

DECENTRALIZED AUTONOMOUS ORGANIZATION USING SBT

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Abstract — A digital organization called a Decentralized Autonomous Organization (DAO) runs on a decentralized blockchain network. It is run by its members according to a set of regulations that are stored in smart contracts. The NFT known as the Soul Bound Token (SBT) can be utilized to take part in DAOs. It serves as a proxy for ownership in the company and can be used to cast votes on DAO-related proposals and decisions. SBT is intended to be secure, open, and unaffected by manipulation. When a DAO is established, it issues buyable tokens, like SBT. SBT can be used by DAO members to vote on proposals, choose leaders, and control the organization's finances. Holders of SBT also have the option of sharing in the DAO's earnings.

Keywords — DAO;Blockchain;NFT;SBT;Voting

I. INTRODUCTION

A digital organization that runs on a decentralized blockchain network is known as a decentralized autonomous organization, or DAO. Using a set of rules included in smart contracts, which are self-executing computer programs that run on the blockchain, DAOs are managed by their members. These guidelines specify how the organization does business, makes decisions, and handles finances. The result is a decentralized, transparent organization that is impervious to manipulation. Although DAOs are not brand-new ideas, recent developments in blockchain technology have made them more usable and practicable. The first cryptocurrency built on a blockchain, Bitcoin, offered a decentralized, trustworthy method of exchanging value without middlemen. The idea of smart contracts was first proposed by the more advanced blockchain network Ethereum. Smart contracts are self-executing computer programs that may automate difficult operations. DAOs become conceivable with the introduction of smart contracts.

DAOs are intended to establish a decentralized and open method of operating organizations. In traditional organizations, decisions are often made on behalf of the organization by a centralized authority, such as a board of directors. This centralized system may lead to a lack of accountability, transparency, and fairness. By establishing a fair and democratic framework where each member has a voice in how the organization is administered, DAOs seek to solve this issue.

The primary characteristic of DAOs is their decentralized voting-based governance structure. Members of a DAO can vote on proposals, choose leaders, and control the

organization's finances using their tokens. The more of these tokens a member holds, the more voting power they have because they each represent a stake in the company. DAOs can be employed for a range of tasks, including money management, project investment, and community administration. For instance, a DAO could be established to finance a fresh blockchain initiative. The DAO's members might pool their resources and utilize them to finance the project. As the project develops and makes money, the money will be dispersed to the DAO's members in proportion to their ownership stake.

II. LITERATURE REVIEW

The concept of DAOs was first introduced in 2013 by a group of developers in the Bitcoin talk forum. The idea was to create a decentralized organization that would operate on the blockchain, allowing for transparent decision-making and management. However, it was not until the introduction of Ethereum in 2015 that DAOs became more practical, as Ethereum introduced the concept of smart contracts that could automate complex tasks and allow for more sophisticated governance structures. The governance structure of DAOs is a key feature that distinguishes them from traditional organizations. DAOs use a decentralized voting system where members can use their tokens to vote on proposals, elect leaders, and manage the organization's funds. This creates a more democratic and equitable approach to decision-making, where decisions are made by consensus rather than by a centralized authority.

Several studies have examined the governance structure of DAOs and the challenges they face. A study by Tran and colleagues (2020) examined the governance structure of the DAO Maker, a platform for creating and managing DAOs. The study found that the governance structure of DAOs is complex, and there are several challenges, including voter apathy, low voter turnout, and the potential for manipulation. Another study by Hafner and colleagues (2019) examined the governance structure of the DAO that was famously hacked in 2016.

One challenge that DAOs face is the lack of legal recognition and regulatory frameworks. As DAOs operate on the blockchain, they are not bound by traditional legal systems and regulations. This can create uncertainty and risk for both the organization and its members. Several studies have examined the legal and regulatory challenges faced by DAOs

Another challenge that DAOs face is the potential for collusion and manipulation. As DAOs rely on a decentralized voting system, there is a risk that a group of members could collude and manipulate the system for their own benefit. Several studies have examined the potential for collusion and manipulation in DAOs and proposed solutions, such as introducing reputation systems and using quadratic voting (Reicherdt et al., 2020; Schär et al., 2020).

Despite these challenges, DAOs have the potential to create decentralized and transparent organizations that are resistant to manipulation and corruption. Several studies have examined the potential uses of DAOs, including managing funds, investing in projects, and governing communities. For example, a study by Reicherdt and colleagues (2021) examined the potential for DAOs in the context of climate change mitigation. The study proposed using DAOs to fund and govern climate change mitigation projects, creating a more democratic and transparent approach to climate action.

In conclusion, DAOs are a powerful new concept that has the potential to revolutionize the way organizations are managed. However, as with any new technology, DAOs face several challenges, including governance structure, legal and regulatory frameworks, and the potential for collusion and manipulation. Despite these challenges, the potential uses of DAOs are vast, and several studies have proposed innovative solutions for overcoming these challenges. As the blockchain ecosystem continues to grow and evolve, we can expect to see more innovative uses of DAOs in the future.

III. EXISTING SYSTEM

One of the main problems in existing DAO is transferable NFT. The Transferable NFT make the DAO system less secure. Anyone with the NFT can create a proposal and vote for a proposal. If a person is wealthy means he have an ability to buy all the NFTs from different peoples by exchange it will money. This makes the DAO regulated by only one person or a small group person. This will break the concept of decentralization in DAO. To overcome this issue, we use a different concept instead of NFT.

IV. PROPOSED SYSTEM

In Our System, One proposed system that could use Soul Bound Tokens (SBT) is a Decentralized Autonomous Organization (DAO). In this system, SBTs could be used as a means of participation and governance within the organization.

SBTs could be distributed to members of the DAO as a way of incentivizing participation and allowing members to have a stake in the organization. Members could use their SBTs to vote on proposals, elect leaders, and manage the organization's funds, creating a more democratic and equitable approach to decision-making. The use of SBTs could also create a more transparent and auditable system, as all transactions on the blockchain are publicly visible. Additionally, the use of SBTs could allow for more flexible ownership structures within the DAO. Instead of relying on traditional ownership structures, where a few individuals or entities have control over the organization, SBTs could be used to distribute ownership and decision-making power among a wider group of members. This could create a more decentralized and resilient organization that is less vulnerable to corruption and manipulation.

V. METHODOLOGY

The methodology for implementing a Decentralized Autonomous Organization (DAO) using Soul Bound Tokens (SBT) would involve creating a smart contract on a blockchain platform, such as Ethereum, that outlines the rules and governance structure of the organization. SBTs would be created and distributed to members based on their level of participation and stake in the organization. Members would use their SBTs to vote on proposals and make decisions related to the organization. The use of SBTs would ensure transparency and accountability, as all transactions on the blockchain are publicly visible. The DAO would operate autonomously, with decision-making power distributed among its members.

A) Hardware and Software Requirements:

This application 'Decentralized Autonomous Organization Using SBT' uses the below things for its hardware and software requirement:

- 1) Hardhat: Framework for smart contract development
- 2) Wallet: Metamask to store SBT
- 3) Browser: Google Chrome or Firefox
- 4) RAM: Above 8GB
- 5) Operating System: Windows 10 64 bit

B) Working:

The working of a Decentralized Autonomous Organization (DAO) using Soul Bound Tokens (SBT) would involve creating a smart contract on a blockchain platform, such as Ethereum, that outlines the rules and governance structure of the organization.

SBTs would be created as ERC-20 tokens on Ethereum and distributed to members based on their level of participation and stake in the organization. Members would use their SBTs to vote on proposals and make decisions related to the organization. Each SBT would represent a fraction of ownership in the DAO, with the total number of SBTs representing the entire ownership of the organization. The use of SBTs would ensure transparency and accountability, as all transactions on the blockchain are publicly visible. The DAO would operate autonomously, with decision-making power distributed among its members. Proposals could be submitted to the DAO for consideration, and members would use their SBTs to vote on whether to accept or reject the proposal. If the proposal is accepted, the DAO's smart contract would automatically execute the decision. The use of SBTs would create a more equitable ownership structure and allow for more decentralized decision-making.

C) Design and Implementation:

A Design and implementation of a Decentralized Autonomous Organization (DAO) using Soul Bound Tokens (SBT) would involve several key steps:

1. Determine the DAO's governance structure: Before creating the smart contract, it is important to determine the governance structure of the DAO, including the number of members, their roles and responsibilities, and the decision-making process. This will help to determine the distribution and allocation of SBTs among the members.

2. Create the smart contract: Once the governance structure has been defined, the smart contract can be created using a smart contract development framework such as Solidity for. The smart contract should outline the rules and procedures for the DAO, including how proposals are submitted and voted on, and how SBTs are allocated and distributed.

3. Create and distribute SBTs: The SBTs can be created as ERC-721 tokens on Ethereum. The total number of SBTs should be fixed and represent the entire ownership of the organization. The SBTs can be distributed to members based on their level of participation and stake in the organization.

4. Establish a voting mechanism: Members can use their SBTs to vote on proposals and make decisions related to the organization. A voting mechanism should be established, such as a simple majority vote or a weighted voting system based on the number of SBTs held by each member.

5. Execute proposals: Once a proposal is accepted by the DAO, the smart contract should automatically execute the decision. This could involve the transfer of funds, the creation of new SBTs, or other actions as defined in the smart contract.

The implementation of a DAO using SBTs requires a strong understanding of blockchain technology and smart contract development. It is important to thoroughly test the smart contract before deploying it on the blockchain to ensure that it functions as intended and that there are no security vulnerabilities. In addition, regular audits and updates should be conducted to ensure the security and integrity of the DAO. A DAO using SBTs can provide a more equitable and decentralized decision-making process, allowing for greater transparency and accountability in organizational governance.

D) Software:

The software used for implementing a Decentralized Autonomous Organization (DAO) using Soul Bound Tokens (SBT) can vary depending on the blockchain platform and development environment being used. One commonly used development environment for Ethereum-based smart contracts is Hardhat, which provides a suite of tools for building, testing, and deploying smart contracts.

Hardhat allows developers to write smart contracts using Solidity, the primary programming language used for Ethereum-based smart contracts. Hardhat also includes built-in testing tools, which can be used to ensure that the smart contract functions as intended and that there are no security vulnerabilities.

Another important software tool for interacting with a DAO using SBTs is a wallet software that supports the blockchain platform being used. For Ethereum-based smart contracts, MetaMask is a popular wallet software that allows users to interact with the Ethereum network using a web browser extension. MetaMask allows users to manage their SBTs and vote on proposals submitted to the DAO.



Fig.1 Hardhat in CLI

E) Advantages:

- Increased decentralization
- Transparency and accountability
- Efficient decision-making
- Security and immutability
- Scalability

VI. EXPERIMENTAL RESULT

A) Test case 1:

Creating a Proposal with required SBT will submit the given proposal successfully without any error.



Fig.3 Test case 1

B) Test case 2:

Voting Proposal with required SBT will submit the given vote successfully without any error.



Fig.4 Test case 2

C) Test case 3:

Voting more than once with require SBT will throw an error



Fig.4 Test case 3

D) Test case 4:

Creating a Proposal without having required SBT will throw an error.



Fig.5 Test case 4

E) Test case 5:

View proposal without having required SBT will throw an error.



Fig.6 Test case 5

VI. CONCLUSION

In conclusion, the use of Decentralized Autonomous Organizations (DAOs) has opened up a new era of innovation and collaboration in the blockchain space. By combining the benefits of blockchain technology with the automation of decision-making processes through smart contracts, DAOs are paving the way for a new kind of organizational structure that is decentralized, transparent, and democratic.

The proposed project of implementing a DAO using Soul Bound Tokens (SBT) on the Ethereum blockchain has the potential to address some of the limitations of traditional DAOs that rely on Non-Fungible Tokens (NFTs). The use of SBTs allows for a more flexible and scalable approach to decision-making, as well as enabling greater community participation and incentivization.

The project leverages a range of software tools, including hardhat and Metamask, to create a secure and user-friendly environment for managing DAO operations. Additionally, the project incorporates a range of best practices, such as using a testnet for development, to ensure that the DAO is secure and fully functional.

Overall, the proposed DAO using SBTs has the potential to revolutionize the way in which organizations operate, by enabling greater collaboration and transparency between stakeholders, as well as promoting a more inclusive and equitable decision-making process.

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