Use of Blockchain Technology to reduce the level of corruption in E-Tendering Process

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Abstract - *E-tendering is being adopted by world which is electronically publishing, communicating, accessing, receiving and submitting all tender related information and documentation. The Research paper presents use of blockchain to reduce the Corruption Level in E-Tendering process in government field. Similarly, it's also used for all government payments as a way to increase transparency in transactions and avoid overbilling to minimize frauds and money embezzlement.*

*Key Words***: E-Tendering, Bitcoin, Blockchain, Ledger, Bidding, Contract, Miners.**

1. INTRODUCTION

Tendering is a bidding process that is used to invite bids for large projects and procurement contracts. In case of e-tendering, this whole bidding cycle is conducted online hence e-tendering system has gained much popularity over the last few years and it is replacing the traditional tendering systems in a majority of industries. Now days All kind of Civil work and NTPC e-tenders are now quite commonly used by the government are completed with the aid of the virtual tendering process. Bitcoin is a cryptocurrency, a form of electronic cash. It is a decentralized digital currency without a central bank or single administrator that can be sent on peer-to-peer bitcoin network without the need of intermediaries.

According to Don & Alex Tapscott, authors Blockchain Revolution (2016). "The blockchain is an incorruptible digital ledger of economic transactions that can be programmed to record not just financial transactions but virtually everything of value" **[2]**. The increasing demands for more transparency in public administration worldwide ask for open data, and the establishing of other mechanisms as well as keep using the contributions of new technologies for focusing on better controls and governance mechanisms. One of the new technologies that presents potential to be used to protect organizations from corruption is Blockchain. An important point when dealing with corruption perpetrated by frauds is the use of technology to avoid wrongdoing or to reduce its impact. Tenders are very

complex subject provided they are the main way governments transfer money to other organizations, including private one.**[1]**

To participate in process people can easily review the websites of online tendering portals that provide information about the latest tenders. After identifying the ideal tender contractors can subsequently log in the relevant tender website, review the T&C (Terms and Conditions) and register themselves in process.

2. LITERATURE REVIEW

As the Tendering process is upgraded there are some issues which were not yet fixed. Corruption is the one of the biggest problems which occurs in E-Tendering process i.e. money sanctioned by government while giving the contract. Corruption often increases the cost and lowers the quality of goods or services acquired which might not meets the expectations described in contract. So sometimes project often fails before its validity because of insufficient funds provided by government, due to third party involvement which leads corruption in public procurement and can be profoundly harmful to country's economy and growth.

We know some structures which were collapsed due to poor material used which results into severe casualties. Sometimes we heard structure's (bridge, building or any other public place) had been collapsed which damaged the infrastructure with huge casualties. It may happen due to improper maintenance or the bad resources/materials used to construct it. There was incident occurred in 2015, the contract was to put electricity wires underground so there is no problem of power misuse or any injury such as short-circuit. So according to contract the contractor has to dig up 7-10 feet ground and then placed the wires with proper coating wound on it. After that contractor has to cover it by stones and cement mixture and cover the street by blocks.

But actual work was not according to contract i.e. workers dig up only 2-3 feet and finished the work by

placing the wire underground and covered the street by blocks. In Monsoon water goes inside the blocks so street remains wet and sometimes pedestrians faces electric shock while walking due to improper work done during construction. So, in response when people asked contractor, he said I got only these amounts of money so what should I do?

If these kinds of issues happened at low level imagine what should be happened in big projects? What money would be sanctioned by the government? what and how the resources were used? To solve these problems, we can make use of Blockchain which can reduce the level of corruption as well as the frauds in financial sectors due to its powerful features like immutability, transparency, decentralization.

3. OBJECTIVES

1) Use of Blockchain and Cryptocurrencies to reduce the level of corruption in E-Tendering process.
2) To achieve transparency, immutability in transactions.

4. CONCEPTUAL MODEL

As we know about E-Tendering process there some phases in which vendor can undergo i.e. from Tender notice creation to Tender audit and storage. User can view the Terms and conditions and register for tender. After bidding is done and before giving tender to authorized vendor, we can open an account for vendor to transfer money. Also, we able to keep track of it because we are working in blockchain environment, we can maintain transparency, immutability in transactions. Each block consists of proof of work, hash of previous block and transaction details which is immutable and true information in nature. Every block is related to another Block i.e. there is a parent-child relationship between two blocks. There can be only one child to a parent and a child can have a single parent. This helps in forming a chain in Blockchain as shown in **Fig.1**. When payment process begins, we can enter transaction information such as personal details of vendor, amount and other information and broadcast it to P2P network called as Nodes.
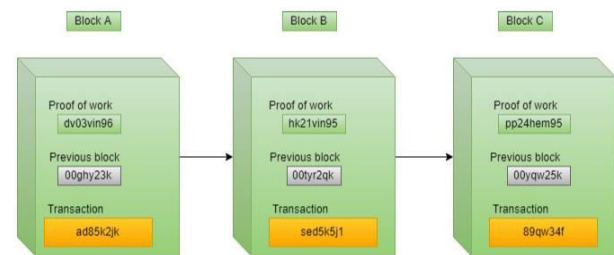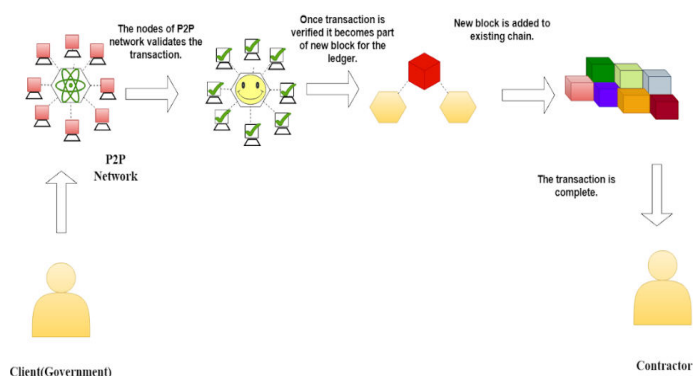

Fig:1-Structure　　　　　　　　　of　　　　　　　　　block

Available nodes can validate the transactions by verifying the transaction details. These works can be done by Miners who are always looking forward to mine new block and are also listening actively to receive new blocks from other miner as well as from the transaction pool. Before adding transaction, it will check if any of the transaction is not already written in a block that it might receive from other miners. If so, it will discard those transactions otherwise add the transaction to block. The miner will add his own Coinbase transaction for getting rewards of mining the block.

The miner in similar way calculates the State and Receipts transaction root hashes
Also, nonce and timestamp is added to the block header. One of the miners would be able to solve the puzzle and advertise the same to other miners in the network. The other miners would verify the answer and if found correct would further verify every transaction while accept the block and append the same to their ledger instance. This entire process is also known as Proof of Work wherein a miner provides proof that has worked on computing the final answer that could satisfy solution to the puzzle. This generates a new block on the chain which contains transaction details. During this time the accounts of both the parties are updated with new balance. Finally, the Block is replicated across every node in the network and added to chain which completes the transaction.**[3]** After process gets complete the money is withdrawn from client's account and deposited into vendor's account and the transaction is completed.

Fig:2- **Conceptual Model**

[4] https://www.firstpost.com/business/laxmicoin-indias-own-bitcoin-seeks-regulatory-clarity-for-launch-1326881.html.

5. VARIOUS INITIATIVES

There are many cryptocurrencies available like Bitcoin, Ethereum, Litecoin, Ripple, Bitcoin Cash, Omisego, Qtum. To support cryptocurrency in India, Reserve Bank of India discover Laxmi Coin **[4]**, which have been preparing to launch as India's first virtual currency for many weeks. As it is government asset, we can implement Laxmi coin in our blockchain environment to minimize the corruption as only authorize users can have access to Laxmi coin which will reduce the third-party involvement and also, we will be able to track the usage.

6. CONCLUSIONS

The changes which are made are transparent to all participants. Once the block is written it can't be deleted. There are multiple miners which can validates the transaction so there is no central authority which results in Transparency, Immutability and decentralization respectively. As the level of corruption is rapidly increasing in India, we can use blockchain technology to reduce it as well as use of cryptocurrencies to support next generations technologies which might scale and improves economy of India.

REFERENCES

[1] https://www.researchgate.net/publication/325495539_The_uses_of_the_blockchain_smart_contracts_to_reduce_the_levels_of_corruption_some_preliminary_thoughts.

[2] https://blockgeeks.com/guides/what-is-blockchain-technology/

[3] https://medium.com/coinmonks/https-medium-com-ritesh-modi-solidity-chapter1-63dfaff08a11