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This document does not constitute an offer or sale of the Tokens or any other mechanism for purchasing the Tokens (such as, without limitation, a “simple agreement for future tokens”). Any offer or sale of the Tokens or any related instrument will occur only based on a disclosure statement, risk factors, and purchase agreement for the Tokens or the applicable instrument (each, an “**Offering Document**”).

Purchasing the Tokens or any related instrument is subject to many potential risks. Some of these risks will be described in the Offering Documents. These documents, along with additional information about Messari and the Network, will be available on our website at <https://messari.io/tcr/whitepaper.pdf>. Purchasers of Tokens and related instruments could lose all or some of the value of the funds used for their purchases.

Messari Token-Curated Registry

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Abstract. Today’s token markets are inefficient and often unfair. The absence of a mandatory disclosures framework for token issuers has led to a variance in the quality and consistency of communications regarding a token’s utility, rights, or supply. The resulting information asymmetries typically favor issuers and their private backers at the expense of the general user, a dynamic that may lead to regulatory scrutiny, legal liability, and a breakdown in trust between issuers and their communities. We propose a solution that encourages issuers to file voluntary disclosures in a public data library governed by a token-curated registry. The registry is a game theoretical system that allows curators to create eligibility criteria for a transparency whitelist, admit new applicants, and expel members that break community rules. The registry itself is self-regulating as it is governed by actors whose long-term interests align with improving token economy data standards.

1. Introduction

1.1 Token Sales: Fundraising Innovations and Regulatory Challenges

The token economy has spawned several fundraising innovations since Bitcoin’s birth in 2009.

The first innovation was tied to Bitcoin itself, which pioneered the concept that a scarce digital asset could be algorithmically generated and fairly distributed to users who performed the most “work” for a decentralized network over time. The second arguably came from teams like Ripple and Dash, who “pre-mined” large portions of their network tokens in order to build “treasuries” that could be tapped for ongoing project development costs. The third was popularized more recently: the token sale, or “initial coin offering”, which allowed teams to sell tokens at or before the creation of their proposed networks in return for the funds required to properly build and deploy the network’s key features.

Token issuers frequently employ a combination of fundraising schemes. For instance, the Ethereum Foundation completed a token sale in 2014, nearly one year before it deployed its network. In addition to the capital raised in the sale, the Foundation earmarked additional ETH tokens for its own long-term treasury. Finally, at the network’s launch, Ethereum included a predictable issuance schedule that distributed new tokens to the network’s transaction validators, much like Bitcoin’s proof-of-work mining.

Token sales have funneled vast sums of capital to open protocol development in recent years - funding that would have been difficult or impossible to secure without the issuance of corresponding network tokens. Developers argue that tokens are required to run applications and govern the platforms they build.

Their scarcity is intended to reward early adopters if the network's value grows over time, solving a coordination problem that arises regarding how to sustain public resources.

Yet, most of these tokens have not conferred token purchasers with any of the financial, governance, or basic information sharing rights typical in the legacy securities industry, and have placed few restrictions on how funds can be deployed or how additional tokens can be sold to new purchasers. This can result in unfair and inefficient markets that benefit an issuer's private backers, and create opportunities for insider trading around key announcements, such as when a token may trade on a new token exchange. The asymmetries often harm general consumers, who may transact at a disadvantage due to incomplete information or become susceptible to fraudulent schemes.

The prevalence of token treasuries, founder rewards, "pre-sales" to institutional investors and industry insiders, and secondary listings on dedicated exchanges further highlights similarities between token sale mechanics and securities offerings in the traditional capital markets. That has caused regulators like the U.S. Securities and Exchange Commission to warn issuers that many of their tokens have "the hallmarks of securities," and that the circumstances under which they conduct their sales might put them on the wrong side of existing securities laws.

The purpose of this paper is not to parse the nuances of international securities laws and their applicability to any specific token project. We do, however, find it helpful to first recognize the mandates of global regulators, as that offers a glimpse into potential solutions. Ones where token issuers would do well to abide by the spirit of existing laws, and adopt common sense transparency standards that can help their network users make more informed decisions about their purchase, use, or disposition of a token.

1.2 Promoting Fair and Transparent Token Markets Amidst Regulatory Uncertainty

Global regulators like the SEC are today much more concerned with protecting consumers and maintaining fair and efficient markets than they are with facilitating further capital formation in the token industry. If consumers purchase tokens from a central issuer with a "reasonable expectation of profit" that hinges on the ongoing efforts of the issuing team, the SEC has warned those teams to either a) register their tokens as securities, or b) file for an exemption that would shield the issuer from more rigorous reporting requirements, but preclude "retail investors" from purchasing a network token.

Legal opinions are mixed on the subject, but many experts agree that whether a token should be classified as a security hinges primarily on the utility of the token at the time of purchase (i.e. can the token be used for the network's services), as well as the impact that any ongoing efforts of the issuer would have on the future value of the token. However, the SEC Chairman has also signaled that a token's use "can evolve toward or away from a security" over time, suggesting that the agency does recognize a spectrum exists between payment tokens like Bitcoin, tokens with consumptive properties, and bona fide securities.¹

¹ This taxonomy is consistent with the guidance issued by Swiss regulators at FINMA, who outlined three broad categories of tokens: payment tokens, utility tokens, and asset tokens.

Assessing the utility of a token at any given time and understanding the impact an issuer’s ongoing efforts may have on the value of a token network entails a great degree of subjectivity. However, improvements to token issuer disclosures could help to identify more objective benchmarks for what constitutes “essential development work” or “token utility.” A disclosures framework could help yield the critical data necessary to inform common-sense, industry-led regulations regarding a token’s legal evolution.

A public data library that hosts standardized token issuer disclosures could serve as the financial backbone of the token economy, much like the SEC’s EDGAR database in modern financial markets. This library would standardize information, improve access, and help token purchasers of all sizes and backgrounds to make smarter purchasing decisions.²

Whilst setting standards for token issuer disclosures and replicating a token economy version of EDGAR may appear to be a straightforward solution, there are significant global coordination challenges to implement this in practice. Which projects must file? Who creates, amends, and enforces the disclosures framework? Which regulatory body (or bodies) should govern the filing submission process? Token markets are globally accessible, with jurisdiction often difficult to determine, and issuers often have the ability to shift their operations to jurisdictions requiring less transparency.

If history is a guide, we believe it is highly unlikely that any meaningful global regulatory coordination will happen in the near-term. As such, we see a combination of two short-term scenarios playing out. First, token issuers will move to jurisdictions that will allow them to operate under reasonable and well-defined regulations. Second, token issuers may, for fear of legal liability and often on the advice of counsel, respond to legal uncertainty by reducing rather than increasing transparency with users regarding project developments, token treasury policies, and key personnel changes.

We propose an alternative: a private market system to incentivize an open token issuer disclosures library. Specifically, we propose the creation of a registry governed by token investors, exchanges, and advisory groups, who purchase stakes that provide curation rights over registry members.

2 The Messari TCR Overview

2.1 Architecture Overview

The Messari Token-Curated Registry (TCR) is a game-theoretical system where participants are incentivized to collaboratively maintain a free, open-source, and voluntary token project disclosures database. The TCR serves a similar function to the SEC’s EDGAR filing system for public companies, however it is not reliant on a centralized regulatory body to create or enforce filing standards. Instead, the TCR uses incentives to ensure economically rational stakeholders will act in their self-interest to maintain a reliable, high-quality information resource for the token economy.

² A recent Rice study found that reviews of these seemingly mundane standardized reports drives outperformance even at professional hedge funds.

The Messari TCR consists of:

- A Database of standardized token Project disclosures, which contains fields outlining a Project’s governance structures, community communications policies, and token treasury management.
- A Smart Contract with which participants interact to produce a Whitelist, a list of token Projects whose disclosures have met the minimum transparency criteria set by the community.
- A Constitution, which outlines the minimum disclosures a token Project must provide on an ongoing basis in order to maintain status on the Whitelist, and which may be updated periodically by token-holders to reflect evolving standards in transparency best practices.

2.2 Participants and Incentives

Participants in the Messari TCR consist of Applicants, Consumers, Curators, and Validators.

- **Applicants** are individuals or entities who have standing to file disclosures on behalf of a token Project. They desire to have their Projects on the Whitelist to signal that they have met industry best practices around transparency and self-regulation. They submit Project disclosures into the Database, and, using the Smart Contract, apply for inclusion and pay application fees. If accepted, they will have rights to publish and modify their Project’s page in the Database, though the community will be able to propose updates.
- **Consumers** are individuals or entities that access the Whitelist and the Database. They desire high quality data and seek standardization in token issuer disclosures.
- **Curators** are parties who acquire Messari TCR tokens, which give them proportional rights to vote on new applications and earn application fees. Curators authenticate the completeness and veracity of disclosures, and, using the Smart Contract, vote to admit/reject applications, challenge listings, and adjudicate disputes when a Project’s status on the Whitelist is challenged. They also set transparency standards by voting on amendments to the TCR’s Constitution. Curators can be token funds, advisory groups, exchanges, or other accredited investors. These stakeholders are incentivized to curate a high quality Whitelist in order to attract Consumers and additional Applicants, thereby increasing the intrinsic value of the TCR as an information resource.
- **Validators** are parties designated by Curators to curate the Whitelist for a fee. They play a role similar to that of the proxy advisor in the equities market. Curators may wish to retain the token’s governance and economic rights, but outsource the bulk of the data validation work to a third party. Validators may also be tasked with issuing challenges to Projects that have fallen out of compliance with the TCR’s criteria.

Participant Summary				
	Applicants	Consumers	Curators	Validators
Participant Group	Individuals or entities who have standing to file disclosures on behalf of a token Project.	Individuals or entities that access the Whitelist and the Database.	Parties who acquire Messari TCR tokens for voting and earnings rights.	Parties who are designated by Curators to curate the Whitelist.
Examples of Participants	Treasury managers of token Projects	Developers, investors, regulators.	Professional investors, advisory groups, token exchanges.	Messari, auditing firms.

Economic incentive	To be on the Whitelist to signal that they have met the transparency standards.	To access standardized, high quality token disclosures as signaled by the Whitelist.	To curate a high quality Whitelist in order to continuously earn application fees.	To curate a high quality Whitelist in order to continuously earn a service fee from Curators.
Interactions with Database	File disclosures.	Read the Database.	Set transparency standards. Authenticate disclosures.	Set transparency standards. Authenticate disclosures.
Interactions with Smart Contract	Submit applications. Pay application fees.	Read the Whitelist.	Vote on applications. Earn application fees.	Vote on behalf of Curators. Charge Curators a fee.

A well-designed TCR should create a virtuous circle of economic incentives. As long as the majority of Curators act in their economic self-interest to review and admit new compliant Projects, the Whitelist's perceived importance and value should grow along with the quantity and quality of Projects it contains. This will in turn drive even more Applicants to apply for inclusion, creating continuous incentives for Curators to maintain a high-quality Whitelist.



3. Smart Contract Mechanics

3.1 Overview

The Smart Contract solves the coordination challenges of managing a global token disclosures Database without relying on a trusted, centralized administrator. It does so by recording votes and automating reward distribution with a blockchain, making these key processes more transparent and fair, relative to a centralized platform.

There are two voting mechanisms: review and challenge. In the review process, Applicants submit an initial application on behalf of their Projects, and Curators vote to admit or reject the Projects. Once admitted, the original Applicant is expected to keep disclosures up-to-date in a manner agreed upon in the TCR's Constitution. Should they fail to keep their disclosures up-to-date, Curators may use the challenge process to vote the Project off the Whitelist. In the following subsections, we will describe how both voting mechanisms proceed and how rewards are redistributed between participants.

3.2 Review

At any point in time an Applicant may enter standardized disclosures into the Database, and, using the Smart Contract, submit an application which includes an application fee and a link to their disclosures. This will initiate the review process, in which Curators review the completeness and veracity of the disclosures, and vote to admit or to reject the Project.

A predetermined percentage of the application fee, called the dispensation percentage, is distributed to Curators who participated in the vote and were in the the majority bloc. Non-voting Curators and voters in the minority bloc are not rewarded. The remaining portion of the application fee is:

- Returned to the Applicant, if the Project is rejected. Assuming an application fee of 100 tokens and a dispensation percentage of 50%:

Net Payoffs if Project is Rejected	
Applicant	- 50
Curators	+ 50
Bounty	+ 0

- Kept in the Smart Contract as the Bounty, if the Project is admitted. (Discussed below.)

Net Payoffs if Project Accepted	
Applicant	- 100
Curators	+ 50
Bounty	+ 50

3.3 Challenge

Approved Projects are not guaranteed status on the Whitelist in perpetuity. Curators have economic incentives to verify a Project's disclosures and challenge their TCR status if they fall out of compliance with community standards. A Curator who initiates a formal challenge vote is called a Challenger. A challenge vote is initiated when the Challenger commits a stake equal to 50% of the Bounty, called the Challenge Stake.

If the Challenger wins, i.e., the Project is voted off of the Whitelist:

- The Challenge Stake is returned to Challenger, along with 50% of the Bounty.
- The remaining 50% of the Bounty is awarded to Curators who participated in the vote and were in the majority bloc. Assuming a successful challenge of a 50 token bounty:

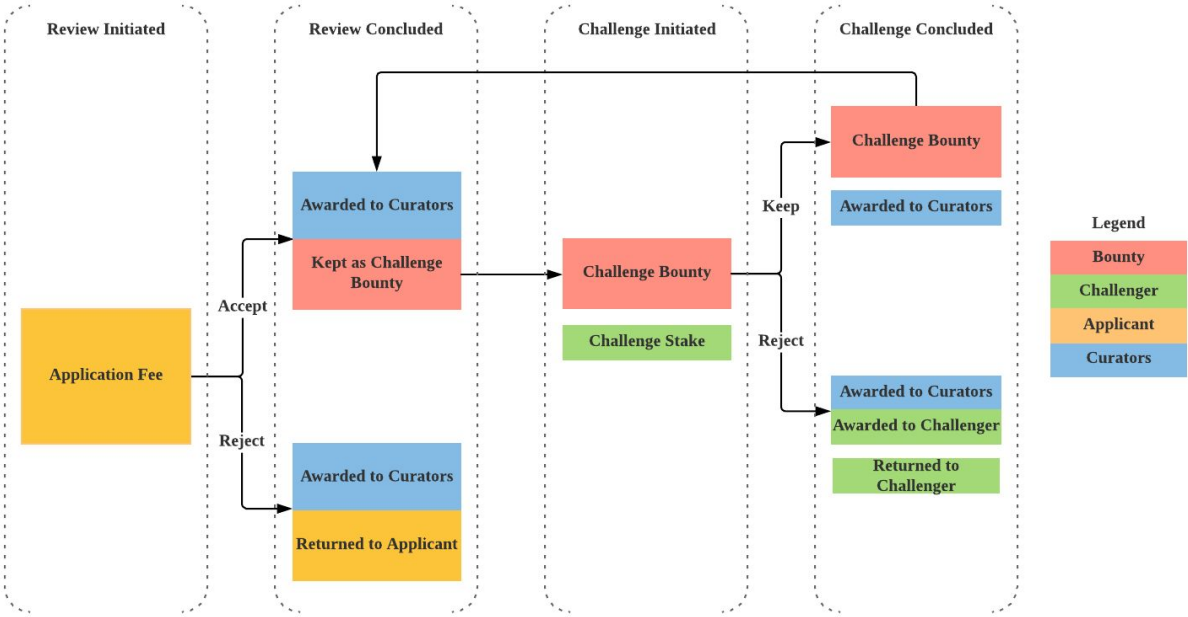
Net Payoffs if Project is rejected	
Challenger	+ 25
Curators	+ 25
Bounty	- 50

If the Challenger loses, i.e., the Project is kept on the Whitelist:

- The Challenge Stake is awarded to Curators who participated in the vote in the majority bloc.
- The Bounty remains unchanged, such that it can be leveraged for future challenges.

Net Payoffs if Project is kept	
Challenger	- 25
Curators	+ 25
Bounty	+ 0

The following flow chart summarizes the economic redistribution between Applicants, Curators, and Challengers, during various stages of a Project’s potential lifecycle in the TCR. The size of boxes is proportional to the dollar amount.



3.4 Voting Rules

Voting rules for initial Applications and subsequent Challenges are nearly identical.

In both the review and challenge, votes are tallied after a predetermined number of days have elapsed following the application or challenge. In order to prevent votes from influencing each other, votes are not revealed until the tally. Curators' voting power is proportional to the total number of tokens they own.

Additionally, any Curator may delegate her voting power to a third-party Validator. Validators may propose a fee corresponding to a percentage of the application fees, creating a competitive market for validation services. The option to designate a Validator is important for Curators who do not have the time or the expertise to make an informed decision, because by design they don't get rewarded if they fail to vote or to be in the majority bloc.

There is a quorum requirement, i.e., a minimum percentage of tokens who participated in the vote for the vote to be accepted by the contract. If quorum is not met, the fee or challenge stake will be returned to the Applicant or Challenger, and the list will remain unmodified.

3.5 Parameters

The following parameters are configurable by Curators as part of the TCR's Constitution:

APPLICATION_FEE: Fee which Applicants must include in their application. The fee is constant in USD but paid in ETH. Note that ETH/USD exchange rate is provided by an oracle. Initialized at \$25,000.

VOTING_DURATION: Number of days after which votes are tallied and revealed. Initialized at 14 days.

QUORUM_PCT: Minimum percentage of participating votes required. Initialized at 25%.

MAJORITY_PCT: Minimum percentage of participating votes required. Initialized at 51%.

DISPENSATION_PCT: Percentage of application fee that is awarded to Curators, remainder will be staked as Challenge Bounty. Initialized at 50%.

4. Database and Standardized Disclosure Format

https://docs.google.com/spreadsheets/d/1xvFv5ZSNhNUGsFM2nkm_9g5Iq_hGS3_sK-rZyfvkJus/edit?usp=sharing

5 Discussion

5.1 Current TCR Literature Review

The concept of TCR was first implemented and popularized by the AdChain team³. The Messari TCR is inspired by its fundamental idea of aligning incentives between Applicants, Consumers, and Curators, but is specifically designed from first principles. Notable differences between Messari's and Adchain's design are the following:

1. In the Messari TCR, the default result of an application is rejection, rather than admission, so as to keep the quality of the Whitelist as high as possible. We address quorum issues by assuming that most Curators will either vote on new Applications or proxy their votes to Validators.
2. Application fee is fixed, rather than at the Applicant's choosing, to ward off "pay-to-play" applications. We may charge fees at the greater of a fixed nominal fee (e.g. \$25,000) or as a percentage of the token's treasury assets (e.g. 5 basis points).
3. Application fees are paid and settled in ETH (or stablecoins if and when they prove to be functional) rather than in the native TCR token. This will help to separate the financial incentives of those governing and improving the intrinsic value of the list (Curators) from those tasked with reviewing each application for a fee (Validators). This will also facilitate the bootstrapping phase of the TCR as initially there may not be a liquid token market for Applicants.
4. In both review and challenge votes, Curators' and Validators' short-term rewards are independent of whether the Applicant gets approved or rejected. This will incentivize Curators and Validators to focus on the long-term goal of maintaining a high-quality Whitelist.

One mechanism to ensure there is a liquid market for Messari TCR tokens would be to create a bonding curve.⁴ This could be particularly useful in pricing new bounty tokens or tokens for purchase by third-party challengers. Bonding curves are smart contracts where native TCR tokens can be openly bought and sold with ETH at an algorithmically predetermined price. While bonding curves help to provide liquidity, they may also create inflation and deflation shocks which impact current Curators' pro rata earning rights. We will explore this idea and other emerging ideas later.

5.2 Risks and Mitigations

Spam applications: A well-funded entity may launch a spam attack by submitting a large number of low-quality applications. Given the relatively high fees required to apply to the TCR, we view the likelihood of such an attack as low. We must, however, consider the pace of new applications. Handling too many applications at any given time would likely lead to a degradation in the quality of a given Curator's assessment, or cause them to become overstretched with applications to review.

51% attack: A well-funded entity may acquire 51% of tokens and thus voting rights on applications and parameter changes. This is likely an even more expensive attack than spam applications, but if it happens, the minority's only recourse in the current design of the TCR may be social consensus, i.e., to fork the Smart Contract, identify the malicious Curator, and airdrop new tokens to all other minority Curators. We could implement two additional features into the TCR to fight this type of plutocratic attack. First, we

³ <https://medium.com/@ilovebagels/token-curated-registries-1-0-61a232f8dac7>

⁴ <https://medium.com/@simondlr/tokens-2-0-curved-token-bonding-in-curation-markets-1764a2e0bee5>

could use a reputation system where Curators and Validators' identity are known so as to assist social consensus. Second, we could use a voting system where voting power increases sublinearly as the number of tokens increases, such as quadratic voting⁵.

Low vote turnout: This is a weaker form of the 51% attack. If vote turnout is usually low, say 10%, then the attacker may only need to acquire 11% of tokens to launch an attack. However, in theory, the fact that non-voting Curators and Validators don't get rewarded should incentivize them to vote, thereby driving up the turnout.

Validator centralization: Similarly to the 51% attack, Curators may delegate their votes to Validators, potentially leading to their centralization. This is acceptable as long as Validators act in the best interest of Curators, but some could willfully or negligently admit an unqualified Applicant, or reject a qualified Applicant. Still, bad actions by Validators are curbed by the power that Curators have over them. Validators are in perpetual competition for Curators' proxies, and could be easily replaced for incompetence that jeopardizes the integrity of the Whitelist.

Bribery: In "51% attack", "low vote turnout", and "validator centralization", the attacker is a voter or a small number of colluding voters who directly control the result of the vote. By contrast, the entity that offers a bribe to Curators and Validators may or may not have voting rights. Bribery will likely become problematic as the perceived legitimacy of the Whitelist grows over time. For example, a Project that has been admitted to the Whitelist may be incentivized to bribe Curators and Validators to keep a competing Project out of the Whitelist; an unqualified Project may bribe Curators and Validators to get on the Whitelist. We see two ways to combat bribery. First we could use a reputation system, as previously described, so that Curators and Validators' decisions will be driven by a combination of economic and social incentives. This could significantly drive up the cost of a successful bribery. Second, we could implement an algorithm where a random subset of votes are tallied. This could double the cost of bribery because in a non-random tally the briber will have to bribe 51% of voters, whereas in a random tally the briber will have to bribe all the voters.

Vote coordination: Because application fees are only distributed to the majority bloc, voters may be economically incentivized to coordinate with each other off-chain. By way of example, if 1/3 of voters are certain to vote yes and 1/3 of voters are certain to vote no, the remaining voters could coordinate with each other and pick an arbitrary side, so as to reduce the uncertainty in their payoff. While coordination could be facilitated by bribery, it could still occur in the absence of bribery. A wide distribution of tokens and a reputation system should make this type of attack more difficult. An alternative design is to award voters independently of whether they are in the majority bloc or minority bloc, but that would encourage them to vote arbitrarily without doing any work.

Filing "vandalism": After a Project is admitted, the original Applicant has the sole right to update her public filing. However, she may willfully introduce material errors in updates, which will be reflected in the Database until discovered and successfully removed by a challenge.

⁵ https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2003531

5.3 Governance

A governance system to upgrade the Messari TCR is necessary for a few reasons. First, as the industry rapidly evolves, the community may wish to amend the criteria for admitting new Projects into the Registry or add or remove certain filing requirements. Second, Curators may want to change the parameters of the TCR in order to maximize their earning potential. Third, TCR participants' may realize their incentives can be better aligned with slightly different TCR parameters or token mechanics. A successful Smart Contract must be one that is capable of adapting to changing environments.

The first scenario is likely the easiest to handle. The community may come to an off-chain consensus about a new filing format which future Applicants must follow. It may also ask Projects on the Whitelist to come into compliance with current standards, and challenge them if they fail to within a defined period.

The second and third scenarios require on-chain governance since they involve changing the rules of the TCR itself. On-chain governance of contract changes is complexified by the fact that once a contract is deployed to the blockchain it is final and cannot be altered. Fortunately, the community has developed several types of upgradable contracts already (Zeppelin, Aragon, etc.), and will likely introduce more innovative upgrade mechanisms over time. In order to facilitate development and testing of the smart contract and bootstrapping of the TCR, we will implement a three-step governance approach.

1. Initially, the Messari development team will be the only entity with the right to deploy Smart Contract upgrades. Furthermore, applications to the TCR will be submitted on an invitation-only basis, and Messari will be the sole and default Curator. By doing this Messari will help define the culture of “what constitutes an acceptable application”.
2. The TCR will launch with a set of approved Projects. After the initial deployment, the TCR will be made fully open to new Applicants.
3. The network will transition towards a decentralized governance system (see Appendix), where Curators vote to change parameters and to approve contract upgrades. Messari intends to fully liquidate its token treasury within five years of launching the TCR.

6 Conclusion

Today the absence of a mandatory disclosures framework for token issuers has led to an inefficient and unfair token market. We have proposed a token issuer disclosures registry governed by token funds, advisory groups, exchanges, or other accredited investors. It is a game-theoretical system where the community is incentivized to collaboratively build a free and voluntary token project disclosures database. It solves the coordination challenges of managing a global token disclosures database without relying on a centralized administrator. As such, it is a decentralized way of managing a list of trusted and legitimate projects as recognized by the community and stakeholders.

7 References

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Appendix

1 Decentralized Governance

Designing an effective decentralized governance system is an extremely challenging problem. This section serves as a literature review of promising ideas which have emerged in the space. These ideas are not necessarily mutually exclusive, but rather could be combined to produce a powerful governance system for the Messari TCR. Note that many of these governance ideas may be used for the curation of Projects themselves.

One-token one-vote: The simplest form of decentralized on-chain governance is one-token one-vote direct democracy. A contract upgrade is deployed if the majority of tokens vote to approve it. Otherwise, the status quo is maintained.

Liquid democracy: The disadvantage of a direct democracy is that, for something as complex as a smart contract upgrade, the majority of Curators may not have the expertise to make an informed decision. In a liquid democracy, Curators delegate their votes to experts, but may override the votes if they feel strongly about a particular decision. The idea behind liquidity democracy is similar to that of proxy curation and delegated proof of stake.

Partial-lock commit/reveal (PLCR) voting: A “partial-lock” is a mechanism which locks tokens to prevent double voting, a dishonest action where a Curator may cast a vote, transfer tokens to a different address, and cast another conflicting vote. The “commit/reveal” is a mechanism that hides individual votes that are “partially-locked” until they are revealed for tally. This is done to prevent the ongoing voting process from influencing the end result.

Futarchy: In a futarchy, rather than voting on a code upgrade proposal, Curators pick an objective metric and use prediction markets to determine whether approving or rejecting it will best optimize the metric. For instance, in the Messari TCR, the objective metric may be whether Curators’ earnings will improve next year over the past year. Two prediction markets are then created, one for “approve” and one for “reject”. If the “approve” market is priced higher than the “reject” market, then prediction market participants believe that approving the proposal is more likely improve to Curators’ earnings, and the proposal would get approved. Prediction market participants have skin-in-the-game because a year later they will be paid based on the actual outcome of whether or not Curator’s earnings will have improved.