



## TENDER ALLOCATION SYSTEM USING BLOCKCHAIN

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### Abstract

Blockchain Technology has been drawing the attention of governments across the world because of its improved security and its potential to achieve smart governance. Generally, governments issue tenders to external organizations which lead to various malpractices such as spying and bribing government officials. Hence, the purpose of this project is to overcome these drawbacks and introduce a secure and transparent tendering system which is tamper proof and limiting human supervision to minimum.

**Keywords**—Blockchain, Tender Allocation System, Firebase, Hash key, Bid, Auction System, Smart Contract, Ethereum, Solidity, Distributed ledger.

### Introduction

The integration of blockchain technology has brought about a new era of transparency, efficiency, and security in the constantly changing realm of governance and technology. On the other hand, the emergence of blockchain has created a transformative change by providing a secure digital ledger that guarantees the honesty and reliability of government tenders. Governments worldwide are currently redefining their tender allocation systems, utilizing the decentralized nature of blockchain. This ensures that the systems become more accountable, streamlined, and trustworthy.

The fundamental essence of blockchain technology lies in its decentralized and distributed ledger system. This system ensures that transactions are recorded across numerous computers in a manner that prevents retroactive alterations without modifying all subsequent blocks and gaining consensus from the network. The inherent qualities of immutability and cryptographic security make blockchain a perfect solution for the intricacies associated with government tender processes. In a tender allocation system based on blockchain, every transaction, negotiation, and decision-making process is meticulously logged in blocks, creating an immutable chain. In this network, every participant possesses an exact replica of this ledger, guaranteeing transparency and accountability throughout the entire tender process. By adopting blockchain technology, governments can effectively reduce the risks associated with fraud and corruption. This enables a fair and transparent allocation of tenders based on merit and adherence to regulations, rather than being influenced by undue factors. Furthermore, the tender allocation process can be significantly expedited through the automation capabilities of smart contracts, which are a feature of blockchain technology.

These smart contracts allow the creation of self-executing contracts with predefined rules. As we further explore the realm of blockchain-driven government tender allocation systems, it becomes clear that this groundbreaking approach not only boosts efficiency and transparency but also cultivates an elevated sense of trust among the government and businesses.



## Literature

(V.Hassija 2020) focuses on the importance and benefits of integrating technology into the government tender assignment process. The authors have chosen Ethereum as the platform to implement an edge computing framework seamlessly integrating it into the workflow of government tenders. To enhance tender assignments, they propose an auction algorithm designed to match contractors with tender projects. This strategic alignment aims to improve profitability for both government agencies issuing tenders and construction companies participating in the process.

Upon evaluation, results show improvements across tender parameters compared to existing methods. This thorough analysis strengthens the credibility of using blockchain based approaches. Demonstrates their potential, in transforming how government tenders are assigned.

(Dhawal Mali 2020) stated The procurement landscape, which is crucial, for governments and corporations to acquire goods or services heavily relies on e tendering. However, using this method raises concerns about security issues. To address this blockchain technology offers a solution by emphasizing decentralization and strong encryption in a block-based architecture that ensures transaction management.

This study focuses on the application of contracts within the Ethereum blockchain to create a distributed e-tendering system. Each aspect of the system is carefully examined to understand the intricacies of processes and their underlying implementations. Additionally, we delve into the gas requirements associated with the tender contract shedding light on the systems resource needs. Two potential areas for research are also identified;

1. Enhancing Smart Contract Security; This involves strengthening the security of contracts by incorporating cryptographic algorithms to enhance their resilience against potential threats.
2. Optimizing Gas Efficiency; We propose exploring methods to improve the gas efficiency of contracts ensuring smooth and cost-effective execution of transactions, within the e tendering system.

(Pranamy Jain 2020) said organizations the tendering process is widely adopted to procure goods and services. It aims to promote competition and ensure outcomes by inviting multiple bids. However, using this procedure, across countries often faces challenges like a lack of transparency and biased allocation of contracts to favored agencies. This can lead to imprudence and speculative practices.

Blockchain technology as a ledger helps ensure the integrity of records secure currency exchanges and facilitate trustworthy deals and transactions. In a network each participant has access to an updated copy of the encrypted ledger allowing them to seamlessly verify transactions.

This research paper introduces a tender procurement system based on technology. The system is designed to establish a impartial and reliable bidding framework. Its main objective is to manage the bidding process while conducting unbiased evaluations of bids. One unique feature of this system is the integration of an auditing application that enables citizens to evaluate the process with one click. This participatory element introduces a stake mechanism that actively reinforces the integrity of the system by preventing claims, about task completion.

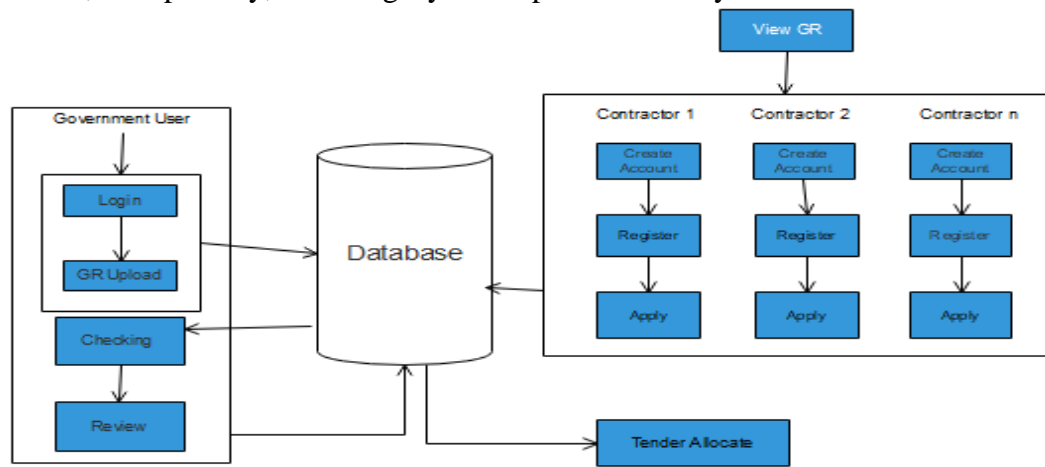
By proposing this groundbreaking system, the paper aims to address the limitations of tendering processes by promoting transparency, fairness and citizen engagement.

## Proposed Methodology

In the proposed blockchain system, government users and contractors are participants within a decentralized consortium architecture designed to establish a secure edge computing infrastructure. The process begins with the government user sharing detailed tender information with all relevant contractors on the blockchain network. Within this framework, the tender is awarded to the contractor offering the less bid, ensuring a fair and competitive selection process.

The unique feature of this model lies securance and privateness offered due to combination of permission and permission less based blockchain Also model allows only authorized nodes have the privilege to view or verify specific data, enhancing data security and confidentiality. By utilizing this

approach, the proposed system aims to efficiently and securely manage government tender processes, promoting fairness, transparency, and integrity in the procurement system.



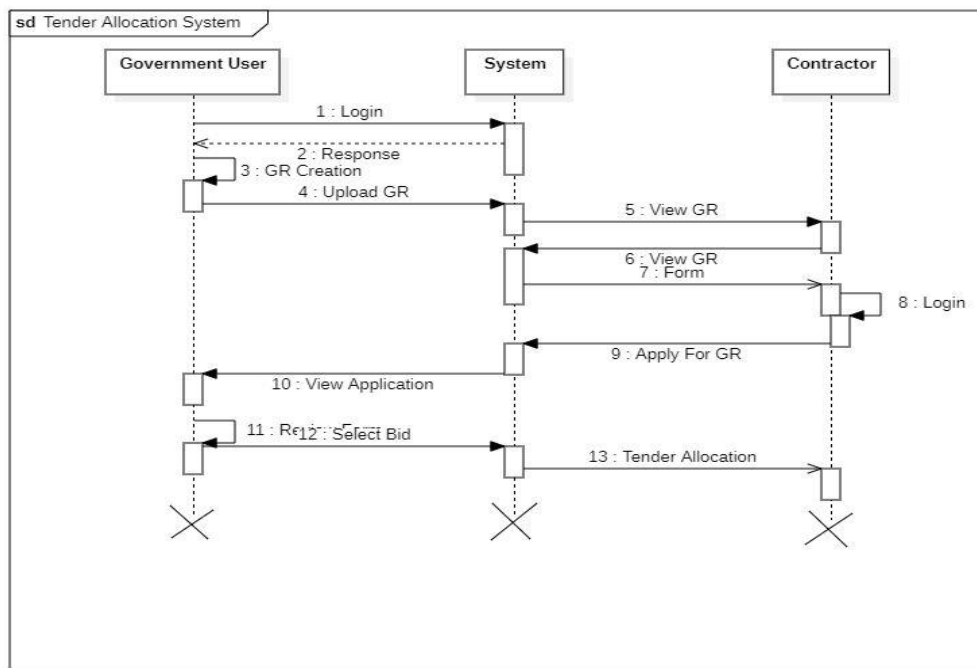
**Fig 1. Proposed System Architecture**

The proposed methodology for the blockchain tender allocation system with an auction system aims to create a transparent, secure, and efficient platform for allocating tenders while ensuring fairness and competitiveness. The system will leverage blockchain technology to establish a decentralized and tamper-proof ledger where all tender-related transactions and data are recorded. Smart contracts will be implemented to automate the tendering process, ensuring that all participants adhere to predefined rules and conditions. The use of blockchain will provide its advantages to bids, contract reducing risk of fraud and manipulation.

Incorporating an auction system will further enhance the efficiency of the tender allocation process. Bidders will participate in a competitive auction where they can submit their bids electronically through the blockchain platform. The auction system will be designed to encourage competitive pricing and optimize the allocation of tenders based on predefined criteria such as cost, quality, and delivery time. To ensure fairness, the system will employ cryptographic techniques to maintain bidder anonymity during the auction, preventing collusion and promoting a truly competitive environment.. The methodology not only ensures a fair and transparent allocation system but also streamlines the entire tendering process, reducing administrative overhead and promoting efficiency in public procurement.

### Working Module

In our proposed system, we leverage blockchain technology to revolutionize the traditional tender allocation process. Utilizing the transparency and security features of blockchain, we ensure a tamper-proof and auditable record of all transactions. The system operates through smart contracts, automating the entire tender process from the announcement to the awarding. Through an innovative auction mechanism, contractors can bid for projects in a decentralized and competitive environment. The blockchain ensures that every bid is securely recorded, maintaining the integrity of the process. The auction system, governed by predefined rules within the smart contracts, fosters a fair and efficient environment, encouraging healthy competition among contractors. This approach not only saves time and resources but also enhances the overall transparency and accountability of the tendering process.



**Fig 2: Working Flow Diagram**

**Roles: Admin and Contractor**

Within the system, two primary roles exist: Admin and Contractor. The Admin, equipped with necessary privileges, oversees the entire process. They initiate tenders, set parameters for the auction, and validate the smart contracts to ensure compliance with regulations.

On the other hand, Contractors participate in the auction, placing bids through secure, cryptographic means. The blockchain technology guarantees that bids are confidential yet verifiable, maintaining the inconspicuousness of the bidders while ensuring the integrity of the activity. Once the auction concludes, the smart contract automatically awards the project to the winning bid, eliminating any scope for bias or manipulation. This system not only empowers the contractors by providing them with a transparent platform but also enables the admin to efficiently manage tenders, thereby reshaping the future of tender allocation through the innovative use of blockchain technology.

**Conclusion**

In this paper, the project on the Blockchain Tender Allocation System with Auction System represents a significant step towards enhancing pellucidity and efficiency in the attainment process. Although the project remains unfinished, its potential impact on the procurement landscape is undeniable. The integration of blockchain technology and auction mechanisms could revolutionize how tenders are allocated, ensuring a tamper-proof and decentralized system that promotes trust among stakeholders. Despite the challenges faced during the project's development, the groundwork laid so far signifies a promising future. To fully realize its potential, it is crucial for the project team to address the existing gaps, refine the system's architecture, and ensure seamless integration of blockchain and auction protocols. With continued dedication, collaboration, and innovation, this project has the potential to transform traditional tender allocation processes, setting new standards for transparency and efficiency in the realm of public procurement.

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