

Fund Transfer Tracking System using DLT

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ABSTRACT

Blockchain is technology that is being adopted globally due to its decentralized, secure, immutable, and tamper-proof features. In India, funds are a contentious topic, and large sums of money are allocated to various schemes in the public interest. However, the lack of transparency in this process can be overcome by using blockchain to provide a fully secure and immutable environment for tracking funds. This paper proposes a blockchain-based government fund transfer and tracking system to enhance transparency, traceability, and accountability in the public sector. The system provides a secure, immutable, and decentralized platform for tracking funds, subsidies, and benefits provided by the government to citizens. The proposed system utilizes smart contracts to automate the transfer and tracking process and enable efficient verification of transactions. The paper highlights the benefits of using blockchain technology, such as increased trust, reduced corruption, and enhanced efficiency in government operations. The proposed system is designed to address the challenges faced by the Indian government in providing transparent and efficient services to its citizens.

Keywords: Blockchain, Fund Transfer and Tracking

1 Introduction

Blockchain is a term that is commonly used in today's world, but only a few individuals are fully aware of the technology. Some people call cryptocurrencies like Bitcoin and Ethereum "blockchain," while others understand that they, among other things, function using the blockchain idea. In his white paper, Satoshi Nakamoto introduces the idea of blockchain. Nakamoto is also thought to be the pseudonymous creator of the Bitcoin protocol. Blockchain is a technique for storing data in a way that makes modifying or tampering with the records difficult or impossible. It is referred to as a "digital ledger," much like the ledger that financial organizations use to keep track of their transactions. A distributed system in which a decentralized digital ledger is maintained is what blockchain fundamentally is. The term "blockchain" refers to a chain of networks formed by the connections between each block in a blockchain. Every time a transaction takes place, the record is updated in the participants' peer network. Each block contains specific information, such as the number of transactions. The term "Distributed Ledger Technology" is frequently used to describe this method of decentralized data storage (DLT). Data integrity across the network is guaranteed by DLT. We will talk about the blockchain concept and how it can be used to track public monies in this essay. India being one of the biggest democracies in the world, a sizable section of the population is economically underprivileged. The government of India and state governments provide a wide range of policies and programs to help the population who are economically disadvantaged. People may fail to take advantage of these policies and programs because they are unaware of them. Blockchain technology can be used to track the best plan for citizens to take advantage of various government programs while bridging the gaps in state and central policies, thereby resolving this issue. This project encourages transparency in government operations.

2 Literature Survey

1. Ethna: Analyzing the Underlying Peer-to-Peer Network of Ethereum Blockchain by Taotao Wang, Chonghe Zhao, Qing Yang, Shengli Zhang, Soung Chang Liew. The paper analyses peer to peer



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communication. Detailed explanation on various protocols like gossip broadcast, DEVp2p, Txpool are explained.

2.Data Vaults for Blockchain-Empowered Accounting Information Systems by Muhammad Imran Sarwar, Muhammad Waseem Iqbal, Tahir Alyas, Abdallah Namoun, Ahmed Alrehaili, Ali Tufail and Nadia Tabassum

The paper describes the characteristics of Blockchain. The paper also explains the increase in security and integrity of data shared across a network through SHA256 algorithm. SHA256 uses 256-bit long encryption key and is considered to be most secure and a minor change to the original data alters the hash value.

3.Blockchain Security Attacks, Challenges, and Solutions for the Future Distributed IoT Network by Saurabh Singh, A. S. M. Sanwar Hosen and Byungun Yoon. This paper describes various securities and challenges in blockchain. The paper gives an idea about various securities used in blockchain that helps in understanding the whole system.

4.Do-It-Yourself Recommender System: Reusing and Recycling with Blockchain and Deep Learning by Sachi Pandey, Vikas Chouhan, Devanshi Verma, Shubham Rajrah, Fayadh Alenezi, Rajkumar Saini and KC Santosh.

The paper discusses waste management with the help of combining two technologies: block chain and deep learning. The paper gives a very innovative idea and helps in understanding how these technologies can save the environment.

5.A Framework to Make Voting System Transparent Using Blockchain Technology by Muhammad Shoaib Farooq, Usman Iftikhar and Adel Khelifi. The paper describes various methods in order to provide a secure blockchain based voting system. The algorithms mentioned in the paper does not allow any kind of tampering of data.

3 Proposed System

3.1 System Requirements

Ganache

NodeJS

Git

Meta Mask

Truffle

3.2 Front-end Part

We have created a portal that allows users to submit bids for the projects that the government has put for sale. For the front end, we employed web technologies like JavaScript, React, HTML5 and CSS3 to handle the logic component and provide dynamicity to the portal.

This portal serves as the interface where the receivers who are bidding for specific schemes and the contributors who are the government authorities, communicate and take use of a fully transparent and tamper-proof system at their disposal.

3.3 Backend Part

Our project's backend has been fully created using blockchain-based framework like Ganache. The Ethereum Virtual Machine's development environment, testing framework, and asset pipeline are all based on truffle and Ganache is a component of the Truffle Suite framework.

Ganache is a development tool used to manage your own local blockchain network while creating decentralized applications on Ethereum. Ganache is a personalized blockchain for Ethereum development.

For a private Ethereum blockchain environment, we can use Ganache to engage with smart contracts on your own private blockchain. Smart contracts are programs stored on a blockchain used to further execute blockchain network so that all participants can be updated about the outcome without any third-party involvement or time loss which increases transparency to the system.

MetaMask is used as a reliable and effective payment gateway. MetaMask is an online application wallet which authenticates each transaction made within the network. MetaMask verifies each transaction before processing it which guarantees the effectiveness and security of every transaction.

4 Process

The Fund transfer tracking using DLT mainly uses blockchain based technology. Here we open the ganache interface as in figure 1, which is the local blockchain, and link the project there under the contract tab. The contract tab then displays the number of smart contracts that have not yet been deployed. Only one block which is the first block known as the genesis block is generated under the block tab. It is automatically created when the blockchain program launches and it will not contain any data. The command truffle migrate is used to deploy the backend application using a ganache smart contract in the blockchain network when the Git bash is opened in the truffle folder. After the command has been carried out, a description of the smart contract is displayed.

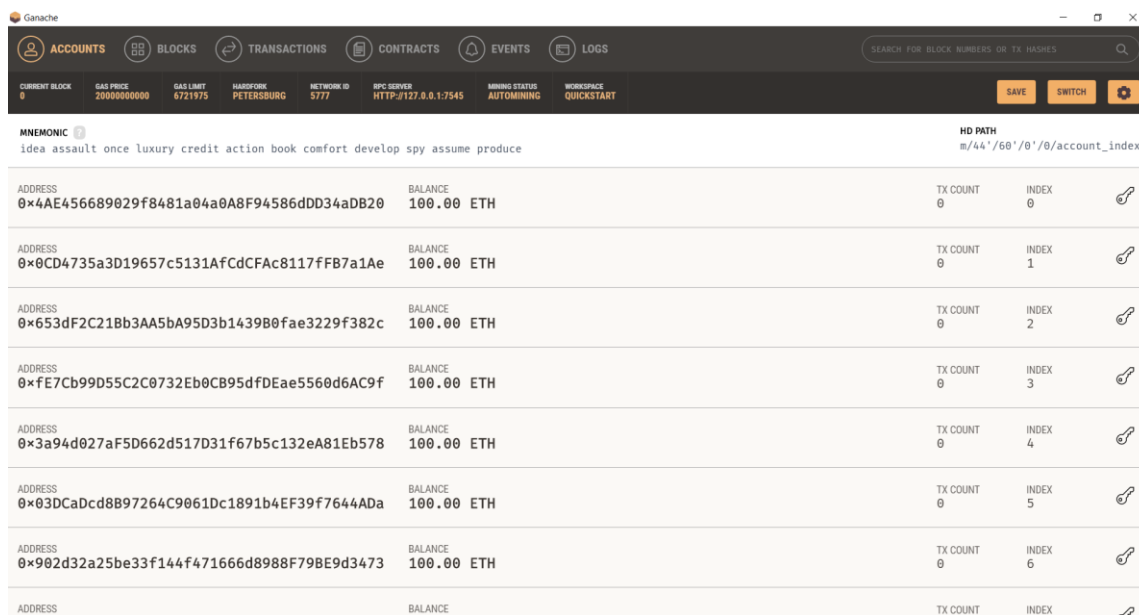


Figure 1: Ganache interface

It contains data such as the total number of deployments, total cost, block number, block timestamp, and so on. The smart contracts are then visible in the contract tab on the blockchain network. Then, under the block tab, further blocks have been added since the smart contract was put into use. In other words, every deployment in a smart contract counts as a transaction. Thus, the blockchain records every transaction that occurs. The deployed smart contract's transaction information is found under the transaction tab. The block number and the time the block was produced are only two examples of the actions recorded under the logs tab. Everything will be monitored using the blockchain networks in this way. The npm run start command is then used to launch our front end through Git bash. Then in localhost:3000 the client-side application is launched as shown in Figure 2.

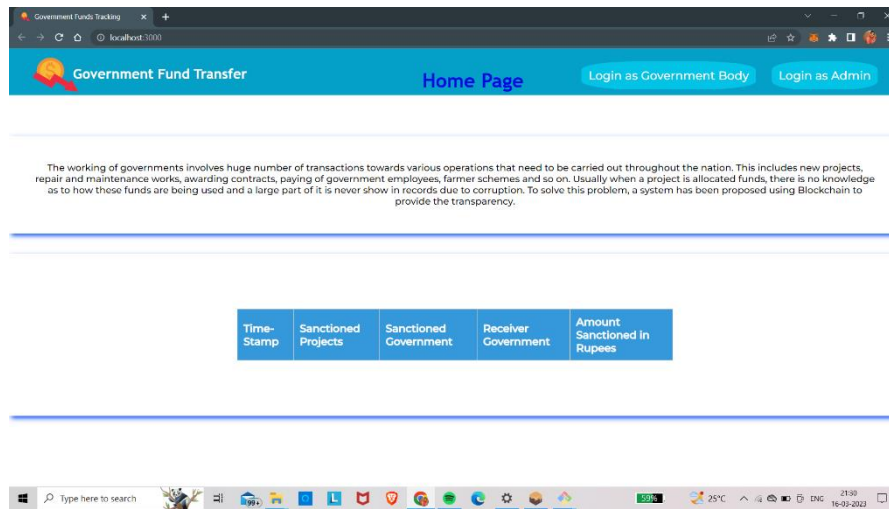


Figure 2: Client-side application after running the command

Next, start the client-side program and log into MetaMask after completing all of these tasks as shown in Figure 3.

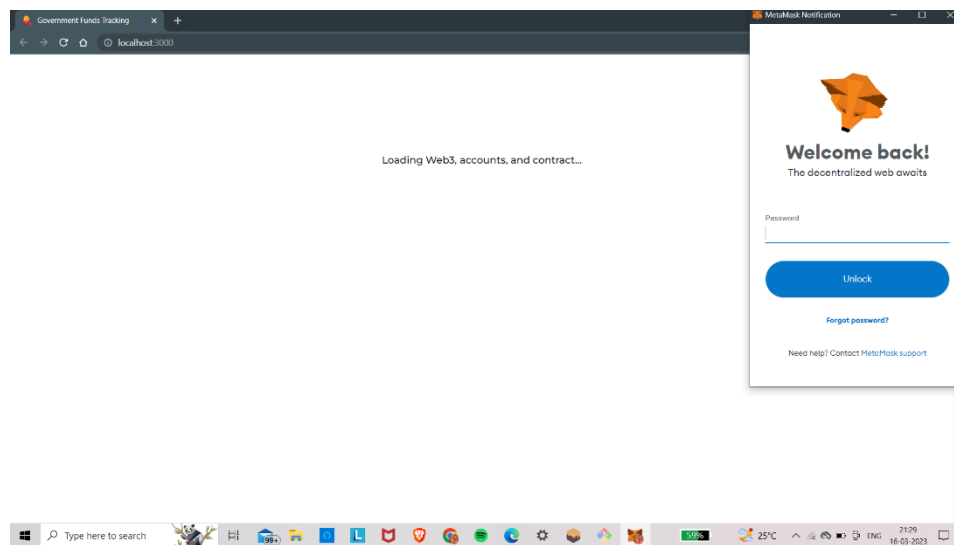


Figure 3: MetaMask interface.

Next, we use the private key to add an admin account to the MetaMask. The first account's key value in the ganache is where the private key is taken. Then, after logging in as admin, we will add the government entities, such as the central government, state government, and so forth, by demonstrating the entity's name, function, and public address as shown in Figure 4 and Figure 5. The public address is derived from the ganache's account addresses. Only the admin has the ability to add additional governments. When adding these accounts to the MetaMask, we'll follow the same procedure as for the admin account and we use the private key for the central government as the key value of the account that comes right after the admin account. The remaining accounts will be handled in the same manner. To create an account, that specific account address is used as the public address for that particular government body, and the key value is used as the private key for adding those accounts to the MetaMask.

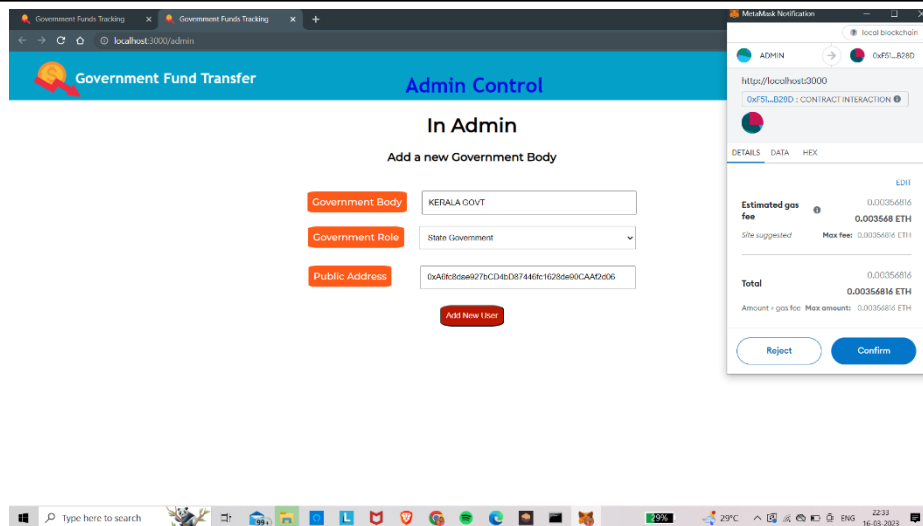


Figure 4: Admin login page to add different government bodies

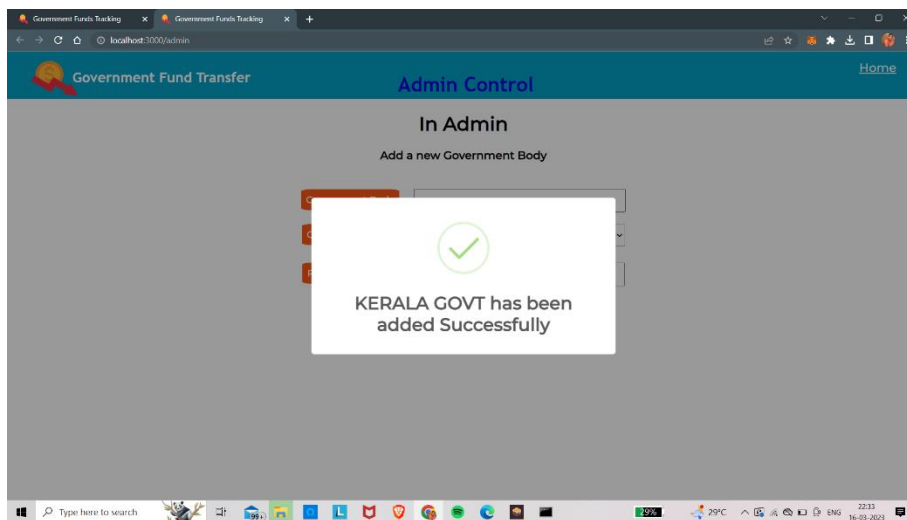


Figure 5: Successfully added the government body

Once all the account are created and added to the MetaMask then we'll login as central government and as shown in Figure 6, we'll select add funds to do the transaction, as all the transactions are assigned from the central government to the other government bodies as in Figure 7. Then choose the section sanction fund and will be redirected to a page as shown in Figure 8 in order to distribute the money among the other government body. As shown in Figure 9, any user may view the table format in which all transactions between the various government bodies are shown.

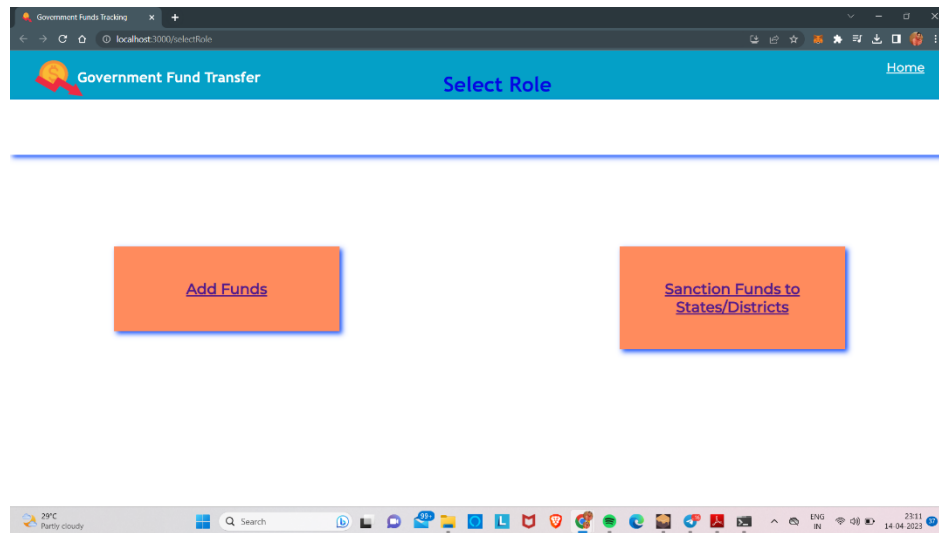


Figure 6: Interface to select role

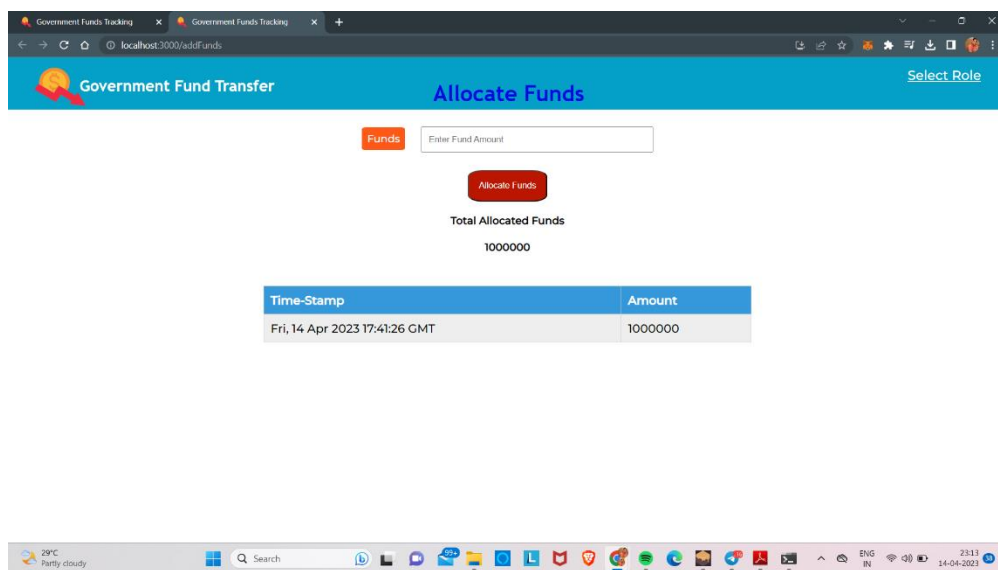


Figure 7: Interface to allocate funds to central government

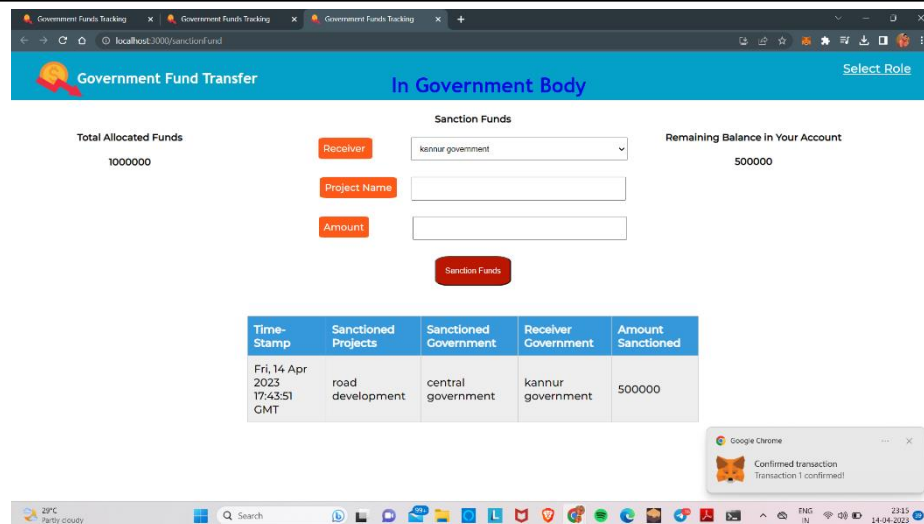


Figure 8: Interface to allocate funds from central government

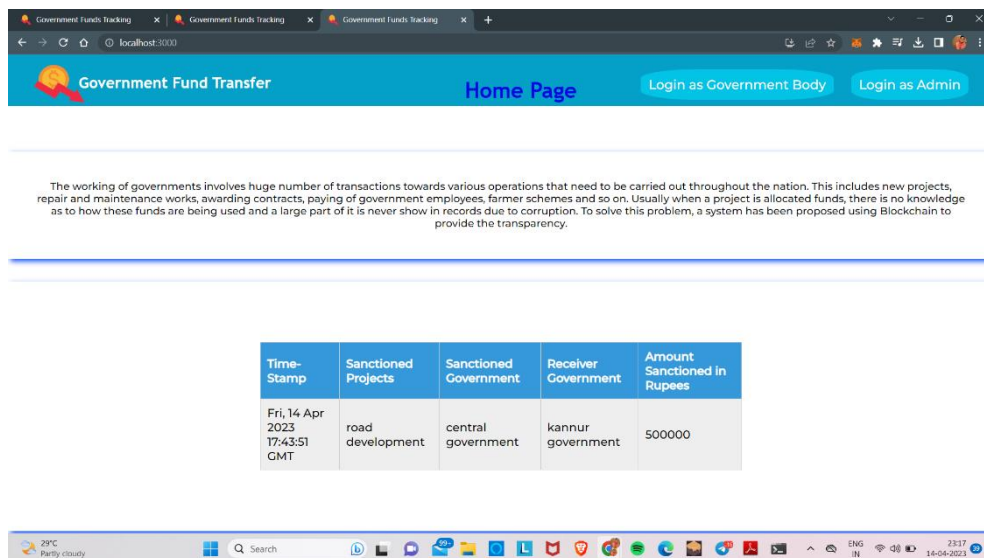


Figure 9: Final output interface

5 Conclusion

The immutability, tamper-proof, protected, and decentralized qualities of Blockchain enable it to close the application's security weakness. Like other blockchain systems, Hyperledger Fabric has a ledger, employs smart contracts, and functions as a framework for members to control their transactional activities. It offers appropriate governance and access control and can be expanded as required.

Access and privacy are taken into account when creating. The technology can give transparency in all transactions with the government with subsequent improvements. Passing the proposed system will enable the community's lower strata to better comprehend how the programs will benefit them. Also, because of the system's openness, they will be able to see every transaction that is being conducted.

The authorities will confirm the legitimacy of every single coin. In this way, every rupee that belongs to the Indian people is kept in good hands, and every person has the right to inspect government finances and ask questions about them.

The P2P network can store data with great strength thanks to blockchain technology. Potential hazards to any form of system modification or manipulation are eliminated by blockchain technology.

6 Declarations

6.1 Acknowledgment

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