



State Government Fund Allocation and Tracking System Over Blockchain

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ABSTRACT

The state government has many departments which have various schemes that are used to provide funds to the citizens that qualify for them depending upon the requirements laid down by the government for each scheme. This means that there needs to be a centralized system which will be able to keep track of all the various applications, document approval status, sanctioned amounts and all the different schemes that the government is offering. This system, however, needs to be highly secured and it needs to ensure that only authorized users are allowed access to the system, which are problems which can be solved using the technology of Blockchain. The properties of Blockchain such as immutability, consensus mechanisms and cryptographic encryption ensure security and prevent unauthorized users from being able to access or edit data on the Blockchain. The transactions in this system will be placed within a transaction pool before a new block is mined which means several transactions can be verified and recorded together to reduce the costs involved in blockchain transactions. Improvement in overall efficiency and quality of user experience for government can lead to tackling of other administrative problems using emerging technologies like Blockchain.

Keywords: Blockchain, Government Fund Allocation, Transparency, Accountability, End-to-End Fund Tracking

INTRODUCTION

The trust of citizens in Government schemes and policies is an important factor in determining whether these policies and schemes will be successful or not. Using the blockchain technology the process of applying for grants announced by the government under various schemes can be simplified and made quicker. The properties of Blockchain such as immutability, cryptographic encryption and consensus mechanisms make the security tighter for the data that is stored. The system described in this article will allow heads of department's access to include new schemes in the system and then accepting or rejecting the applications that the citizens will be able to understand the different schemes announced by the government and upload the necessary documents. Once the verification of these documents is completed by the government officers, they are stored on the blockchain system so that these documents can be reused later. After the verification of these documents is completed, the money will be granted to the respective citizen applicant.

PROBLEM STATEMENT

To build a Blockchain based system in order to facilitate the allocation and tracking of funds from the State Government

LITERATURE REVIEW

The major problem plaguing the fund allocation system is the problem of transparency. The issue with tackling the transparency problem alone is that it leads to rise in concerns about privacy of the citizens applying for the schemes and about the security of the data that is stored by the government. This means that a fund allocation and tracking system that is based in transparency, safety and privacy is required to facilitate the process of allocation and tracking of funds. In this study, we have developed a system that provides the key features of protecting personal data while also providing a transparent pathway for the citizens to track their application status while also giving the Government accurate tracking of the funds allocated to the applicants while not having to rely on multiple middle layers of document verification.

An existing system built over Hyperledger Composer which provides an UI called playground has well defined attributes like asset, transaction and participant, creating a relation analogous to contractors and sub-contractors where contractors withdraw huge funds from governments, and they are then distributed to sub-contractors. This system, however, grants every participant access to all assets in the system, which is not ideal.

Another system looks to provide greater transparency in fund allocation by providing functions to add money to beneficiaries directly, however this system is too generalized, and it does not provide enough document approval mechanisms. Another problem with this system is that it only uses hashing as its security measure for data. This system was improved upon by providing it with attributes: property, activity and participant. However, this means

that the citizens will not be able to track the funds from their side. This system is also built on the assumption that each citizen will only apply for a scheme once and that the application is processed instantly.

A system built in April 2022 provides the facility for creating user accounts to request funds. 'Admins' are special users in these systems who can revoke access to accounts, which means that an external agent must act as an 'Admin' order to function who will have access to all data challenging privacy of public users. It also disallows the tracking of allocated funds. Another improvement on previously built systems is that of using AES as an additional layer of security for data. This system adds security and mobility to the system using cloud-based architecture. It requires a double verification handshake from the Government's and the citizen's side. The system adds more costs for cloud services and keeps the previously mentioned 'Admin' function which challenges the security of data.

The above systems can also be broken down into smaller systems which can be used to allocate funds on a state, district and city level. However, these systems extensively use Database systems which can make the systems less secure. By analyzing the various existing systems in this domain, we have realized that a system that will use Blockchain and its functionalities is more secure and trustworthy than a system which only uses databases. By providing the citizens a way to track their application status and their funds will bridge the gap between citizens and the government.

CHALLENGES IN THE EXISTING SYSTEM

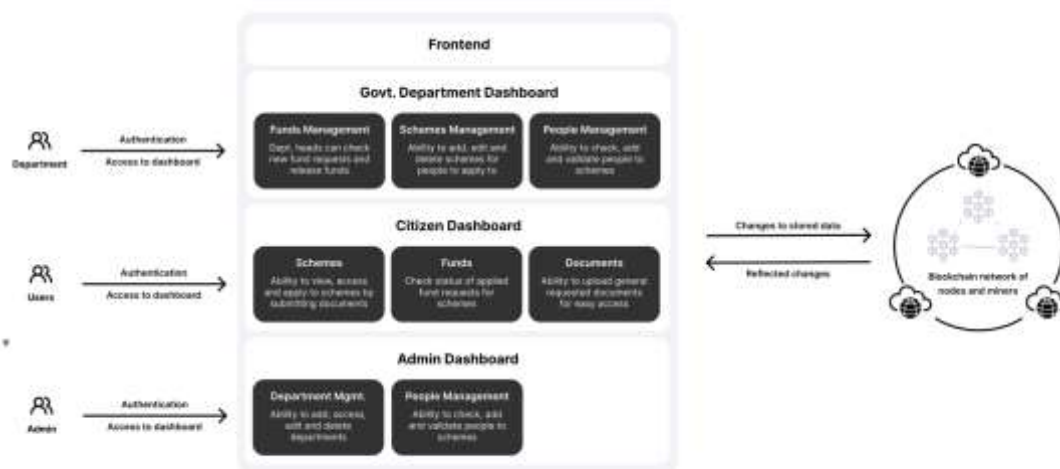
The problems in the existing systems are:

- Provision of access to the assets to all users without any priority.
- Only using one security mechanism like hashing at a time.
- Not granting the applicants the ability to track the status of their funds.
- Only allowing a singular application from a participant per scheme.
- Giving the admin rights over the entire system that is a third-party user and might not be trusted completely.
- Added costs of cloud services that are required to store records.
- Extensive usage of the database for all transactions makes the storage less secure.
- The rejection level for an application is not being made clear to the applicant.

PROPOSED SYSTEM

Privacy of applicant's data, transparency in the system, and security of the data stored are the biggest problems that exist in the current systems. The proposed system is based on the technology of blockchain which lends transparency and authentication mechanisms to this system due to its consensus mechanisms and its cryptographic encryption gives the data an additional layer of security. The system will ensure that the documents uploaded by the applicants are only viewed by the authorized government officers. This system also ensures that no single user has access to edit or change all types of data within the system.

The system can be best depicted as follows:



In this system there will be three types of access provided to the system:

1. Department Access: Department officials, who have been authorized to view documents from applicants and to create, modify and delete schemes related to their departments and are able to track the funds to the applicant's wallets.
2. User Access: Citizens who want to apply for schemes can use this access mode to check the available schemes, check if they are eligible for a particular scheme and apply for it. They can then upload the necessary documents and wait for processing.
3. Admin Access: Admin access is given only to top level government officials overseeing the departments and the users. They have access to create new departments if necessary and are the ones who authorize the creation of accounts for new users.

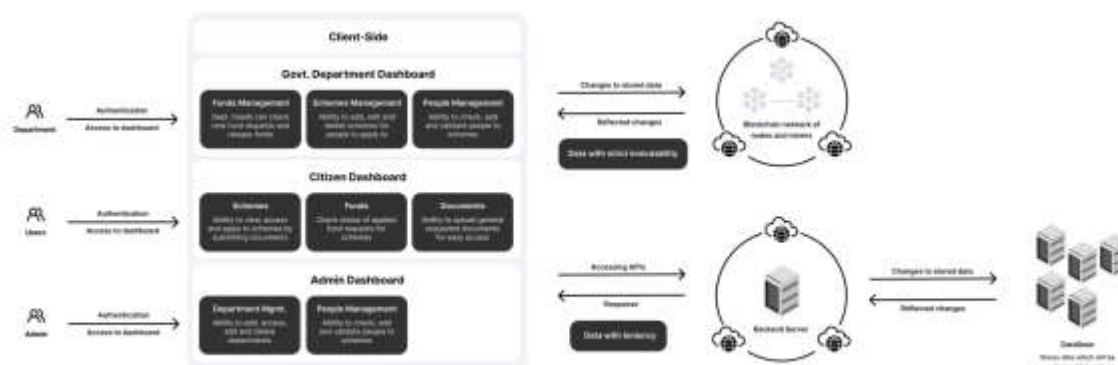
IMPLEMENTATION METHODOLOGY

Implementation of this system is based upon creating a system that can store transaction data on the Blockchain which makes the data stored safe and secure. This system will store data on the Ethereum Blockchain which is open source, so its code is openly available for anyone to view, use, modify, and distribute.

Solidity is used to write the smart contracts necessary to complete the transactions. The documents that are uploaded by the user and which have been approved will be stored permanently on the cloud system which means that approved documents don't have to be re-uploaded. The system will also bundle multiple transactions together in order to reduce the costs required in mining blocks.

The addition of the admin function which is only allowed to approve new accounts and add, change, and delete accounts or departments means that the admin will never be able to interfere in the approval process of the documents.

By reducing the dependency of these systems on traditional databases and will not store data like document-id, approved amounts or account information of citizens like Aadhar Card Numbers, PAN Numbers, etc.



The above system will be accessible to all authorized users and make the process of allocation and tracking of funds easier and faster.

CONCLUSION

The existing blockchain based systems for fund allocation and fund tracking have problems of privacy of data, transparency and accountability. In this study, the proposed system looks to build upon pre-existing systems and give the users more transparency and bridge the gap between citizens and the government.

This new system also looks to make the user experience better and simpler to make the system more attractive for all citizens to use. By adding more features to enhance user experience we hope to engage more citizens to use the system.

FUTURE SCOPE

The system can be made more scalable by using the Byzantine consensus mechanism. The system can be further secured by adding another level of encryption to data. The usage of multiple documents can be bundled together to use one unique identifier which will make tracking easier. Sub-contractors can be added so that funds for schemes can go directly to them whenever necessary instead of citizens having to find contractors and sub-contractors.

REFERENCES

1. Gawade, Kale, Mane, & Koli. (2022, April). Government Fund Allocation and Tracking System using Blockchain. *International Journal of Multidisciplinary Innovative Research*, 2(2).

2. Vadher, Pandey, Sawant, & Lopes. (2021, June). State government fund allocation and transaction system using blockchain technology. *Journal of Emerging Technologies and Innovative Research*, 8(6).
3. Katore, & Choubey. (2021, May). Government Scheme and Funds Tracker using Blockchain. *International Journal of Engineering Research & Technology*, 10(5).
4. Ansari, Patodia, & Mirza. (2022, March). Government Fund's Allocation and Tracking System Using Blockchain Technology. *International Journal of Advanced Research in Computer and Communication Engineering*, 11(3).
5. Jambulkar & Ratnaparkhi. (2020, September). Government Fund Distribution and Tracking System Using Blockchain Technology. *Journal of Emerging Technologies and Innovative Research*, 7(9), 1379–1387.
6. A. Mohite and A. Acharya, "Blockchain for government fund tracking using Hyperledger," 2018 International Conference on Computational Techniques, Electronics and Mechanical Systems (CTEMS), Belgaum, India, 2018, pp. 231-234, doi: 10.1109/CTEMS.2018.8769200.