

Smart Donations for Software Development via Blockchain

Abstract—The paper discusses the challenges open-source software (OSS) developers face in securing funding for their projects. It proposes the creation of a demo for an escrow smart contract, modeled after Initial Coin Offerings (ICO), to provide funding for OSS projects. The smart contract incorporates multi-signature, escrow, and ICO logic to give donors control over the project's status in a decentralized autonomous organization. The workflow involves developers creating proposals and roadmaps, with guest users supporting the project to become donors. Donors receive special tokens that allow them to vote on the project's development process. The demo aims to provide a structured and transparent process for funding and decision-making within the project, addressing the challenges OSS developers face.

Index Terms—Blockchain; Open Source Software; Smart Contract; Voting

I. INTRODUCTION

In today's world, open-source software is of great economic value to enterprises and individual users. The internet, open-source computer operating systems, development tools, web services, and other major components of the global infrastructure heavily rely on owners of open-source software (OSS). According to a recent report by the Linux Foundation, over 430 companies with annual revenue above \$1 billion extensively use OSS [1]. However, maintaining such projects, fixing bugs, managing collaboration, and addressing issue complaints require significant time and effort. Additionally, project maintainers have limited stable options to secure funding and focus on their projects, as outlined in [2].

The issue of funding for OSS presents a significant challenge for funders, primarily due to the lack of transparency in how value is distributed and the workflow of projects. To tackle this problem, we have created a demo of an escrow smart contract designed to fund these projects. This smart contract is based on the model used for Initial Coin Offerings [3], with tokens that can be utilized for voting on the continuation of funding [4]. We have adapted this model for donations rather than investments, making it more suitable for OSS funding.

II. PROJECT DESCRIPTION

The demo formalizes the interaction between the developers' team and donors through a smart contract. This smart contract incorporates multi-signature (multi-sig), escrow, and ICO logic to give donors control over the project's status in a decentralized autonomous organization (DAO) manner.

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The interface shows a 'Project Proposal Form' for the 'Open Source DAO'. At the top, there's a yellow box with the address '0x2DE328...0A3733'. The form itself is purple and contains several input fields: 'Document hash', 'Duration (Months)', 'Team Monthly Allowance', 'Addresses separated by commas', 'Multisig signature threshold', 'ICO duration', 'Days for monthly consensus', 'Sponsor monthly vote quorum', 'Total utility token supply', and 'Threshold for monthly report signs'. A yellow 'Submit' button is at the bottom right. A footer note says '© 2024 Open Source DAO. All rights reserved.'

Fig. 1: Project proposal interface for developers.

The interface shows 'Fund Collection Progress' for the 'Open Source DAO'. At the top, there's a yellow box with the address '0x2DE328...0A3733'. The main area is purple and displays: 'Project HASH: d508b362....e48a7479', 'Time Left: 4 days 23:9:49', a progress bar at 65%, and 'Collected: 650 / 1000 ETH'. A yellow 'Fund Now!' button is at the bottom.

Fig. 2: Guest user's view of a fundraising campaign.

The interface shows 'Time to vote!' for the 'Open Source DAO'. At the top, there's a yellow box with the address '0x2DE328...0A3733'. The main area is purple and displays: 'Last commit: 069b4ae9...1e83e48a', 'Voting time: 21 days 6:48:20', a progress bar at 40% Yes and 20% No, and a 'Satisfied? Vote with your 11.2%' prompt. There are two buttons: a green 'Yes' button with a thumbs up icon and a red 'No' button with a thumbs down icon.

Fig. 3: Donor's view of the current stage's progress and the ongoing voting process.

The workflow is as follows. Developers create their proposal and roadmap, and guest users can support the

project with their funds to become donors. These funds are held in an escrow account, and donors receive special tokens, which hold no monetary value but allow them to vote on the significance of the project's development process. On a monthly basis, if donors are satisfied with the progress, developers receive payment. If not, the financing ends, and donors can claim the remaining funds. The smart contract logic is outlined below.

Upon deployment, the contract requires parameters such as the project proposal, duration, monthly team allowance, developer addresses for multisig, multisig signature threshold, funds collection time frame, monthly consensus time frame, donor monthly vote quorum, total utility token supply, and the threshold number of monthly report developers' signatures.

Once the period for the collection of sponsored funds ends, the smart contract will either allow for the withdrawal of funds for donors up to the sponsored amount if an insufficient sum was collected or lock the sponsored sum within the contract if the conditions were satisfied and a sufficient sum was collected.

The smart contract then enables donors to mint utility tokens to vote in monthly decisions on whether to continue funding the project or close it. These utility tokens are minted in proportion to a donor's input from the total supply of utility tokens.

Every month, if a certain number of donors have not voted against continuing, the developers can receive funds with their signatures through multisig. If donor vote against continuing the project, they can withdraw their funds based on their utility token supply.

Overall, the smart contract provides a structured and transparent process for funding and decision-making within the project.

III. PROTOTYPE IMPLEMENTATION

A. Technology Stack

The demo was built using a variety of programming languages and stacks. The application product implementation includes a frontend built with the Vue3 framework, a centralized backend API built using the Python programming language and FastAPI framework, and decentralized blockchain smart contracts developed for Ethereum Virtual Machine (EVM) compatible blockchains using Solidity programming language.

B. Application Product

The application includes a user experience (UX) flow that enables different tasks for various users, such as the (Figure 1), guest users (Figure I), and donators (Figure 3).

Upon acceptance, the source code and instructions for running the project will be available on Github.

IV. CONCLUSION

This demo outlines a funding workflow for open-source software developers using a smart contract. The smart contract helps to clarify the development roadmap and provides donors with a better understanding of the project's goals and progress. It also includes an escrow mechanism allowing donors to stay informed and terminate funding in case of poor performance or scams.

Our paper highlights the potential benefits of using blockchain and smart contracts for open-source software development donations. The system we propose aims to increase donor involvement and transparency in projects. While the demo is not a comprehensive research study or a production-ready system, it draws attention to the funding problem for open-source software.

In the future, we envision the development of a DAO to finance multiple open-source software projects within a single pipeline. This DAO could introduce more user roles, such as proposal and report reviewers, and make it easier for donors to contribute to multiple projects through collective funding.

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