

# E-TENDERING SYSTEM USING BLOCKCHAIN

Om Choudhari<sup>1</sup>, Prashant Dolas<sup>2</sup>, Riya Jadhav<sup>3</sup>, Pratap Bhamare<sup>4</sup>, Prof. G. G. Raut<sup>5</sup>

<sup>1</sup> Om Choudhari, Department of Computer Engineering, GESCOE, Nashik, Maharashtra, India

<sup>2</sup> Prashant Dolas, Department of Computer Engineering, GESCOE, Nashik, Maharashtra, India

<sup>3</sup> Riya Jadhav, Department of Computer Engineering, GESCOE, Nashik, Maharashtra, India

<sup>4</sup> Pratap Bhamare, Department of Computer Engineering, GESCOE, Nashik, Maharashtra, India

<sup>5</sup> Prof. G. G. Raut, Department of MCA (Engineering), GESCOE, Nashik, Maharashtra, India

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**Abstract** - Governments and businesses rely extensively on information and communication technologies for interactions and communication. E-tendering, the electronic publishing, access, and submission of tender-related information, is becoming more and more well-liked on a global scale. However, the risks associated with this digital environment include fraud, collusion, and unauthorized access. Blockchain technology is a possible answer for the construction business since it offers qualities like transparency, traceability, non-repudiation, and non-tampering. In order to increase efficiency and transparency, this study introduces a web application for a blockchain-based electronic tendering system. Blockchain allows for the secure, decentralized storage of transactional data, which helps organizations fight fraud. The experiment highlights the usefulness of blockchain for business bids and purchases.

**Key Words:** Blockchain, Smart Contract, Tendering System, Security, Tenders, Bidders, Bidding

## 1. INTRODUCTION

Blockchain technology has been embraced by numerous businesses in many different industries, including finance, healthcare, agriculture, and government. However, the lack of blockchain-based frameworks and a safe tendering methodology has prevented the tendering business from utilizing blockchain. By utilizing internet technology for simplified procurement procedures, e-Tendering is in line with e-government initiatives to increase the value of trading partners. Its goal is to increase productivity and efficiency in business processes for vendors and buyers.

Traditional systems depend on strong third parties for security, but improvements in blockchain technology and privacy protection have brought attention to the significance of decentralization. Blockchain is the best option for tendering among parties who lack confidence since it provides transparency, immutability, non-repudiation, and traceability. Blockchain technology's decentralization and strong encryption can allay the worries of traditional Tendering. It can function as a safe, decentralized, and open method for tendering, enabling bidders to keep an eye on portal operations and track all tender activity.

As a result, the tendering process enjoys greater security trust. Online tender bid management and submission is known as "e-tendering." Physical documentation is no longer required, and it makes procurement transparent and effective. It improves accessibility for both suppliers and procurers while

streamlining the tendering process. A decentralized digital ledger with several nodes is what blockchain technology does. Through cryptography, security, immutability, and transparency are all guaranteed. Peer-to-peer transactions without middlemen are made possible by the linking of transactions in a chain of blocks. It has numerous applications in sectors including supply chain, healthcare, and finance and delivers confidence and verifiability. Blockchain transforms data management and transactional procedures in addition to currency.

## 2. LITERATURE SURVEY

1. Blockchain-based e-Tendering System. Dhawal Mali, Divya Mogaveera, Parth Kitawat, Mohd. Jawwad. This article describes (based on) how smart contracts work. It can be used to design the Ethereum blockchain. A distributed electronic bidding system is being considered [1].
2. Research on Blockchain-Based E-Bidding System. Dan Wang, Jindong Zhao, Chunxiao Mu. This article presents a decentralized electronic bidding system based on blockchain and smart contracts. The system replaces traditional databases with blockchain and uses chaincode to handle business logic[2].
3. A Design of Blockchain Based Smart Contract for Tendering. Denies Kiyeng, Simon Maina Karume, Nelson Masese. This research focuses on Blockchain with the concept of BYOE (Bring Your Own Encryption) in procurement [3].
4. Land registration using Blockchain technology. Mohammed Moazzam Zahuruddin, Dr. Sangeeta Gupta, Shaik Waseem Akram. This work deals with a land registry system using blockchain. It was proposed to overcome the above limitations of the land registry system [4].
5. A Domain Engineering Approach for the Development of Tendering E-marketplace Applications. Abraham Nieva de la Hidalga, L. Zhao. This article proposes applying a domain engineering approach to the development of bidding applications for electronic marketplaces [5].
6. A review on competitive bidding procedure and strategy of bidding. Raju Prajapati, Dr. Jayeshkumar Pitroda, Prof J J Bhavsar. This paper has focused on finding solutions that help clients select contractors when considering multiple project objectives [6].

### 3. PROPOSED SYSTEM

The proposed blockchain-based e-tender system makes use of blockchain technology to guarantee the effectiveness and security of the whole tender management process. The proposed Tenders Management System would use software that is a web-based system for all operations. This makes it possible for the system to maintain a straightforward, transparent transaction using only the data that it specifically requires.

This paper offers a foundation for a system that addresses the privacy and security issues with E-Tendering platforms by utilizing blockchain technology. Then comes the actual tendering, bidding, and bid assessment procedure. All kinds of tenders are handled, applications, business profiles, documents, tender acceptance and rejection are reviewed, and administrative operations are managed. The business is eligible to take part in any active bids that are available. The bidder makes a bid proposal, following which the bidder develops a bid in response to the tender after examining the tender and taking into account the tendering specifications. Any type of data updates from the firm level or administrative level in any kind of data, such as modifications to a tender, changes made after an application is submitted, changes to the approval status, and so forth, would all be detected as tampering. Due to this, once a submission has been made, it cannot be changed in any way, and the outcome of the review is uploaded to the blockchain.

#### ADVANTAGES:

- The buy/sell history is clearly displayed and unchangeable.
- Users may keep track of all chains and status.
- The likelihood of manipulation by outside parties is decreased by the Smart Tender Management System. Additionally, it is less expensive to use smart tenders without a mediator.
- All documents are shielded from unauthorized access via encryption.
- It uses computer protocols to automate the system, saving hours in numerous commercial procedures.

### 4. SYSTEM ARCHITECTURE

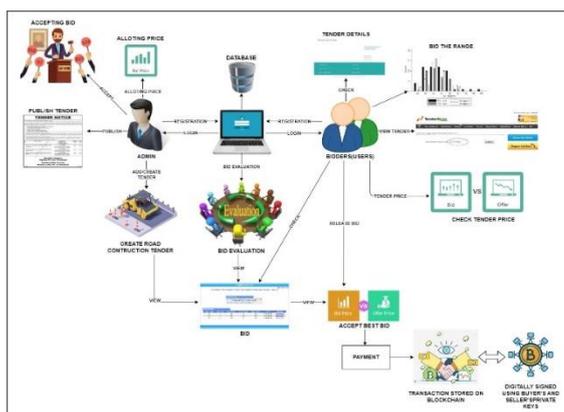


Figure 4.1 : System Architecture

This proposed system consists of :

Admins will log into their accounts to update notifications regarding the bidding process. You have the option to create a tender, post a tender, give a price, accept an offer, book a bidder and do the payment to them.

After registering, bidders can log into their accounts to search and view bid notifications. After submitting your application, you will be able to see a response from the bidding officer (System Admin). Bidders can obtain available offers by accessing them through the system.

### 5. MODULES

#### 1. Admin:

- Login
- Tender
- Create Tender
- Publish Tender
- Allotting Price
- Accepting Bid

#### 2. Bid:

- Bid Evaluation
- Accept Best Bid

#### 3. Bidder (User):

- Register
- Login
- Tenders
- Check Tender Details
- Check Price
- Release bid

### 6. ALGORITHMS USED

AES : The Advanced Encryption Standard, also known by its original name Rijndael, is a specification for encrypting electronic data such as files.

RSA : The Rivest, Shamir, and Adleman algorithms are public-key cryptosystems and one of the oldest widely used for secure data transmission, such as text files.

### 7. RESULT

A web-based application was developed on Blockchain using Ganache for local Ethereum Network, IPFS for File Storage, Remix IDE and Solidity Language for Smart Contracts, Python , web3.js and MetaMask.

1. The below diagram represents the smart contract created and deployed



Figure 7.1 : Smart Contract Deployed

2. Below figure shows the smart contract and its function



Figure 7.2 : Functions of Smart Contract

3. The below figure shows the transactions encrypted and hashed in blockchain

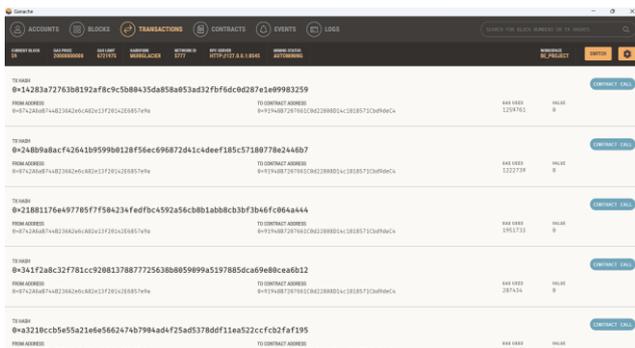


Figure 7.3 : Transactions Encrypted through Hashing

4. The below figure shows the confirmation from the MetaMask for any transaction

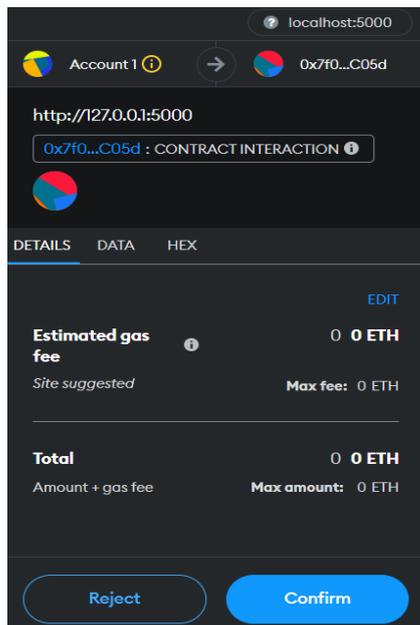


Figure 7.4 : Transaction Confirmation from MetaMask

## 8. CONCLUSION

To improve data security in electronic bidding, this is an E-Tendering system based on blockchain technology. In order to avoid disagreements, it emphasizes the necessity of a precise authentication system and suggests a transaction data architecture for information transmission in tenders. To guarantee transparency and fairness, the tendering process will take place within the blockchain ecosystem. Finally, it should be noted that Blockchain Technology has enormous potential to transform digital services, enhancing their effectiveness, customer happiness, trust, security, privacy, and cost effectiveness.

## 9. FUTURE SCOPE

In future, this system can be implemented and deployed as an iOS and Android application. Further research on blockchain use in other governmental and commercial domains is possible.

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