

Smart E-Tender Processing and Tracking Application Using Blockchain

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Abstract

Tenders and Bids are generally used by Governments and Businesses to purchase goods and services. The mismanagement of Tendering results in huge losses if practices go wrong. This includes promoting contractors, mishandling records, lack of transparency, hacking, data editing and other issues. To ensure that the tendering management process is secure and efficient, here we use Blockchain Technology to resolve Tendering Management problems. A Blockchain is secured by a combination of encryption in conjunction with an architecture based on indisputable blocks for transaction management. In that case, We use Blockchain Hyperledger technology to secure transactional documents as well as transactions such as tender documents.

Keywords:

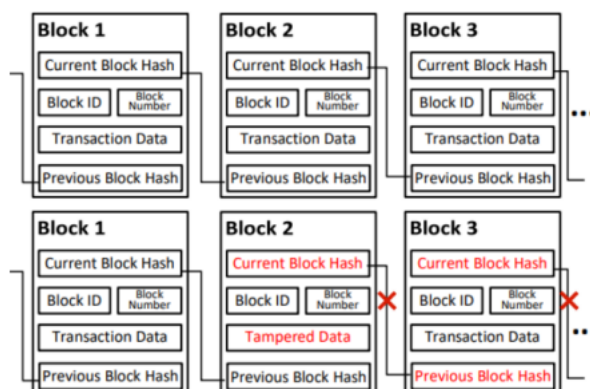
E-Tender, Blockchain, Decentralized System, Ethereum, Smart Contract.

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I. INTRODUCTION

BLOCKCHAIN - Blockchain is a peer-to-peer network architecture. If a peer fails the data is accessible through other peers. All participants share equal roles in networking. Blockchain is a flat topology and all participants are identical. Blockchain is not hierarchically organized. Decentralization, Transparency and immutability are the key features of Blockchain Technology. Blockchain is a new and ground-breaking database. It is not as same as other types of databases that are installed on a single central server. The blockchain database is set up on computers. Participants who have used the database use those computers. The same identical database is installed on every computer that has used the database; and therefore it is referred to as a distributed database. The participants are referred to as a node. All nodes have to agree whenever a new entry is created in the database and a consensus has to be reached. For example, if we use the payment metaphor, if a person is trying to make a payment from one user to another and has insufficient funds within. Furthermore, there are participants in the network called miners, that bring processing power to the network to solve mathematical problem in return for a reward. This is used to make sure that only valid new transactions can be added to Blockchain also permits new computing platforms such as Ethereum.



Ethereum- Ethereum is a blockchain which anyone can download and execute the processing software. It is a platform of Internet service which will provide a guaranteed environment for computation. Ethereum is a programming blockchain and peer-to-peer network. It provides a comprehensive set of functionality useful to developers. EVM or Ethereum Virtual Machine is the focal point of this system and where all smart contracts are executed. EVM is completely self-contained and does not have access to file systems or processors. Since each node of the system operates under Ethereum virtual machine, it contains consensus over the entire network. Ethereum is the best fit for apps that automate direct peer interaction or facilitate group coordination action through a system. Ethereum virtual machines carry out transactions. Every node in the chain functions as an EVM. EVM is the application server that will support smart contract processing and scheduling features.

Ethereum Smart Contracts - Smart Contracts are the strongest feature of Ethereum Blockchain. Smart contracts are contracts whose functions can be called external. Smart contracts are programs that monitor the behavior of accounts in the Ethereum state. When an Ethereum contract is compiled, the contract is compiled in bytecode. The bytecode is stored within the Ethereum network on the blockchain. Due to the fact that the blockchain is immutable, after it is added to the blockchain more changes can be made to it. When an address is created and the smart contract is compiled, by recompilation, it goes on to have an updated address. All contracts have their own addresses. The original idea for Ethereum was essentially to do some coding that enables the user to put money in holding bin, and this holding bin would require certain parameters to be met. Smart contracts are one of the main reasons which blockchain and distributed delivery technology progresses beyond the case of value storage usage or financial handling transactions.

TECHNOLOGIES USED:

EVM(ETHEREUM VIRTUAL MACHINE):

The process of understanding a set of instructions following certain rules (smart contracts, transactions, applications) and execution of such instructions in a logical order this is done by Ethereum Virtual Machine.

In order to create a private network your computer must first become a node of in Ethereum network and then by downloading the entire blockchain we can synchronize it with main Ethereum chain.

For interacting with blockchain network we will use following tools:

1.Geth(Go Ethereum):

To build web development based application Geth is a suitable programming language. This language is basically implementation of Golang programming language. Using this we get connected to java script console which gives access to all the required functions.

2. Creation of DATADIR folder:

Create a separate Folder for storing the database and wallet, it is the basic requirement for creating a private network.

1. Create an empty folder and name it.
2. Right click on folder and select <<Git Bash Here>>.
3. Thus the system will display if everything is ok.

3.Creation of Genesis Block:

In order to start a blockchain network we have to start by creating a single block to which the entire blockchain network will be connected this block is called as genesis block. This block is created during the mining process and added to the network .We can create a genesis block by writing these commands:

4.Creation of EOA(Externally Owned account):

Create a Externally owned account by running a command on second window on Geth window.

After it shows the status create your own account by using command:

Personal.newAccount()

- 1.Create an empty folder on system and name it.
- 2.Set the password.
- 3.Save the account.
- 4.Check the balance in you wallet

5.Get Ethers for account:

By using mining we can get some fake ethers in order for some transactions if we set our mining difficulty level low we can start mining by using

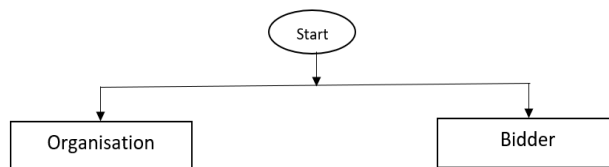
miner.start()
To get balance use:
eth.getBalance()
Thus you will get fake ethers in your account
Stop the mining by using command:
Miner.stop()

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The E-Tender Processing and Tracking Application will work in many stages:

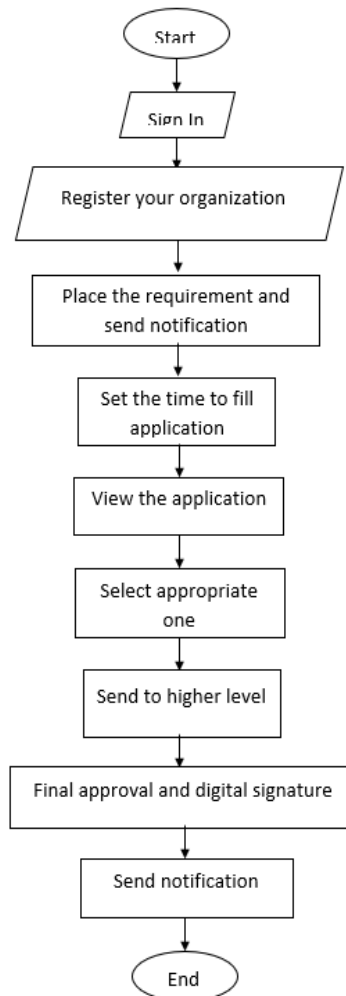
LOGIN/REGISTER:

Login will be provided for two entities for Bidder and For Organization, if you have not logged in before You will get a Register Button where an Organization has to fill necessary details in the form such as Name of Business, Necessary Documents to validate your Business and Contact Details now after registering the Organization will act as a full Node. It is also necessary for Bidder to register by filling necessary details.



NOTIFICATION STAGE:

At Organization End:

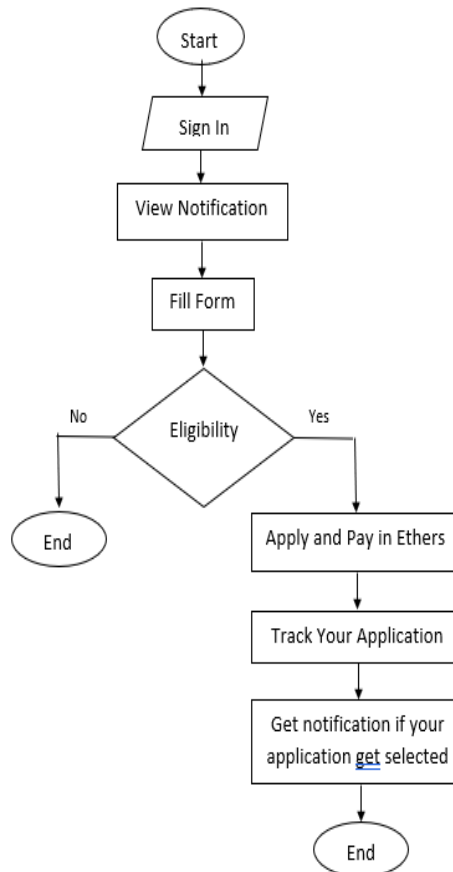


Organization will fill the notification form as per the requirement mentioning their demand for supply and necessary conditions for processing this deal, organization also needs to mention the time limit until which people can place their bids and send notification as per their requirements.

At Bidder End:

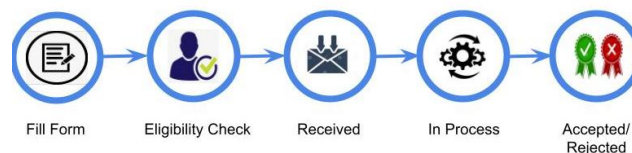
The Bidder can read this notifications regarding ongoing bids in notification sections and participate in auctions by filling the eligibility form first if the bidder is eligible for the process then bidder can he/she can fill the application form for interested bid by filling the application form and placing the bid by paying certain amount of application fee in ethers.

At Bidder End:



TRACKING STAGE:

The bidder can track his application the application form will basically go through five stages Form filling ->Eligible->Received->In Process->Final Status(Accepted/Rejected).



sPROCESSING STAGE:

At Organization level all application forms will be arranged in ascending order based upon their bids. The lower level authority can view the application but the personal details of the bidder will not be visible. The lower level authority can select minimum 1 maximum 3 applications and send it to higher authority for final approval and digital signature.

SELECTION STAGE:

After higher authority approves the final application, the bidder will be notified and his personal details will now be visible to the organization

CONCLUSION:

The Web-3 technologies are trying to fulfill the need in the market for building secure, robust, transparent and fast systems. Where each of the day to day tedious process can be turned into an efficient application which speeds up the process and makes it efficient.

As we can see the corruption in the system can always be eradicated with the help of technology, thus the blockchain base E-tender processing and tracking application replaces the old system where the malpractice and altering of data was prevalent. The E-Tender application successfully accomplishes the purpose of hiding the identity of user so that no partiality is prevailed in the system, any alteration is notified and can be caught, secure and easy to use experience for bidders, more structured and transparent working experience for organizations. In this system we try to achieve a total secure, transparent, easy to use and structured platform.

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