SingularityDAO

Lightpaper

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SingularityDAO is a layer 2 noncustodial DeFi solution which allows members to manage dynamic token-sets (called DynaSets) consisting of a bundle of utility tokens. These DynaSets are somewhat parallel to ETFs in traditional finance. Tokens that have limited liquidity on their own become easier to trade when aggregated into sets. On top of these token-sets, SingularityDAO enables yield farming and futures-based hedging features.

The core purpose of SingularityDAO is to make it more beneficial and less risky to hold collections of utility tokens that individually have only modest liquidity, opening the flow of capital to innovative projects.

SingularityDAO is designed to leverage AI at multiple levels: AI manages dynamic token-sets, executes predictive market-making strategies to provide liquidity for these token-sets on DEXs, and predictively models hedging strategies.

Background and Motivation

In early 2019, there was only $275 million of collateral locked in the DeFi (Decentralized Finance) economy. By February 2020, that number had grown to $1 billion, and it has continued to grow impressively throughout the year, hitting $4 billion in July and $11 billion by October.

The sophistication of DeFi has grown along with its size. First-generation cryptocurrency serves the role of currency in decentralized computing networks separate from any government-backed fiat currency. DeFi creates more sophisticated financial tools in the same environment.

Building on DEXs (Decentralized Exchanges) like UniSwap, many DeFi instruments are noncustodial in nature, meaning that they operate via smart contracts that don't require anyone to hand over custody of their cryptocurrency tokens to anyone else.

DeFi represents the next step toward the democratization of finance. The centralized financial industry has long excluded people of modest means, reserving the best instruments for those with more funds – thus further increasing the wealth gap. Many DeFi projects aim to make sophisticated investment and trading products more accessible, with lower minimum investments and platforms designed to be easy for anyone with an Internet connection to use.

There are some fundamental differences between traditional finance and DeFi, stemming from the fact that in DeFi we are dealing with utility tokens rather than securities, and a sophisticated smart contract infrastructure that can carry out complex transactions without passing custody of value instruments among different parties. But there are also numerous similarities in the logical and mathematical mechanisms.

Some financial innovations are possible in the automated digital world. One example is 'flash loans', a unique form of loan that must be taken out and paid back within a single transaction. These allow a user to borrow funds, convert or trade them across different platforms, and then pay back the amount borrowed, all in seconds.

The success of DeFi has so far been restricted to derivatives of a relatively small number of large-cap cryptocurrencies; SingularityDAO aims to solve this problem and bring DeFi to smaller utility tokens launched by early-stage startups. The beauty of the ICO boom was the way it channeled cryptocurrency resources to a myriad of early-stage decentralized projects. Many of these projects failed, a few succeeded tremendously, and in many cases the jury is still out – but this is generally the way with early-stage tech companies.

SingularityDAO brings the power and sophistication of DeFi to smaller-cap cryptocurrencies with only modest liquidity. When smaller cryptocurrencies are bundled together in the DynaSets of SingularityDAO, individuals and institutions can direct their resources to diversified baskets of smaller cryptocurrencies with greater benefit and less risk than would be obtained by buying the tokens alone. The goal is to incentivize purchasing of high-quality smaller-cap cryptocurrencies, thus increasing the inflow of resources to innovative projects.

To meet these objectives, SingularityDAO is structured in three layers, each with their own token –

1. A lower layer of token-sets known as **DynaSets**. A DynaSet is a dynamically managed collection of utility tokens, much like an ETF in traditional finance. Generally the management of a DynaSet will be done by AI robo-advisors, e.g. agents running on SingularityNET platform
2. A middle layer which allows users to farm and hedge yield tokens known as **SingYield** tokens. These SingYield tokens are based on the ETF-like DynaSet tokens, and allow holders to participate in the value obtained when smart contracts automatically loan out DynaSet tokens to borrowers wanting to perform trading (including simple arbitrages and also AI-based trading)
3. A top-layer governance token called the **SingDAO** token, which is earned by keeping SingYield tokens within the platform.

The structure and operation of SingularityDAO does not intrinsically require AI, but it is designed to leverage AI at every level. AI robo-advisors will be used to manage many of the initial token-sets; AI bots will generate returns from token-sets borrowed from yield farmers; and AI strategies will be used to dampen volatility in portfolios of token-sets and yield tokens.

DynaSets: Noncustodial Dynamic Asset Sets

The lower layer of the SingularityDAO financial architecture is a collection of managed portfolios, referred to as **DynaSets**. Each DynaSet consists of a certain set of utility tokens, and a weight for each. The assets in the DynaSet and their weights may be updated over time by the DynaSet Manager (DAM) associated with the DynaSet.

Similar to an Exchange Traded Fund (ETF), each DynaSet is represented by a token. The various DynaSet tokens may be referred to as DynaSet-x, e.g. DynaSet-1, DynaSet-2. Each token represents a share of the value of the assets in the portfolio according to the weights.

Suppose the DynaSet labeled DynaSet-1 contains the assets RJV, XND and ADA, with a weighting of 1 to RJV and XND and 2 to ADA. Then a single DynaSet-1 token would correspond, at that time, to 1/4 of an RJV token, 1/4 of an XND token, and 1/2 of an ADA token. The assets held in a particular DynaSet, and their weights, are not fixed but are updated dynamically by the Manager.

For tokens with very little liquidity, it will likely be better for DynaSets to contain fairly large numbers of tokens. For instance, an AI-oriented DynaSet could contain 23 different tokens corresponding to different decentralized AI projects. Participants buying into this DynaSet would be buying into decentralized AI as an industry, without having to carefully pick and choose between these 23 decentralized AI projects.

DynaSets will be non-custodial, similar to the TokenSets operated via Set Protocol. The core differences from TokenSets are that DynaSets can acquire or drop assets dynamically at any point, and while TokenSets can bundle only the few biggest tokens, DynaSets are specifically intended to include less liquid tokens.

DynaSet Asset Managers may be fully automated, fully human, or a mix. Given the general predisposition of the project toward AI, there will be a bias toward AI-driven DAMs, including DAMs carrying out sophisticated AI-based predictive and rebalancing strategies. The choice of which DynaSets to allow in the platform will be made using the SingularityDAO governance mechanisms, described below.

The MetaSet and Rebalancing

For participants who don't want to think about the pluses and minuses of particular DynaSets, there will also be an option to select a strategy which is a weighted combination of all the DynaSets on the platform, to be referred to as the **SingularityDAO MetaSet** (meta-DynaSet), analogous to an index fund in traditional finance, that tracks the performance of the whole market.

The formulas and algorithms governing the weighting of the components of the MetaSet will be determined by the same governance mechanisms that assess DynaSets for admission into the platform.

Rebalancing among the components of an AIindex, or the DynaSets in the MetaSet, will be done periodically as the market values of these components shift. An effective approach in this situation (given that potentially highly volatile assets are involved) is to trigger a rebalancing trade only when thresholds are crossed (in terms of the amount of deviation from the target allocation for that asset).

SingYield Tokens: Yield Farming on DynaSets

The lower layer of the SingularityDAO financial architecture is the liquidity pool composed of DynaSet-x and MetaSet tokens owned by various SingularityDAO members.

To put some or all of their DynaSet-x / MetaSet tokens into SingularityDAO liquidity pool, a member locks these tokens in their **SingularityDAO Vault**. The combination of every member's Vault is the SingularityDAO liquidity pool. This pool is used to issue loans and earn interest.

Each DynaSet-x (or MetaSet) token that a member has in their Vault earns a certain amount of SingYield tokens per day as a reward in proportion to its value. SingYield tokens are, of course, also managed in a noncustodial way.

The amount of SingYield earned varies depending on the value of the DynaSet token locked in the vault, e.g. locking a DynaSet-4 token in the vault may yield one SingYield token, while locking up a DynaSet-5 token yields two SingYield tokens, if DynaSet-5 is a more valuable basket of utility tokens. The amount of SingYield rewarded for a particular DynaSet-x (or MetaSet) token is determined based on the average value of the DynaSet-x token in (say) USD over the last (say) week.

Rewards may also be modified to create particular incentives. For instance, the default formula might result in 2 SingYield tokens per DynaSet-5 token per day, but for the first two weeks that a DynaSet-x token is offered, the yield might be doubled (so 4 SingYield tokens per DynaSet-5 tokens per day).

Or extra rewards may be given to incentivize long-term holding, e.g. an extra month worth of bonus SingYield tokens for those who have held DynaSet / MetaSet tokens for six months (where the reward would be given for keeping one's resources in the DynaSet ecosystem, regardless of whether one shifted them among various different DynaSet tokens).

When a member withdraws a DynaSet-x token from their Vault, the SingYield tokens that were generated from that token is burned.

Optimizers: Generating the Yield for SingYield Token Holders

When Optimizers borrow DynaSet-x tokens from the liquidity pool, and pay back the funds with interest, the pool grows. These will in some cases be single transaction flash loans, but longer-term loans will also be supported and may even be dominant at some points, depending on market conditions.

The SingYield token holders thus form a sort of decentralized credit union; their pooled funds earn interest, which the members can then redeem in proportion to the shares they hold.

For Optimizers borrowing and returning tokens in the same transaction, things are simple: no collateralization is required and no interest charged. (However, if they return a bit more to the DynaSet-x Pool than they borrowed, they receive SingYield rewards and also a higher reputation which will put them further forward in the priority queue of Optimizers bidding to make future transactions.)

For Optimizers following longer-term strategies, such as AI-based predictive modeling or reinforcement learning, some collateralization will be required, and they will have to pay some interest into the SingularityDAO liquidity pool. The percent collateral required and the interest charged are parameters that may be adapted by the DAO in real time based on system needs. The interest paid goes into the DynaSet-x Pool.

Optimizers borrow DynaSet tokens, and repay interest in the same. SingYield token holders do not receive this yield directly into their own pockets, but benefit by the increase in the value of their SingYield tokens. The exchange rate between SingYield tokens and DynaSet-x tokens changes over time, influenced by multiple factors including the issue of new SingYield tokens and the changing ratio of SingYield tokens to the liquidity pool of DynaSet-x tokens. For instance, if 100 DynaSet-x tokens correspond to 100 SingYield tokens on January 1, and Optimizers pay an additional 5 DynaSet-x tokens into the pool in the month of January, then by February 1, there are 105 DynaSet-x tokens and 100 SingYield tokens, so (if no new SingYield tokens were issued in the interim) each SingYield token would have grown in value from 1 to 1.05 DynaSet-x tokens.

The DynaSet-x Pool is collectively owned by SingYield holders; at any time an SingYield holder can redeem their SingYield tokens and receive an appropriate amount of DynaSet-x tokens based on the current exchange rate.

Optimizers can run on any software platform capable of communication with the SingularityDAO smart contracts. However initial prototyping will be done with AI-driven Optimizers running on the SingularityNET platform, which is specifically designed for decentralized AI operations.

Back-End Market-Making Activity

For Optimizers to function, the DynaSet-x tokens and MetaSet tokens need trading volume on DEXs. The SingularityDAO itself may at times engage in market-making to help provide this volume, by making both buy and sell orders for certain tokens on relevant DEXs.

All this market-making can be carried out via relatively simple scripts. However it can be done more effectively by AIs that predict what trading pairs on what DEXs will require market-making. SingularityNET platform will be among the useful tools for deploying such AI-based market-making agents. In this way SingularityNET, third-party market-makers and SingularityDAO form closely connected parts of the next-generation DeFi ecosystem.

DynaSet Futures

Once there are significant liquidity pools corresponding to DynaSet-x tokens, it will make sense to create tokens connoting futures contracts defined on DynaSet-x tokens. Creating liquidity for DynaSet-x futures tokens will need to be done actively on DEXs, leveraging the liquidity pools for the underlying DynaSet-x tokens, by the same third-party market making ecosystem that will be making the markets for the DynaSet-x tokens and assisting with making the markets for their constituents.

Availability of these futures will increase the range of strategies available to Optimizers — for instance it will enable Optimizers (AI-driven and otherwise) use DynaSet-x futures contracts to hedge the downside of corresponding token trades. This will considerably increase the robustness of the SingularityDAO economy against bear markets in the tokens underlying DynaSets.

SingDAO Governance Tokens

The final token type is the **SingDAO** token. This is a governance token used in SingularityDAO operations and voting. SingularityDAO is a fully decentralized organization with all aspects of its operation determined democratically by the votes of its participants.

Holders of SingDAO tokens will also receive a certain amount of SingYield tokens each month as reward for their dedication to SingularityDAO governance.

The initial creators and builders of SingularityDAO will receive a certain number of SingDAO tokens at the inception of SingularityDAO.

Beyond this, additional SingDAO tokens will be allocated to those who have held DynaSet-x or MetaSet tokens for significant periods of time. Specifically: An DynaSet-x or MetaSet token that has been in a member's Vault for N months, with mean USD value of c over this period, earns

$$f(N) = c\ N / (N+6)$$

The effect of this is that governance tokens are earned by members who have been part of the DAO for months rather than days or hours. Holding the token for 1 month yields c/7 SingDAO tokens, holding it for 6 months yields c/2 SingDAO tokens, and holding it eternally one eventually approaches SingDAO tokens.

To allow liquidity of governance tokens, but also ensure that long-term members directly have significant governance power, we can specify that only 40% of the governance tokens a given member earns can be sold, and the rest must be retained by that member. This will result in governance being 60% by founders and long-term members, and 40% by those who have purchased governance tokens (directly or indirectly) from long-term members.

Governance token holders will vote on critical aspects of the infrastructure, such as –

- Which DynaSets are accepted as options for members to choose from
- The weighting formulas and algorithms for the MetaSet
- What formula to use for prioritizing Optimizers, in the case there is more demand for borrowing than there are tokens to be borrowed
- Security audits and updates to the smart contracts comprising the SingDAO system