

Blockchain based Secured Allocation and Tracking of Government Funds

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Abstract—Government has numerous responsibilities of state and individual ministries in the country. The everyday working of government involves an enormous number of transactions of various operations that need to be carried out throughout the country. A major hurdle that the top government faces is the low-level corruption that is sometimes impossible to track which hinders the state progress. Tracking it is a very difficult task in the persistent modelling and structure of the government. Every detail is recorded either on paper or a simple database with first to second level authentication. A system that allows for a full proof, secure and authentic fund allocation and tracking is required to form an incorruptible government. It is the present requirement for transparent operations of the government. Blockchain technology is considered to be one among the many transformative technologies in present times with its prominent use case being the application in the crypto currency areas. It becomes very convenient to track the huge amount of data which is not possible in the current system. This makes the functioning of the government and fund flows transparent. Thus, might also prove to gain the trust of the citizens. The top-level government can track all the transactions that happen in the lowest levels. The vital objective of this project is to develop a smart system to track funds allocated to the state government as they traverse through the government process at each stage. This project leverage blockchain technology to secure the transactions at every stage while maintaining transparency in every transaction, sealing every transaction with proofs as the funds move ahead. The proposed system strives to achieve a more secure and an efficient system to maintain the transactional details of the government. Providing more efficient and user-friendly interface, this system allows every authorised individual to view the fund records and transaction details.

Index Terms— Blockchain, Merkle tree, data security, Government funds, secured funds tracking.

I. INTRODUCTION

A block chain can be understood as dynamic records linked to each other with the careful aid of cryptography. Each block is implemented making use of the hash value of the preceding block thus as predominantly evident it is resistant to modifying any data contained inside the blocks and maintained as records. Amid the various useful features of block chain collaborative feature, Decentralised framework, resistance to tampering by third party intruders makes it more relatable and apt to be deployed in extremely secure government systems. Block chains though visualised as a list of records should not be misinterpreted only as a database used for storage rather these ledgers hold useful informative details of transactions carried out. Network of nodes, blocks that hold transaction

details and a chain that holds the cryptographic hash details form the major constituents of any typical block chain system.

II. RELATED WORK

It has been released in a report by the United Kingdom government that blockchain is potent for use in government and government-based services with regard to which it is officially recommended to be used in the same [4]. In the view of providing public notary facilities for citizens, the Estonia government has been making good use of a decentralized system. Here, documents of education and certificate of birth could be notarized with electronic identities allocated by the government [4]. As a part of the esteemed ambition of Dubai to not use paper and preach the goodness of being paperless by the end of year 2020 efforts have been deployed to build a platform that is single. It is via which public sectors for city could successfully host blockchain systems [4]. An announcement has been made by New York city lately. As a part of this plan has been woven to establish a resource hub for the discussed technology's industry to unite the state and stakeholders to facilitate regulation and simulation. Numerous cities across the globe have evidently raised initiatives to employ approaches and set goals to get a hold of the technology's wave, to make their play in the race and stay [4].

Electronic voting is that area that could be exploited to suit the security needs of the government by utilising the block chain technology. Electronic voting is a key public sector and has to be made note of. A simple idea of block chain technology is exploited to suit the needs and be implemented without hassle easing and simplifying the entire process. The primary issues addressed could be broadly categorised into two: Access for voter and Fraud that could prevail. Anonymous casting of vote is carried out via smartphone, computer. Intruders cannot be successful in causing havoc as it will be reflected on ledger. Further, corrections are made by peer-to-peer network nodes. Comprising a network on grounds of security is nearly impossible as most of the blocks have to be hacked before the introduction of new blocks. Thus, it is ensured that votes are not changed and have not been removed [1].

Blockchain based Smart Contract for Bidding System is specialized in blockchain tech with relatively less transaction fee and is made use of to escalate the smart contract of public bids and sealed bids. The stated paper makes use of the blockchain methodology into the E-auction system in order to solve the problems persisting in the conventional methods. Blockchain being a peer-to-peer with right of entry, to structure such that factors in the shape can trust every different factor. Every party can securely communicate, authenticate and exchange records to any of the opposite websites. Within this decentralized structure, the centralized intermediary can be deleted to reduce the transaction cost. The intelligent settlement is made use of in order to avoid the bid fee leaked with the aid of the lead bidder. Some restrictions are laid in the smart deal which can't be revealed prior to the cut-of date [2].

III. PROPOSED SYSTEM

The project revolves around how a technology as secure as blockchain could be incorporated in the fund allocation system of government and the procedurised tracking of the allocated funds. Federal government setup that functions in three authorities as the central government, government of states and local departments could be treated as an ideal target to implement a blockchain system for verified allocation and tracking. Of the allocated funds.

When the local departments, the ministries that they are in, raise a request to the respective state governments stating the amount of funds that they require. This local department behaves as a confluence in the network. The second node in the blockchain network is the state government. When the departments send their individual requests to the state government, the state government node consolidates the individual requests and sends the total consolidated fund as one request to the central government seconded by blocks creation and cryptographically hashing and linking the same. Central government is the third node of the network. When the central government obtains the request from the second node, the fund is allocated and an additional block is created and hashed. Any changes made to the data of the block say account details, sum of funds cannot be changed by any intruder at any point as the entire system is cryptographically hashed and each block is hashed with its previous blocks details. Any bureaucrat, minister, common man can view the details thus guarantees transparency in governance and the fact that the block's contents cannot be changed guarantees ample security. The decentralized approach ensures no loss of data, intact storage of all the documents, thorough verification by any bureaucrat, ministry or a citizen. Thus, employing blockchain technology in fund allocation and tracking takes electronic governance a step forward curbing corrupt practises, ensuring transparency and security.

A. Project Architecture

Using blockchain technology for tracking the transactions can make it more secure and digitized. This incorporates the creation of blocks for every transaction in the government. Each transaction details are stored in the data field of the block and encrypted. Figure 2.2 depicts the architecture of the project. In this web application developed, a network with 3 peers is mocked. Department/ministry, state government and central government constitute the nodes of the network. At the beginning of every financial year each ministry of the state plans its financial requirements and forwards the fund request to the government at state. State processes the request and forward the aggregate fund request (cumulative sum of fund required by each ministry) to the central government. On approval of the central government, funds are transacted to the state government. Here, a block is generated which contains the transaction details of fund transfer from centre to state. This generated block is validated by all the nodes (proof of work) and is added to the block chain (if existent) or forms a new chain. State has to allocate the received funds from the centre to each ministry.

For every transaction happening in the network, a block is generated, validated and appended to the blockchain. Every single node in the network has the same copy of the block chain. Hence, any changes or intervention is directly reflected on the chain. This ensures the security of the transaction at each level and transparency in the financial sector of the government. Any intervention or the modification leads to the chain breakage. This can be easily found through block chain mining. Hence, no corruption at any level can go unnoticed. This also ensures the efficient usage of monetary assets of the government. Flow of every penny in the system is recorded and kept track of securely. The entire workflow of the system is depicted in the figure 1 below. All the functionalities are shown in order.

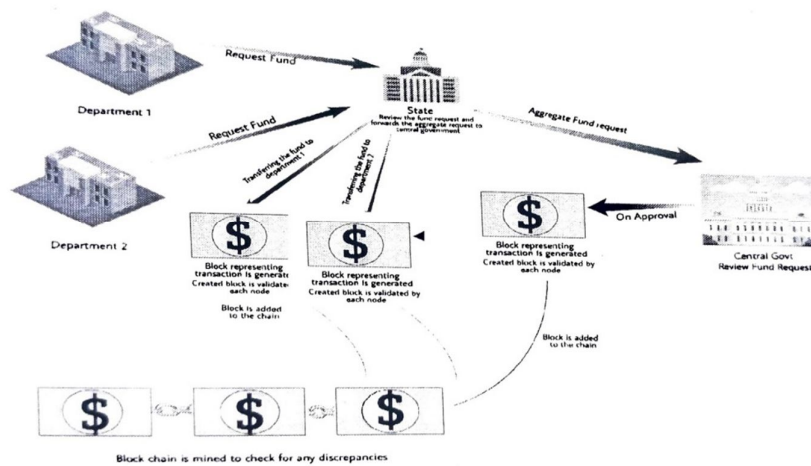


Figure 1. Architecture

IV. EXPERIMENTAL RESULTS

In this section results of this work are discussed. The work was carried out on the Intel i7 processor and 8GB of RAM. I implemented the creation of block, chaining and mining operations in java on windows platform. This system stores all the transactional details in the blocks. Tracking them is made available for all government authorities, thus making the system transparent. Any modifications in the data are reflected and can be viewed by all government authorities.

V. CONCLUSION

The application design avoids the centralized intermediaries or the third parties involved in the fund transfer system. Every authorized person in the system can view the transaction details. Any modifications are directly reflected. Thus, no modification can go unnoticed. Corruptions at any level can be eliminated through this system. This application can fill in the gap to make the working of government more digitized and paperless. Any loss of documents is avoided. This decentralized system provides every authorised party to track the funds transferred. Thus, the government can track every rupee systematically and conveniently. This also promotes efficient usage of the government funds. Any third party

FUTURE WORK

With certain advancements more value and power could be added to this project. Game theory puzzles are one such advancement that could be incorporated. This is more of a mathematical model that is concerned with the mining part of the blockchain. The block is validated before being added to the chain. The block is validated before being added to the chain, and the Game theory puzzle starts a competition among the miners. Upon successful solving of the complex puzzle, a reward could be felicitated or the block be added itself. Complex proof of work would mean more confirmed transactions and validated blocks creation.

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