DLOOP staked into this Index, each Solution Provider is rewarded with its weight on this total amount.

Solution Provider	Stake (DLOOP)	%	Rewards (DLOOP)
Index Creator	50'000	50/95	52.63
Alliance Partners	10'000	10/95	10.52
Alliance Partners	25'000	25/95	26.31
Module Provider	10'000	10/95	10.52
TOTAL	95'000	100	100

Table 1: Example split of 100 DLOOP into 4 providers.

In addition to governance rewards, Solution Providers are also compensated with stablecoins. Both decentralized and regulated Index Creators contribute these fees to the d-loop Treasury, contingent on the performance of their respective Indexes. These fees are then distributed as dividends to DLOOP/veDLOOP token holders, proportional to the size of their stake relative to the overall network stake.

To summarize, this rewards model aligns the ownership of the network and the financial rewards with those who contribute more value (through Index performance) and exhibit greater commitment (by staking a larger amount)

3. Token Distribution

The d-loop protocol will mint 200M tokens.

The following allocation will ensure the smooth operation of the protocol:

- 60M will be allocated to the d-loop treasury
- 40.5M will be issued as rewards for vested escrow and governance rewards

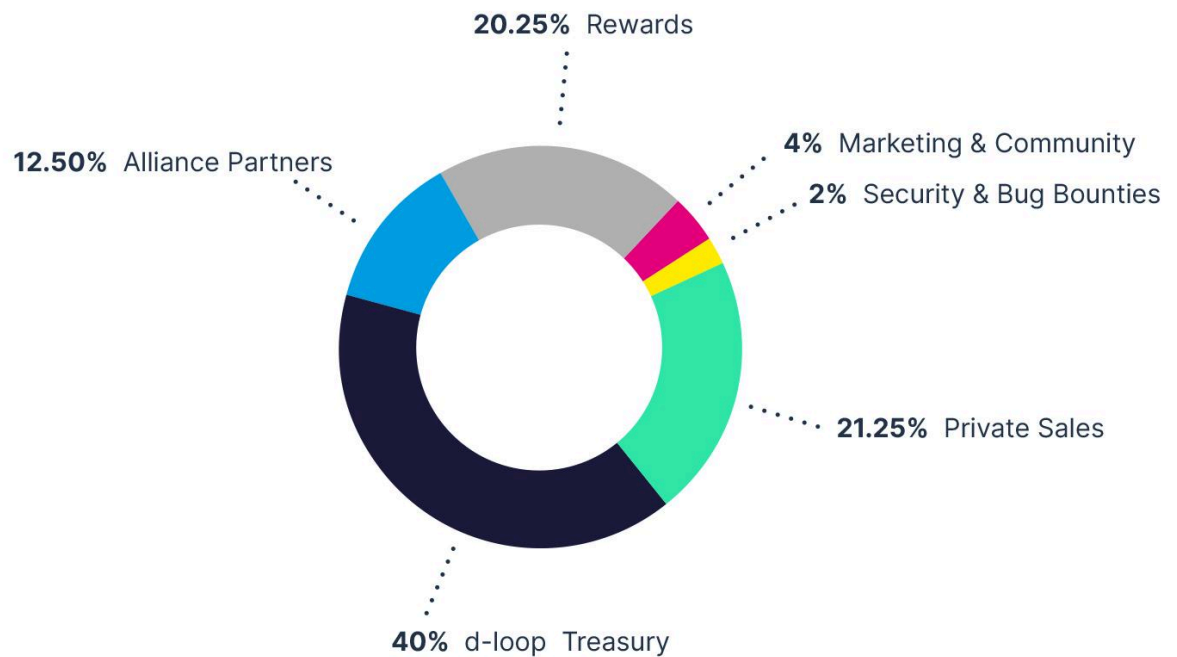


Figure 4.

3.1 d-loop Supply Control

Supply control is achieved by an algorithmically defined tracking and virtual issuance schedule.

As the issuance of DLOOP depends on the performance of the community, DLOOP supply is variable. During times of good community performance, the supply is increased; otherwise, the supply is decreased through a burning mechanism. However, the maximum supply at any point in time is determined by a piecewise linear function.

This limits the maximum supply to 200M DLOOP for the first 1,406 days from the launch of the protocol. After this period, no new DLOOP tokens will be issued unless the community decides so by passing a governance proposal.

The rewards released and penalties imposed are parameterized such that d-loop becomes more attractive compared to the market.

The figure below is for visualization purposes only as different users will have different boost values depending on when they lock up DLOOP.

While D-LOOP tokens are available to regulated entities only, we envisage DLOOP tokens being made available to, and traded by, institutions via 3rd party providers such as crypto custodial services.

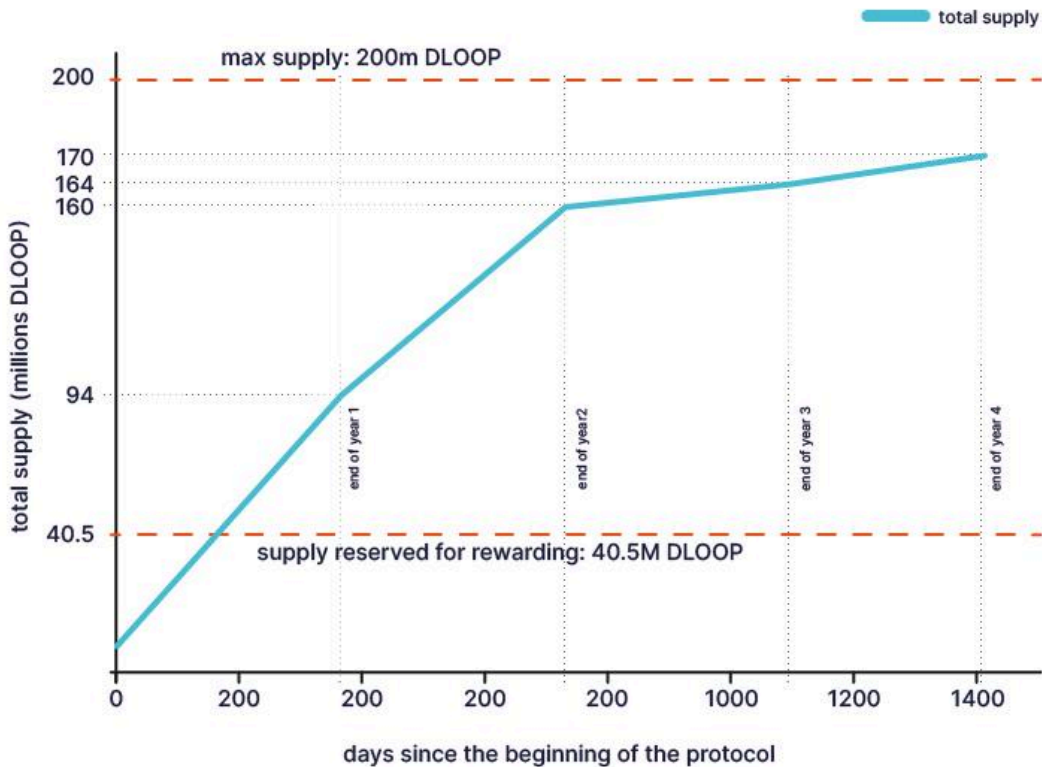


Figure 5. Expected supply controls curve. After day 1,406 the issuance schedule will be decided by governance voting.

This ensures that the total DLOOP token supply, capped at 200M for the first 1,406 days, is always maintained and helps create a healthy token economy for the protocol. The total supply is split into three: [85]M issued to the market, [10]M reserved for locked veDLOOP vested escrow rewards, and [5M] reserved for decentralized governance rewards.

An algorithmic procedure that compares the “actual” rewards and penalties runs periodically. This algorithm relies on a theoretical minting curve:

$$M(t) = \begin{cases} 94.00M + 2.1004 \times t, & \text{if } 0 < t < 365 \\ 160.24M + 0.44505 \times (t - 365), & \text{if } 365 < t \leq 730 \\ 174.28M + 0.1348 \times (t - 730), & \text{if } 730 < t \leq 1095 \\ 178.52M + 0.0549 \times (t - 1095), & \text{if } 1095 < t \leq 1406 \end{cases}$$

where t is the number of days since the beginning of the protocol.

4. Governance

d-loop has decentralized and institutional governance modules. Both governance structures operate differently, and each has its own reward mechanisms.

4.1 Decentralized d-loop Governance

DLOOP is a governance token used to inform d-loop governance decisions. It offers governance rights whereby DLOOP token holders can issue and vote on d-loop Improvement Proposals (DIPs) to improve the protocol. DLOOP token holders receive rewards for active participation.

DLOOP holders receive the following rewards:

1. Governance participation rewards issued on a time-based curve, with greater rewards for those who vote earlier
2. Access to a pool of rewards based on Index performance, e.g., an additional 0.5% over each Index rebalance

4.2 Decentralized Governance Architecture

DLOOP holders who participate in governance get access to a rewards pool which is emitted on a schedule.

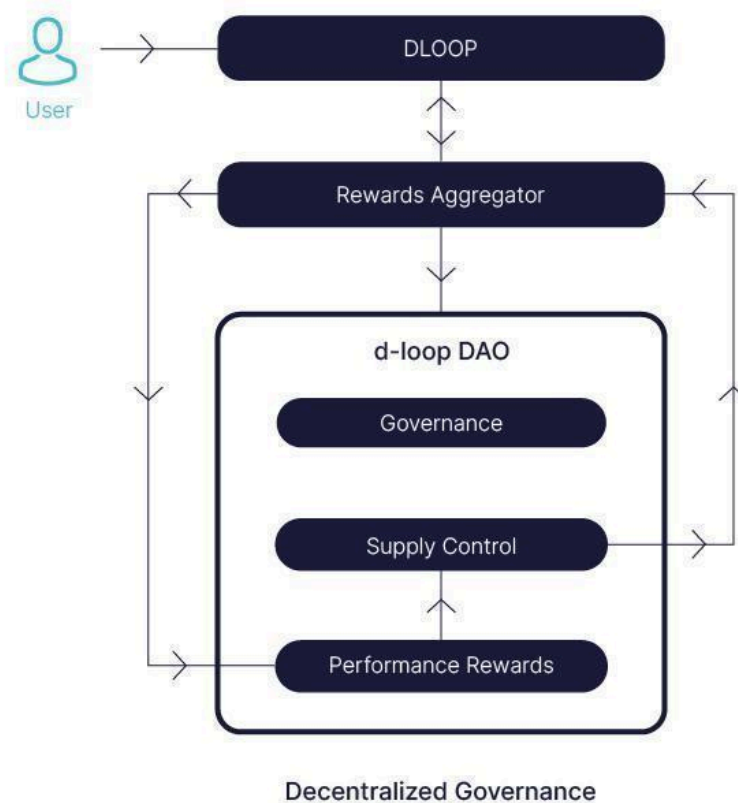


Figure 7.

4.3 Institutional d-loop Governance

Institutional entities can freely convert DLOOP to veDLOOP, with reserved 1:1 conversion available to approved institutional partners. veDLOOP token holders can lock their tokens and create voter escrow veDLOOP tokens.

Entities that opt to lock their veDLOOP tokens receive three benefits:

1. Receive rewards from a pool of 20% of the total supply, divided proportionally among those who locked tokens. The reward program lasts for a period of 4 years until the reward funds are exhausted, and offers up to 20% boosted rewards on the performance depending on the lock period.
2. Governance rights, whereby veDLOOP token holders can issue and vote on DIPs and other proposals to improve the protocol

Rewards and voting power are higher for longer locks, and they decay over the term of the lock, thereby incentivizing users to extend their lock-up periods. Users can unlock their veDLOOP to reset and increase their boosted rewards and voting rights, thereby offsetting the decay. Users thus express long-term confidence and support of the protocol and are rewarded for doing so.

4.4 Institutional Governance Architecture

Institutional governance works as follows:

1. When a d-loop token holder locks up their DLOOP, the protocol issues veDLOOP tokens that they can use to govern the d-loop DAO. They can set the lock-up period for any period, with a minimum of one week and a current maximum of 1,406 days. (For more information about the issuance schedule, please refer to the *Supply Control* section.)
2. The longer a holder's lock-up period, the more significant the boost to their reward issuance while still adhering to the supply limit curve.
3. The holder's veDLOOP tokens are non-transferable ERC-20 tokens and represent voting rights. Voting rights and boosted rewards decay throughout the lock period. Users must therefore continue to extend their lock-ups to maintain higher levels of boosted rewards and increased voting power.

4.5 Institutional Governance Rewards

For holders that lock up their veDLOOP in return for vested escrow, the boosted rewards are a percentage of the increase to the rewards they have earned. These additional rewards are received when rewards are claimed.

The rate of the boost decays in line with the decay associated with voting rights over the term of the lock-up. As more veDLOOP tokens are locked, the issuance rate of DLOOP rewards decreases.

Additionally, the protocol extends veDLOOP token holders rewards similar to staking. That is, as new DLOOP is minted, veDLOOP token holders receive a share from a pool of tokens equal to 10% of the maximum supply as a reward. This way, veDLOOP token holders' DLOOP holdings are less diluted compared to others' if the supply is inflationary, and amount to a bigger share if the supply is deflationary.

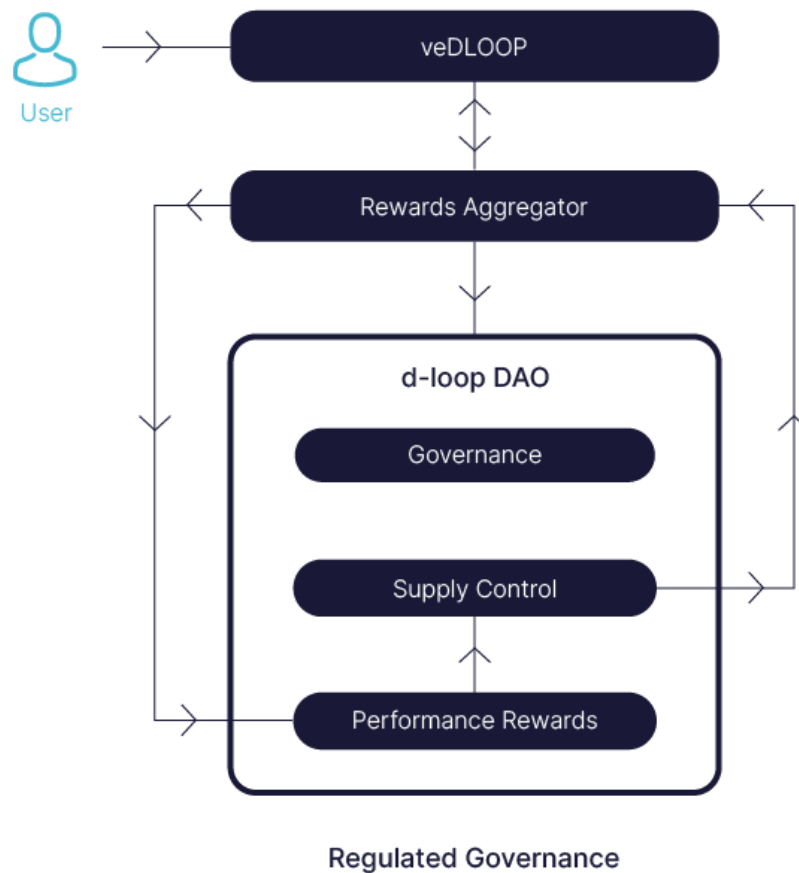


Figure 8.

5. Institutional DLOOP Voting Rights and Issuance

veDLOOP tokens grant holders additional voting power using the vested-escrow model. d-loop DAO assigns voting power in relation to the time that the user commits to the platform after voting for a proposal, rather than based on the amount of tokens locked. This ensures the voters' commitment to the proposals they vote on.

Voting power is designed as a combination of the amount of veDLOOP tokens locked and the remaining time of the lock-up for those tokens. This represents and directly models the level of commitment that users with voting rights have when it comes to governing the protocol. This idea stems from the Aragon Minime Token, later modified by the Curve team for their protocol:

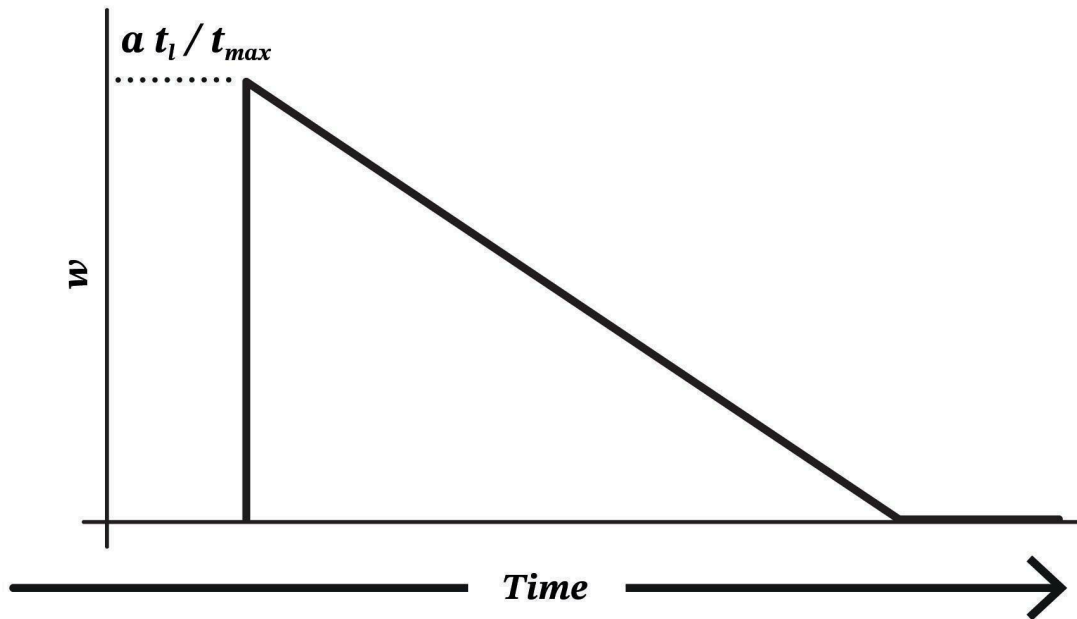


Figure 9. The curve shows the voting power (w) decreasing linearly with time such that the less time left in a holder's lock-up, the less voting power they have. Users have the option to extend lock-up periods at any time to retain greater voting power.

6. DLOOP Token Fees

DLOOP tokens holders earn USDC fees for governance decisions that positively impact portfolio performance.

- The pool of rewards is based on Index performance, e.g., an additional 0.5% over each Index rebalance;
- As DLOOP grants other rights, it cannot be burned when exchanged for a share of the pool. In this case, the rewards pool shares fees with DLOOP holders in USDC.

A basic equation for the evolution of an Index value is as follows:

$$I_t = I_{t-1} \times (1 \pm R_t) \times (1 - TC_t) \times (1 - Perf) - \text{Data Fee}$$

Where I_t stands for the value of the Index, R_t for portfolio return, TC_t for transaction costs, "Data Fee" is a fee paid by indexes to Alliance Partners for aggregated data. "Perf" stands for the fee added to the DLOOP pool. It can be either a fixed value or applied only to affected profits.

$$\text{Perf} = \begin{cases} \text{Perf} & , \text{ if } R_t \geq 0 \\ 0 & , \text{ if } R_t < 0 \end{cases}$$

Whenever an Index rebalances and takes profit, a share of it is accumulated in the pool. The pool state changes as

$$\text{Pool}_t = \text{Pool}_{t-1} + \sum_{\text{indexes}} I_{t-1} \times \text{Perf}$$

7. Data Simulations and Alliance Partner Data Aggregation

Below is a live data simulation using the Pollen protocol as a data provider. The protocol aggregates data from the following sources:

1. The list of assets that the user includes in their virtual portfolio
2. The amount of PLN tokens staked in each virtual portfolio
3. The portion of tokens assigned to each asset in the portfolio

The protocol generates additional data from virtual portfolio performance and the timing of user actions. As a consequence, virtual portfolios offer a unique crowdsourced dataset that reflects varying community investment theses based on varying risk profiles.

By performing historical price analyses, these risk profiles inform well-established risk and return models grounded in Modern Portfolio Theory (MPT). Pollen's data aggregation algorithms provide probabilistically optimised returns compared to automated bots and similar techniques (based on technical analysis), or with traditional optimization (based on standalone random generation of multiple portfolios).

Reputation plays a fundamental role in measuring and informing the data aggregation process used within the protocol's asset allocation and portfolio rebalancing mechanisms.

Let $\{w_1(t_k), w_2(t_k), \dots, w_N(t_k)\}$ define a user's allocation at time t_k . The simplest data aggregation method is the weighted average of the users' allocation scaled by reputation:

$$x_i(t_k) = \frac{1}{\sum_W \text{Rep}_W(t_k)} \sum_U \text{Rep}_U(t_k) w_i(t_k)$$

The reputation metric captures the actual amount a user was able to produce solely based on their decisions. That is, the higher the reputation, the better the user manages their virtual portfolio. Therefore, we should expect that an allocation of assets that sets more weight to users with a higher reputation should capture more rewards.

The figure below exemplifies the above-mentioned aggregation method using data from the Pollen Virtual pre-release on testnet. In this *post-factum* analysis, while an initial amount of USDT 100,000 would decrease to nearly USDT 50,000 if invested into BTC/AVAX or CCI30, an actively managed d-loop Index driven by Pollen Virtual data would be valued at USDT 80,000, net of transaction costs.

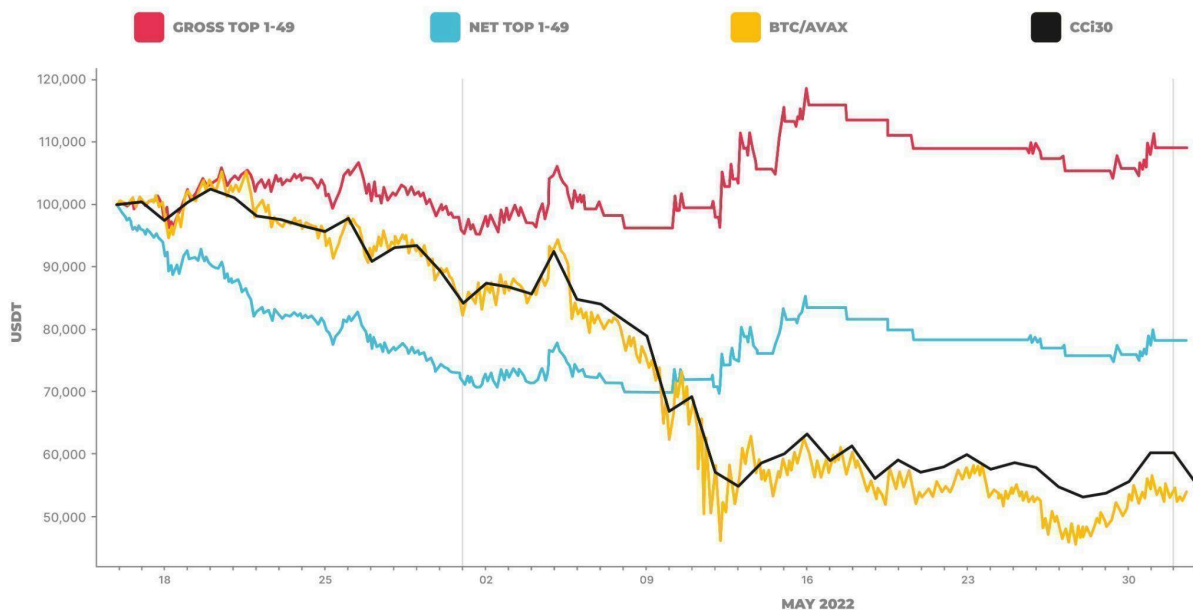


Figure 12. Gross and net performances of a fictional Pollen index aggregated from the top 1-49 Pollenators during the period October 15-November 30, 2022. In this specific setting, the index is rebalanced whenever the aggregated allocation differs by 2% from the current allocation or the value of the index decreases by 2% (trailing stop-loss). This approach considerably outperformed the CCI30 and Pollen's BTC/AVAX market benchmarks.

7.1 Market Benchmarks

We have referred previously to comparisons of a virtual portfolio with a market benchmark – an index composed of a subset of the available assets representing market aspects. For example, a market benchmark constructed by market capitalization selects the top 30 or top 50 assets, and defines their weights based on their participation in the total market capitalization of selected assets (e.g., S&P 500, DJIA, CCI30, etc.)

The CCI30 Index is used as a reference for the global cryptocurrency market benchmark. The objective is to form Pollen's benchmark as a weighted average of these five tokens (or

any subset of them) such that the correlation with the broader market is maximized and transaction costs are minimized.

The figure below compares Pollen's benchmark with the CCI30 benchmark, demonstrating that Pollen's benchmark accurately captures the market's overall movement.

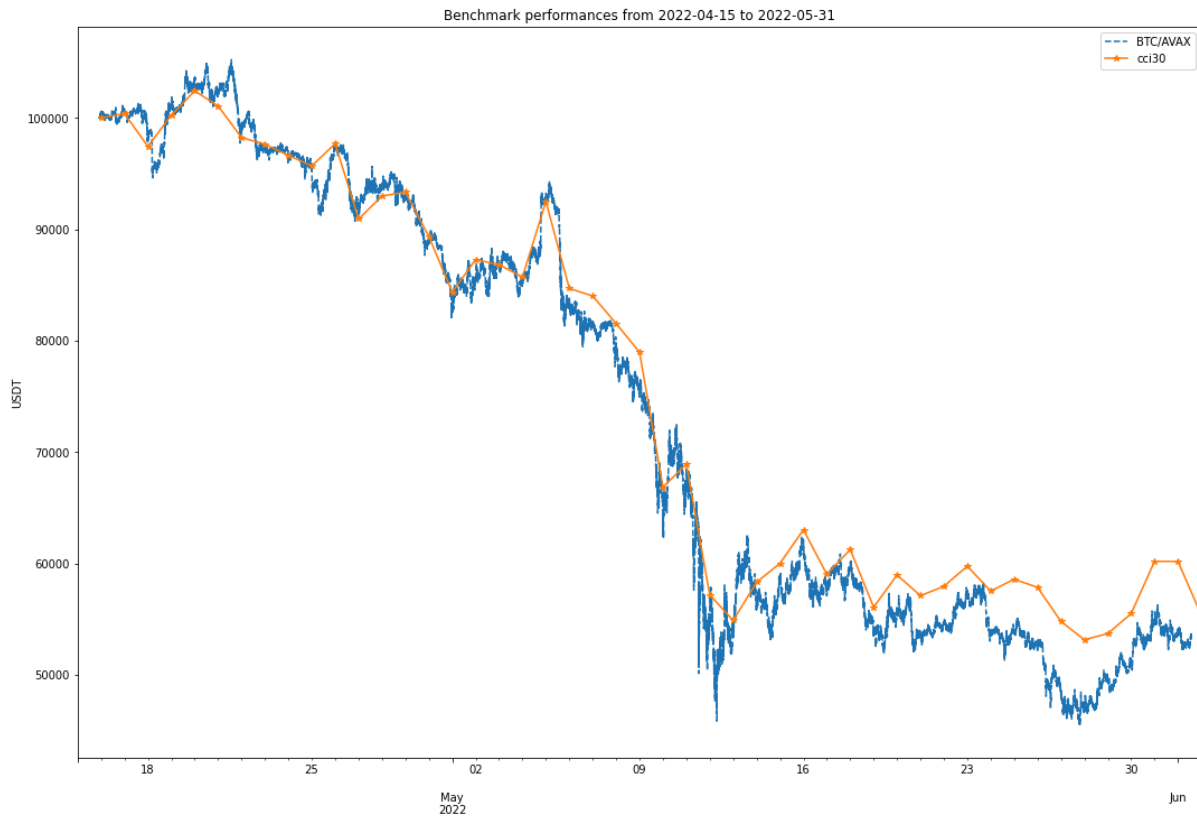


Figure 13. The benchmark rebalances each month to account for the changes in capitalization.

8. d-loop Premium Institutional Module Store

d-loop supports institutional entities by anchoring to a legal entity and firewalling via the Institutional veDLOOP token.

While d-loop is designed to work with traditional finances existing regulatory compliance processes and procedures, the d-loop platform is to host a premium module store that allows indexes to bolt on additional functionality, such as KYC, professional investor validation, anti-money laundering mechanisms, risk management tools, advanced stop-losses, and regulatory reporting.

These premium modules will be offered by third parties on top of the open-source d-loop platform. d-loop will receive 20% of revenues from subscriptions to premium modules. These

funds will be governed through the veDLOOP token and used to continue operating and developing the d-loop ecosystem.

Through the premium module store, premium module suppliers will generate software and subscription revenues from participants in d-loop Indexes.

9. d-loop's Compliance Commitment:

d-loop understands the paramount importance of compliance in fostering trust within the ecosystem. The platform is designed to seamlessly integrate with existing regulatory compliance processes and procedures, allowing institutions to engage with digital assets while adhering to evolving regulations.

The introduction of regulated modules on d-loop enables institutions to participate in DeFi while complying with regulatory standards. Premium Institutional modules provide a bridge between the decentralized world and traditional finance, offering institutions a secure gateway to the digital asset ecosystem.

Conclusion

Our mission is to revolutionize asset management in markets that operate 24/7, minimizing expense and risk while bridging the gap between institutional markets and decentralized finance.

We have introduced three innovations: a conduit for institutional entities to deploy digital asset and crypto indexes and mechanisms to interface with decentralized finance, a shorting mechanism for asset pools, and a proven model that outperforms the market regardless of the prevailing conditions.

The d-loop protocol is designed to leverage the data generated from multiple Alliance Partners, offering the \$10+ trillion investment fund market with a fully decentralized, regulated solution aimed towards regulated markets. Our platform provides a unique opportunity for existing decentralized protocols to find new use cases and enable institutional and traditional finance entities to tap into an increasingly decentralized fintech ecosystem.

Our focus on institutional offerings is central to our vision, allowing d-loop to expand rapidly to new audiences and use cases that align with the needs of our clients.

Institutional entities can securely and reliably manage their assets, with the option of accessing and leveraging the DeFi ecosystem for access to new markets and breakthrough investment opportunities. Furthermore, our Alliance Partners program leverages the power of decentralization to address the market's ever-changing demands and deliver innovative solutions that benefit everyone involved.