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Fundraising Tracking System for NGOs Using Blockchain

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Abstract: ***NGOs in developing nations get financing from donor agencies for various goals, including disaster assistance, education advancement, women's empowerment, and economic development. However, due to reports of fund misuse and record irregularities, some donor agencies have lost faith in these NGOs. For example, in education funding, some students appear on the records of multiple NGOs as beneficiaries, even though only one NGO should be paying for a specific student, so here blockchain plays an important role, The lack of transparency in charities has resulted in a decrease in social investment and a decrease in donor confidence, as donors are frequently uninformed of how their donations are being used. Corruption exacerbates this skepticism. To address these challenges, the Charity-Chain decentralized network has been suggested, which will use the Ethereum blockchain and smart contract-based incentives to validate the impact of social organizations. This improved transparency would help funders, such as charitable organizations, impact investors, and small donors, to more readily monitor their transactions and re-establish trust in these social organizations.***

Index Terms: Blockchain, Ethereum, donors, smart-contract, NGOs

I. INTRODUCTION

This paper discusses the issue of insufficient transparency in financial transactions involving donations and government and non-governmental organization (NGO) financing. Allowing contributors to track their payments and secure the security of their cash is critical to restoring trust and increasing openness in social funding. Donors may easily monitor the impact of their contributions and verify the traceability of each transaction by employing blockchain technology. Every transaction on the charity chain is recorded on a blockchain, which is immutable, resistant to tampering, and responsible. Improving philanthropic transparency through a traceability system based on Internet technologies is crucial for traditional gifts and online crowdfunding to achieve credibility. The proposed charity model system in this study makes use of blockchain technology to increase transparency in philan- thropic contributions.

II. LITERATURE REVIEW

The blockchain offers a decentralized transaction ledger for generating, validating, and transmitting transactions to other nodes within a network. This technology also utilizes cryptographic hash functions, which increase the security of financial transactions. Furthermore, the blockchain can be utilized across a wide range of industries, including fi- nancial services, healthcare, and businesses[2].To ensure the independence and reliability of a charity application, it is necessary to have a self-validating system that is not relian on any other applications. Blockchain technology is being increasingly used for this purpose as it enables the independent verification of transaction integrity and consistency without any restrictions on particular systems. Among blockchain platforms, Ethereum is a popular choice due to its publicnature and superior scalability, enabling it to process between 7 to 20 transactions per second[1].By leveraging blockchain technology, the charity system can become decentralized, eliminating monopolies and limitations imposed by a single authority. This will provide the public with unrestricted access to transaction information, allowing them to verify that their donations are being utilized as intended. A notable example of blockchain implementation is the Chinese government's use of this technology for e-government purposes, which has helped to enhance trust between producers, citizens, and the government. One application of this technology is in ensuring the quality of perishable food, as it enables the safe sharing of product status at every stage, including manufacturing, trans- portation, and marketing[3]. Financial institutions are utilizing blockchain technology to enhance cybersecurity, thanks to its fast processing, cost-effectiveness, decentralized registry, and secure payment information. In India, all citizens are issued an Aadhar number, which includes their biometric data, location, and other details. By combining Aadhar with blockchain technology, several applications like healthcare and voting can benefit, with the added advantages of eliminating single- point failure and privacy concerns.

The consensus protocol used in blockchain applications is crucial as it determinesthe validation parameters for new nodes, and an inappropriate protocol could lead to undesirable outcomes. However, the successful deployment of a blockchain application also comeswith challenges, such as the need for resources and scalability.

III. PROPOSED SYSTEM

The organization requesting funds, or the beneficiary, cre- ates a request on the platform, indicating the desired amount and the timeline for achieving it. Everyone in need can usethe platform, and donors can browse and donate through their accounts. All funds are held in a smart contract until either the target amount or the time-frame is reached. If the beneficiary's target amount is met within the time-frame indicated, the money is transferred to them. The funds are otherwise refunded to the contributors.

Our program becomes more robust as the Ethereum blockchain delivers transparency, scalability, and security. The Ethereum blockchain allows users to trace the wholehistory of their account address. Using that functionality, we can track donor funds and provide complete transparency to them. Many people do not donate money to anyone becauseof the centralized system's lack of transparency. Many people will come forward to make donations to needy organizations (beneficiaries) if we provide the functionality of tracking funds. Centralized systems are vulnerable to numerous typesof attacks. These companies have their own data center, and any problems with their data center will result in the loss of data for multiple users. In the opposite scenario, if theplatform grows in popularity, small businesses will find itdifficult to scale their operations and rely on others, resulting in a loss of consumers. To eliminate all of these concerns,we presented a way for raising funds based on the Ethereum blockchain. It is completely transparent as the underlying infrastructure that we are using is the Ethereum blockchainand it is a public blockchain.

1) *Organization (Beneficiary):* These are organizations, NGOs, or other social businesses that require resources (financial or otherwise). On the Charity-Chain system, they will be able to post their requirements in a predetermined format. They will be crucial in mining as well.
2) *Donor:* They are the organizations that will view the requests made public by various groups and if their tender is accepted, decide to contribute to the cause in accordance with their abilities and preferences.
3) *General User:* Anyone who visits the platform for the first time, becomes a general user as they have not decided to become a donor or beneficiary.

Fig 2 shows the data overflow through the system,The platform allows users to track donations by entering their addresses and browsing through requests created by beneficiaries. If a user wishes to become a beneficiary, they can create a request to raise funds by specifying the goalamount and the time frame in which it should be reached.

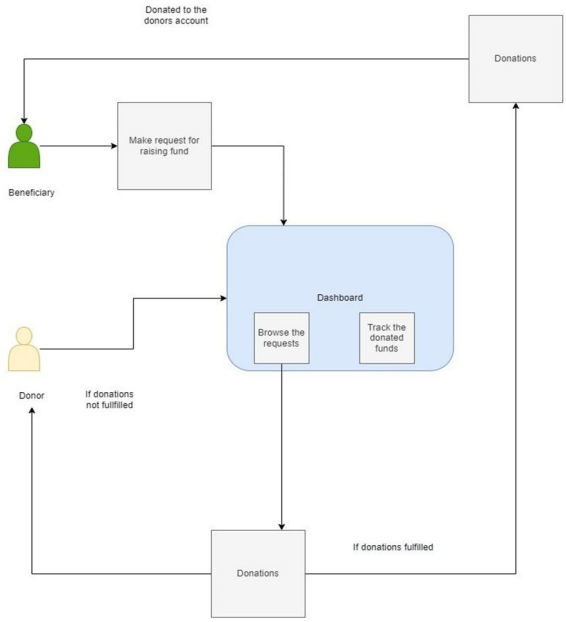

Fig. 1. Proposed System Overview.

Once all required details are provided, the request can be raised for any fundraising need. The platform serves as a general fundraising system, enabling anyone in need to create a fund request.

When creating a request to raise funds, the beneficiary must indicate the reason for the fundraising, which may involve an individual or multiple organizations seeking tosupport a startup. If a user wishes to donate, they can browse through the requests made by beneficiaries before decidingon their contribution.

IV. SYSTEM DESIGN AND DEVELOPMENT

A. *Hardhat*

Hardhat is an open-source framework that provides a suite of developer tools for building, testing, and deploying smart contracts on Ethereum. It includes features such as a local blockchain network, contract testing, and task automation.

B. *Metamask*

MetaMask provides a platform for users to access decentralized applications on the distributed web, allowingEthereum dApps to be executed directly in a web browser without requiring a full Ethereum node. Its primary objective is to simplify Ethereum services and eliminate the complexities associated with Blockchain technology. MetaMask features a secure identity wallet that operates through a unique username and password, enabling users to send or request cryptocurrency using the recipient's address. Upon completion of the transaction, the user is notified. To transfer ethers between accounts, Charity-Chain leverages the capabilities of MetaMask.

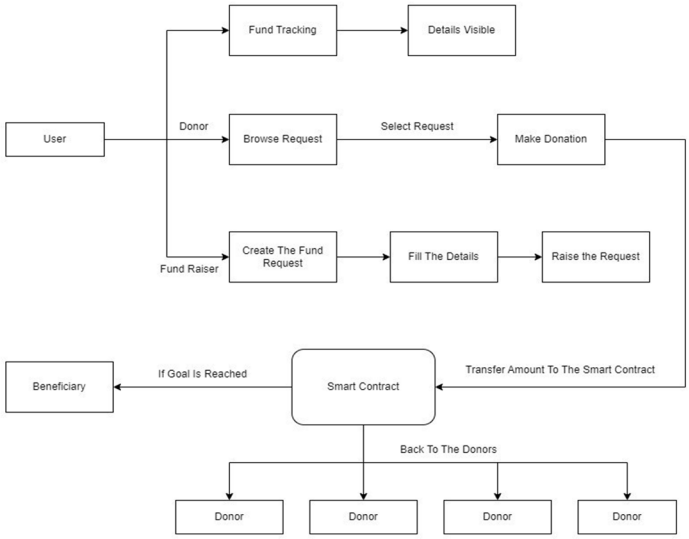

Fig. 2. Depicted View Of Data Flow.

C. *Sepolia Testnet*

Sepolia Testnet is a test network for the ICON blockchain. ICON is a decentralized blockchain network that allows independent blockchains to interact with each other. The Sepolia Testnet is designed to allow developers to test their decentralized applications (dApps) and smart contracts on the ICON network in a safe and controlled environment.

D. *Development*

Following are the essential steps for development purposes.

1) *Step1: Install all the necessary software tools which arelisted as follows:*

a) Visual studio code
b) Solidity smart contracts compiler (Remix IDE)
c) Ganache-CLI (Ethereum and js test environment)
d) Node.js and NPM
e) Metamask

2) Step2: Create Distributed Application Frontend

To create the front end of an application, one needs to use web technologies such as HTML/CSS and ReactJS. Using these technologies, the application's homepage, Browse Request, Donor Dashboard, and Track Donation pages are designed by creating HTML pages and linking them to each other.

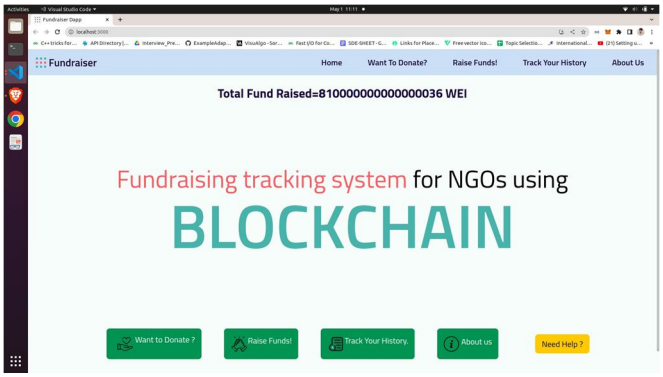

Fig. 3. Home page.

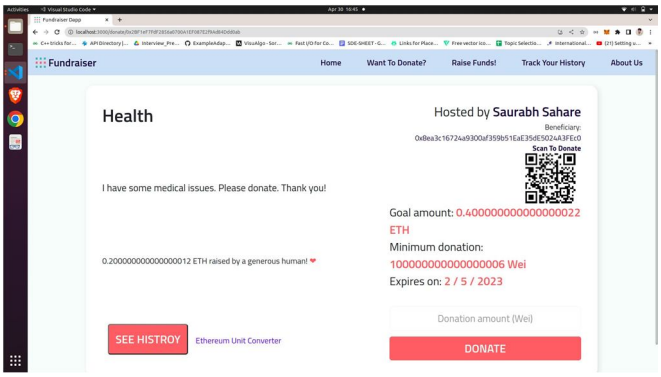

Fig. 4. Beneficiary Address with QR

Fig. 3 shows the Home Page For Donors and available functions on the navbar.

3) Step3: Link to meta mask wallet

When a user conducts a transaction using ethers, a small amount of the currency is used to process the transaction through a process called mining. To use the Metamask platform, users need to register and receive a public key, which they can use to send or receive ethers. In the case of donating to a charity, the donor would send the ethers to the charity's public key, which is listed on the charity'spage. Metamask provides a user-friendly interface forcompleting transactions.

4) Step4: Keep track of the transactions

When Fundraiser creates a fund request using create option as shown in Fig 5. Then Etherscan API allows for transactions to be tracked and reviewed. If a user knows the public key associated with another user, they can viewall of that user's transactions. This capability is available to any user in the network.

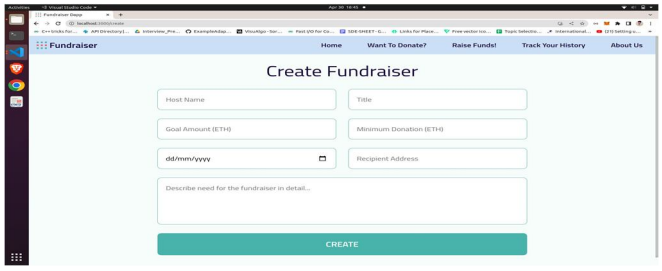

Fig. 5. Request for Fundraising

V. CONCLUSION

The proposed system aims to monitor donations and provide updates to donors once their funds have been received by the intended recipient. To facilitate the tracking of donations, charity chains will utilize smart contracts. The Ethereum platform, being a public platform, is chosen for this purpose. By ensuring transparency in the donation process, donors are likely to contribute more significant amounts to this flexible and efficient system.

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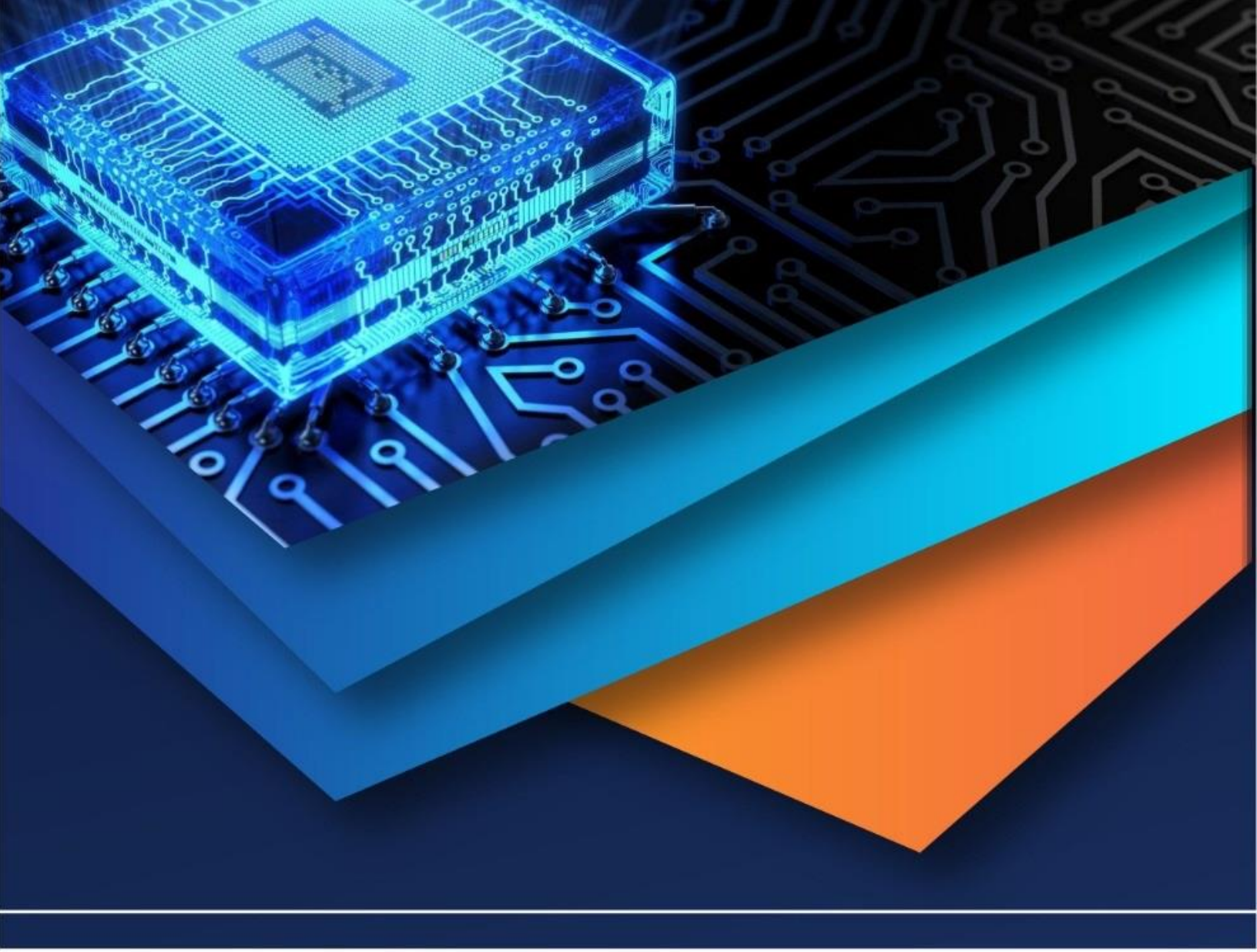

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