DAOSYS: Smart DAO Protocol for Decentralized Finance

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ABSTRACT Despite popular perception, treasuries of Dentralized Autonomous Organizations (DAOs) tend to be centrally controlled and do not reflect the true ethos of cryptocurrency (i.e., *not your keys, not your coins*). DAOSYS solves this problem with its new Autonomous Service Engine (ASE) technology by deploying a reference platform for self-sovereign capital coordination. Through the ASE, the DAOSYS token will serve as a protocol layer creating a fully backed non-speculative asset allowing for quick seamless deployment of child DAOs in a secure manner. This is made possible by innovating on the multi-faceted proxy standard defined in EIP-2535. The ASE will serve as the cornerstone of all SYS Labs decentralized finance (DeFi) products, as supported by the Syscoin Platform.

INDEX TERMS DAOSYS, Smart DAO, Decentralized Finance, Hyper-diamond proxy, EIP-2535

I. INTRODUCTION

The objective of a decentralized autonomous organization (DAO) is to solve the principal-agent dilemma. This dilemma is a result of misaligned incentives where agents acting in a system are incentivized towards their own benefit over the benefit of a principle or other agents acting within the system [7]. Typically, these are found in centralized systems where the central acting authority is the main compromised agent. The DAO solves this by decentralizing the governance process by utilizing smart contracts running on open source blockchains.

The first inception of the DAO concept happened in May 2016 out of the Ethereum community, which was known as Genesis DAO, and was built as a smart contract on the Ethereum blockchain. However, this resulted in the well known DAO Hack which resulted in the draining of $60M USD worth of funds from its treasury [2]. Today, there are many DAOs in operation with Uniswap, Aave and Maker DAO being amongst the most popular. However, these DAOs still fundamentally violate the core value proposition of self sovereignty that crypto currency promises, where DAOs currently take ownership of capital managed in a treasury controlled by a few individuals. This is the problem that DAOSYS intends to address.

DAOSYS vision is to operate like a pure automated market maker (AMM) and be implemented in a manner that does not require external controls. In 2018, Uniswap became the first decentralized platform to successfully utilize an AMM [4]. However, like Uniswap and many AMMs, control of the capital in their respective liquidity pools is still cen-

tralized. DAOSYS intends to address this core issue via its new Autonomous Service Engine (ASE) technology [3], hence allowing DAOs to be more autonomous and fully decentralized. The DAOSYS token is a smart DAO protocol that fully backed by an index of assets supported by its child DAOs. This technology is it will allow users to test, implement and realize countless decentralized finance (DeFi) usecase designs deployed in a secure manner through the ASE without having to continually redeploy new builds.
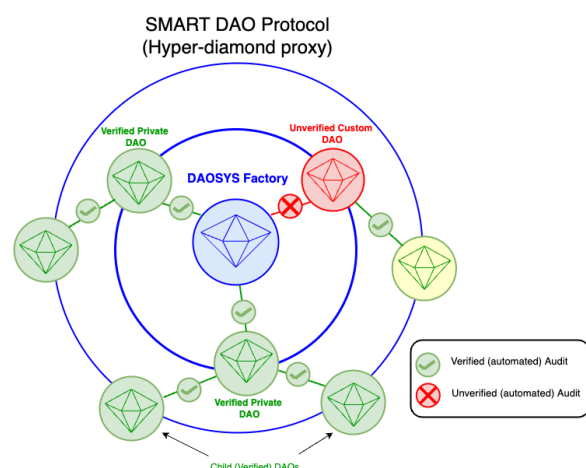

FIGURE 1: DAOSYS as the smart DAO protocol, utilizing the hyper-diamond proxy; see EIP-2353 in Appendix A

Here are the following features that DAOSYS will have:

- SMART DAO protocol
- Self-sovereign via trustless automatic integration
- Seamless fast deployment
- Hyper-diamond standard
- Collateralized VE (vesting) indexing token
- Automated audits of child DAOs
- Fully backed (eg, DAI, SYS)
- Non-spectualtive asset
- Potential emergent behavior (eg, index tokens)

II. GOVERNANCE

DOAs are governance structures for groups of people to come together and make decisions, which is one of its main distinguishing features. Unlike traditional organizations (e.g., private companies, non-governmental organizations, charities, etc.) which have a centralized structure, these decisions are coordinated and enforced on a blockchain in a decentralized manner. Since DAOSYS proposes to be autonomous and fully decentralized, it has no top level governance.

AMMs are an essential part of the DeFi ecosystem. They allow digital assets to be traded in a permissionless and automatic way by using liquidity pools rather than a traditional market of buyers and sellers. Applying the AMM model to DAOs means that users create their own treasuries for specific ventures. These treasuries may apply a variety of governance solutions along with their treasuries. This allows for a compartmentalization of the politics that arise with any governance solution from the actual treasury management.

Under this model, the Syscoin Foundation behaves more like the software vendor. The factory makes open-source reference implementations of DeFi components available to compose into treasuries. Updates to these smart-contracts are available for deploying new pools that may be added to a DAO. Hence, this removes the need for top-level governance solutions that decides whether to include an update because users are free to create new pools.

A user creates a DAO by selecting which vaults and bond markets they would like to include. These vaults may come from one of four sources.

A. REUSE AN EXISTING VAULT

This works best for when users wish to maintain their position in one DAO, but want to add more pools to form a new DAO.

B. RECREATE AN EXISTING VAULT

As the adage goes, *if it's not broke, don't fix it*. The investment strategy implemented in a vault can be used across several instances of vault pools. This works well for new DAOs that wish to replicate the financial strategies of an existing DAO. Also, for when a new DAO would like to invest in other DAOs using the same strategy.

C. NEW POOL WITH NEW INVESTMENT STRATEGY

A user may wish to create a new DAO reusing functionality available from the factory, but configured in a novel manner. The flexibility available in the ASE means that even a simple strategy has several configuration options. This is useful for when a DAO wishes to adopt a novel investment strategy that might not have been previously viable.

D. NEW POOL WITH CUSTOM CODE

The Syscoin Foundation makes internal decisions regarding what smart-contracts are available through the factory similar to open source software development. Because this only concerns the software available from the foundation, this does not need to be open to public governance. When the community at large wishes to release custom code outside the foundation, a user may use the factory to deploy their own factory offering their custom code. This new factory inherits the offerings of the parent factory and may add their own modules.

These pools form the foundation of the DAO. Autonomous and permissionless liquidity pools that act as the agreed upon foundation for DAO treasury management. From there users may launch further liquidity pools that may accept the DAOs Treasury Token for deposit. These form the Roundtables for managing ventures within the DAO. The Roundtables compartmentalize management teams, Councilors, of the various ventures being executed under a DAO's mission statement. A Roundtable typically does not have it's own governance token, instead using a Council Token used to resolve disputes by executing buyout options.

From the Roundtables, any Councilor may use their contribution to the Roundtable to launch a bond offering for a Quest. Quests define the bounty award and terms for completing a task. The Councilor that issues the quest puts their share of the treasury in escrow to fund the Quest. The interest being earned from that underlying position is then split to fund the bounty, compound into that position, and to sell on the bond market. This ensures that Questors know the payment for work they deliver is secured. And protects the Councilor from failure to deliver; see Fig. 2 for outline.

III. ARCHITECTURE

The innovative software architecture that allows DAOSYS to pioneer a revolution in DAOs is the ASE. This introduces a revolution allowing DAOs to become more autonomous and fully decentralized. The ASE iterates on the Diamond proxy standard from EIP-2535 (see Appendix A) to apply AMM functionality for more flexible capabilities.

A. ICREATE2METADATA

The `CREATE2` opcode is a low level human readable instruction used within the stack-based architecture of the Ethereum Virtual Machine (EVM) that was introduced in 2019 with EIP-1014 [6]. This is the technology that enables AMMs in EVM implementations which allows a smart-contract to deploy another smart contract, and is typically called the
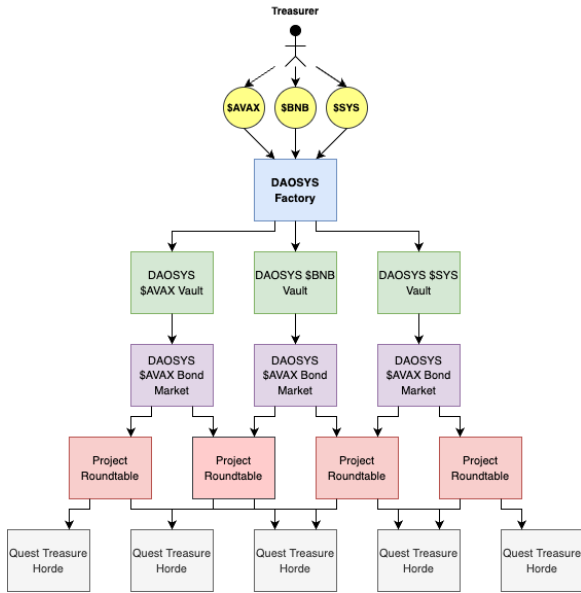
FIGURE 2: DAOSYS Governance Structure: new pool with custom code (ie, Quests)

Factory design pattern. Protocols like Balancer and Uniswap provide the ability to create permissionless liquidity pools. However, the limit of these implementations is the immutable nature of smart-contract bytecode as they can only deploy a single type of contract.

All contracts deployed through the ASE, new service proxies and delegate service, store the metadata for their deployment. This includes the factory address they were deployed from, and the value used to salt their deployment. Combined with the contract's `codehash` this can be used to recalculate the contract's address from the assertion of it's `ICreate2Metadata` interface hook.

B. IDELEGATESERVICE

Protocols like Aavegotchi have pioneered smart-contract architecture by iterating on the proxy capabilities of the EVM to advance the Factory design pattern. Smart-contract proxies take advantage of the `DELEGATECALL` opcode to allow a smart-contract to reuse the logic implemented in other smart-contracts. The Autonomous Service Engine advances this innovation with an infinitely flexible Diamond Factory design. The Diamond Factory design factory combines the Factory and Diamond design patterns to deploy configurable proxies. This allows for infinitely composable proxies.

Delegate Services replace the Facets defined in ERC-2535. Delegate Services define a strict storage allocation and access standard beyond the theory presented in ERC-2535. A Service is a smart-contract or library implemented following the Deterministically Dynamic Storage Allocation standard. A Service also reports the factory that deployed that contract and the salt used during deployment. This way the recalculation of the address from the factory init code hash and salt can be used to verify new Services as an implicit

ACL.

This means that the deployment process for new Services deviates from industry standard. New Services are deployed as compiled bytecode passed to the Service Proxy Factory as the argument for the deployment function. The Service Proxy Factory then instantiates that bytecode as a new contract. ASE compliant Services must include the ASEServiceBootstrapper library to retrieve the address salt to initialize the Service. This should be done by delegating to the canonical external library deployment. ASE compliant external libraries may precalculate their address salt and store it as a constant. The standard Service initialization functions must still be implemented, but may hard code the values and return values since they can not store state.

All Services are required to implement ERC-165 including the Service extension that enumerates the functions. The Service extension to ERC-165 includes a per interface enumeration of the function selectors that define the interface ID. Additionally, there is an enumeration of all the function selectors across all interface IDs, and a ServiceDef struct that includes the information for initializing a Service Proxy to consume the Service.
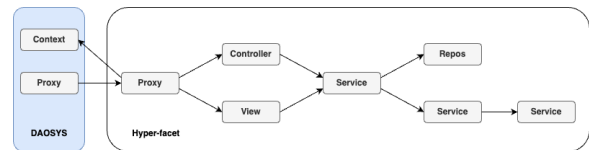

FIGURE 3: Hyper-facet

IV. TOKENOMICS

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A. PYTHON SIMULATOR

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V. ROADMAP

A. SYSLABS

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B. L2: NEVM

In Dec 2021, Syscoin released the first stage of its Network Enhanced Virtual Machine (NEVM) which utilizes the Ethereum Virtual Machine (EVM). In the coming months (from the time of this publication), this will include a Zero Knowledge Proof (ZKP) system to build layer 2 (L2) scalable applications, and one of the first of these applications will be DAOSYS.

C. USECASES

1) Masternode Yield Farming

Yield farming is a technique that uses DeFi to maximize returns where investors submit liquidity to a decentralized application (ie, dApp) to earn yield on their principle using various methods. These methods are classified into four main types which include: staking, lending, borrowing, and utilizing liquidity providers, which is largely done on a decentralized exchange (DEX).

Syscoin plans to incentivize Masternode operators where they can put yields to work by investing them into a DeFi liquidity provider which will be automated in a trustless manner through DAOSYS. Hence, extending the Syscoin ecosystem, and increasing daily volumes. This system of trustlessly investing Masternode yields into a DeFi liquidity provider is what we call *Masternode Yield Farming*, which will serve as the first intended usecase for DAOSYS and will be the first of its kind in the crypto space.

Currently, there are approximately 2,500 Masternodes running on the Syscoin network. In [8], we ran a case study with a 5-year projection analysis on an additional 400 Masternodes, while at the same time factoring in network growth. We applied all these components into our model to estimate daily supply growth of the network, along with its respective confidence intervals; see Appendix B for details. With this tokenomics model, we estimated the expected share a typical node contributes to the network on a daily basis. Finally, with expected share, we estimated the 5-year output of 400 new Masternodes; see Table 1 for details.
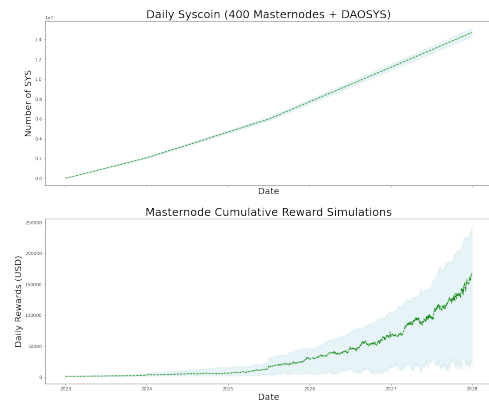

FIGURE 4: SYS (MN+ DAOSYS) = 14,732,279 / 40,000,000 = 36.8% return

The Syscoin Foundation will allocate $20M SYS into SYS Labs. At approx. $27M USD peak valuation, SYS Labs will execute the master node yield strategy using the rewards (see Table 6). This will enable liquidity events which investors of SYS Labs can execute on through token warrants in exchange for equity. Masternode ROI will be used to deposit into DAOSYS which will be used to fund ecosystem initiatives as well as pay out token warrants to SYS Labs

Date	USD	USD (lwr)	USD (upr)	nodes
Dec 2023	$78,091	$51,283	$165,790	400 / 3,044
Dec 2024	$250,676	$75,868	$464,996	400 / 3,123
Dec 2025	$931,645	$214,990	$1,540,776	400 / 3,198
Dec 2026	$2,408,252	$534,067	$3,324,955	400 / 3,270
Dec 2027	$5,246,669	$733,818	$7,265,095	400 / 3,338

TABLE 1: Projected monthly rewards from 400 investment nodes in USD using projected total (ie, Masternode + DAO SYS) rewards and Monte Carlo price simulations; see Appendix B

investors looking to exit. Analysis on Masternode ROI based on price modelling through to year 2028; see here. Analysis on DAOSYS ROI based on price modelling through to year 2025 (not including value created through lending to builders to build ecosystem objectives); see [9].

The same yield strategy (executed through DAOSYS) will also be executed to any of our own tokens we create through DeFi cloning protocols or tokens we create through our innovations (e.g., rollup gas tokens, wallet token, Luxy, ZKCross, etc.) where applicable. Token warrants would be issued and executed on via DAOSYS using an exit mechanism similar to the Masternode Yield Strategy. Also, the act of using DAOSYS to create an exit vehicle helps the remaining investors in the strategy by creating liquidity events that promote the growth of the DAO itself as well as the ecosystem. This is a form of vesting that matures over time. Thus giving unlimited upside potential at the expense of time value while maximizing positive effect of liquidity events instead of being parasitic to the rest of the investors.

2) Index Tokens (Crypto ETFs)

While the concept of indexing in the equity market is well established, it is surprising to see that this principle has yet to be largely applied to the crypto market using smart contracts. Hence, since DAOSYS itself is a non-speculated asset backed index of cryptos, for the first time we introduce a new class of cryptos called index tokens or crypto ETFs. The intelligence of the DAOSYS protocol will allow for the seamless, secure deployment of these index tokens using one of its readily available templates addressing this important usecase.

To put into perspective, under John Boogle's direction, Vanguard is credited with the creation of the first index fund which was made available to the individual investor [10]. This index fund was created in 1957, and was passively tied to the performance of the S& P 500. Boogle is known as the founder of The Vanguard Group, which as of today (ie, Sept 2022), manages $7 trillion in assets. When investing long-term, Boogle argues the most efficient way to invest, is to simply buy the market itself, and that over time when looking at funds as a whole, they as a collective always revert to the mean. He also argues that over time, actively managed funds underperform the market, no matter what the current performance is.

Given the high volatility in the crypto market, and the fact that projects are continually entering and exiting the top 100 or even top 10 projects at a much higher frequency, we propose to simplify this problem and limit our attention to the top two crypos being BTC and ETH, with the introduction of what we term Bithereum. In Fig. 5 we see the advantage of developing an index token using this simple and effective strategy as we compare Bitcoin performance against the performance of various weighting strategies with Ethereum. Also, from a point of reasoning, it makes good sense to create an index token with BTC and ETH for the following reasons:

- ETH and BTC have been the top two projects by market cap for the past 5 years
- ETH is a good proxy for the altcoin market which perform better in bull markets, while BTC is a good proxy for crypto gold which perform better in bear markets
- By referencing Fig. 2, we can see the combined market cap share of the crypto space of both of these two projects has fluctuated between 60-90%
- Market cap share between ETH and BTC is negatively correlated against each other (p-val ~ 0)
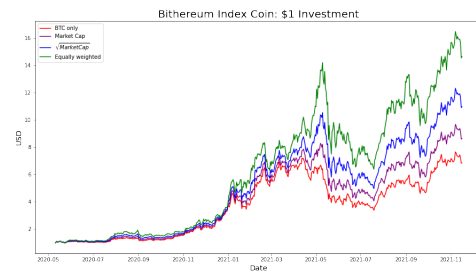- ETH encapsulates large portions of other sectors (DeFi, NFT, etc) of the crypto space

FIGURE 5: Comparison of various Bithereum index coin market weighting strategies beginning at the 2020 BTC halvening with $1 initial investment. We see that compared to just BTC alone, that a 50/50 weighting of BTC and ETH would outperform BTC by ~ 16 times.

It is surprising that with all the developments that have happened in crypto, and given the success that ETFs have had in traditional finance we have not yet seen adoption of this idea into crypto yet. However, DAOSYS with its smart DOA features will allow for the secure and seamless deployment of these new class of cryptos.

D. LAUNCH EXPECTATIONS

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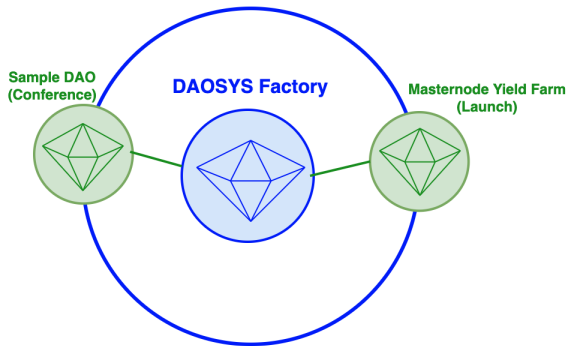395 dignissim rutrum.

FIGURE 6: DAOSYS launch expectation

VI. SUMMARY

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APPENDIX A EIP-2535 (DIAMOND FACETS)

414 EIP-2535 was an Ethereum proposal launched in 2020 to
415 allow for the creation of modular contract systems that can
416 be extended after deployment [5]. To solve this problem, this
417 new proposal introduced a concept known as Diamonds. A
418 Diamond refers to a smart contract system where function-
419 ality and storage is split up into separate contracts, and is an
420 extension of a proxy contract.

421 A proxy contract is the the immutable part a user inter-
422 acts with which holds data. It contains a fallback function
423 which will catch any function call and use `delegatecall`
424 to forward it to a second logic contract. As a reminder,
425 `delegatecall` will execute a function defined in the
426 called contract (logic), but within the context of the calling
427 contract (proxy). Thus, we have our logic defined separately

428 from our data. This allows users to change the logic contract
429 without changing the immutable underlying data.

430 There are several limitations to proxy contracts which in-
431 clude: (a) implementing minor upgrades; (b) 24kb max con-
432 tract size limit; (c) can only create identical proxy instances
433 using one logic contract; and (d) cannot have a modular
434 permission system. Diamonds solve these issues by allowing
435 for multiple logic contracts which talks to the original proxy
436 contract via the `delegatecall`; for comparison between
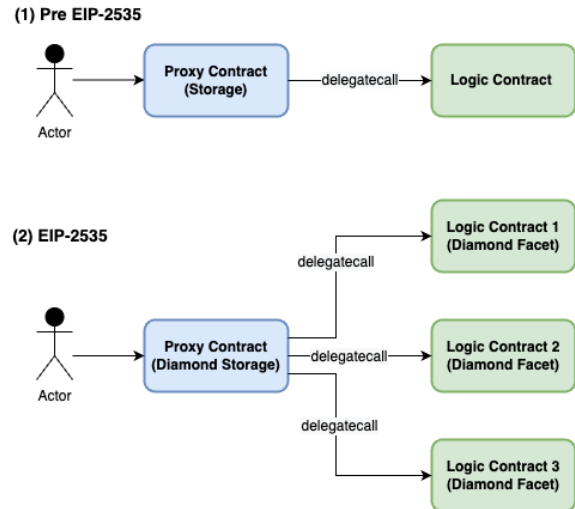437 these two systems see Fig. 7 .

FIGURE 7: Multi-facet proxy; (TOP) prior to EIP-2535, proxy contracts could only make delegates calls to another contract only; (BOTTOM) EIP-2535 introduced the capability of performing delegates calls to multiple contracts

APPENDIX B MASTERNODE TOKENOMICS MODEL

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