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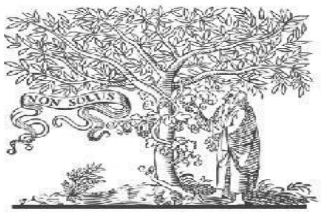

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SMART TENDER MANAGEMENT SYSTEM USING BLOCKCHAIN

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Abstract:
Generally, the governments and businesses both utilise tenders and contracts to buy products and services. In cases of poor practises, improper tender management results in significant losses. This covers issues including favouritism of contractors, poor record-keeping, lack of openness, hacking, data tampering, and other problems. In order to solve this issue, we used a straightforward and secure block chain technology, together with encryption and an unquestionable block based design for transaction management. To enable a completely transparent bidding process, we use block chain technology in this scenario to secure transaction-based documents such as tender documents, applications, bid proposals, firm profiles, prior performance records, approval officer details, and rejection details.

Introduction:
Electronic tendering techniques are currently not 'fair and open,' which means that information is not shared with all parties. To overcome these security issues, blockchain technology, which is heavily focused on information decentralisation and is protected by encryption connected to an incontrovertible block-based architecture for transaction management, can be deployed. Explanation about Blockchain is built on the notion of decentralisation. As a result, it's possible to consider it a distributed database. The distributed database in this case employs the concept of full replication, which implies that each node has a complete copy of the blockchain. Blockchain technology may be used to address these security problems since it focuses largely on information decentralisation and is protected by encryption mixed with an undeniable block-based design for transaction management.

Problem Statement:
Existing System:-
All work is done manually under the current system. Contractors must send their paperwork in on time and via regular mail if they want a chance to submit a timely bid for a particular contract. All department employees are participating in the same duty of document verification, and there is a danger that the best employee will be left behind. Anyone can change the documents while selecting the tenders and the documents will not be secured.

Some Disadvantages are there in existing system they are:
-Difficult to navigate.
-Tenders are very dense and confusing.
-Difficult to manage the data.

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Proposed System:

The Proposed Tender Management System uses block chain technology to guarantee the effectiveness and security of the entire tender management process. Encryption and a reliable block-based architecture for managing transactions are used to secure a block chain.This enables the system to maintain a straightforward, transparent transaction with information-conveying on a need-to-know basis..

Advantages of Proposed system:

-Simplifying stakeholder management.
-Reducing the risk of duplicates.
-Greater control over documents.

Proposed Method:

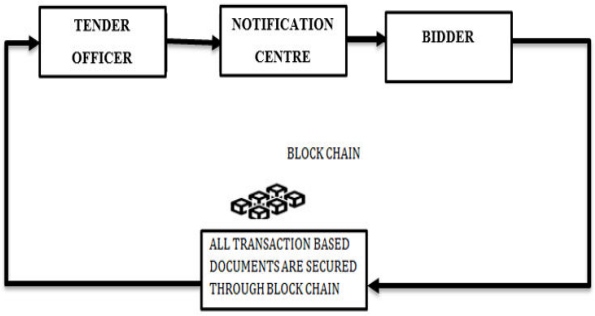

Fig:3.3.1

Modules:

Bidder:

After registering, bidders enter into their accounts to access the tender notifications. The bidder will give the bidder officer their information in a text file if they are satisfied with the tender description. They can check the tender officer's answer after sending the application.

Blockchain:

By separating the data into pieces, the blockchain is utilised to store an encrypted format. After transforming the data into an encrypted format and storing it in a database, use the hash code to hide the data.

Tender Officer:

Following registration, the tender officer will login into the account and update the tender process notification. They have the ability to change or remove the notice section. Now the officer will download the tender files that the bidders registered for and decrypt the data from the downloaded files to obtain bidder information. After receiving bidders' information, a confirmation email is given to them as approval of their tender applications.

5. System Design:

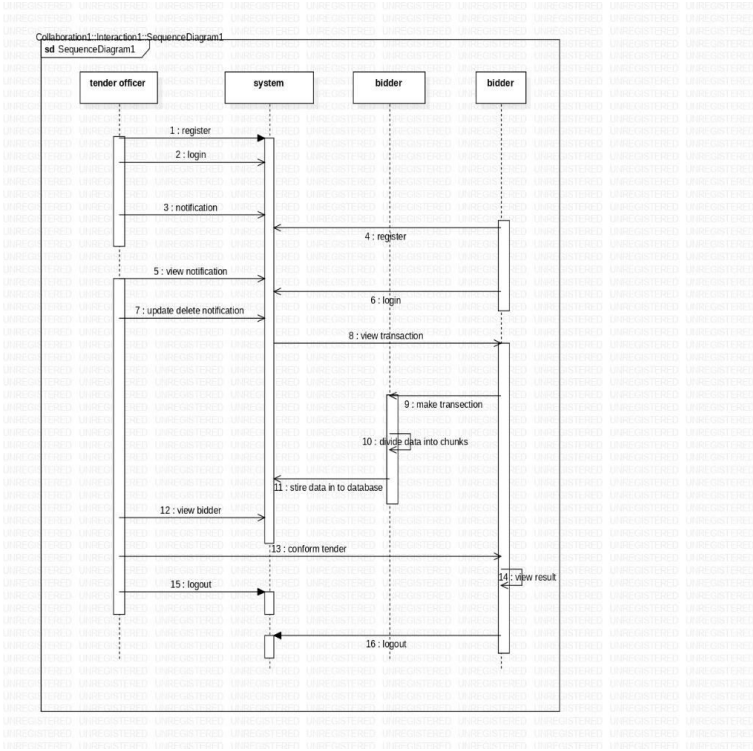

Fig:5.1

In the Unified Modeling Language (UML), a sequence diagram is a type of interaction diagram that demonstrates how and in what order processes interact with one another. It is a Message Sequence Chart construct. Event diagrams, event situations, and timing diagrams are other names for sequence diagrams.

Algorithms:

Encryption & Decryption Algorithm:-

Round keys are a collection of specifically constructed keys used in the encryption process. These are applied to an array of data that contains exactly one block of data, along with other operations? The information that will be encrypted. This array is referred to as the state array.

You take the following as steps of encryption for a 128-bit block:

Derive the set of round keys from the cipher key.

Initialize the state array with the block data (plaintext).

Add the initial round key to the starting state array.

Perform nine rounds of state manipulation.

Perform the tenth and final round of state manipulation.

Copy the final state array out as the encrypted data (ciphertext).

The reason that the rounds have been listed as "nine followed by a final tenth round" is because the tenth round involves a slightly different manipulation from the others.

The encrypted block is simply a 128-bit sequence. Because AES operates with byte values, we must first transform 128 bits to 16 bytes. We say "convert," but it's very definitely already saved in this format. RSN/AES uses a two-dimensional byte array with four rows and four columns for operations. The 16 bytes of data at the start of the encryption.

Block-Chain Technology:

The Block-chain is a growing collection of records known as blocks that are linked together cryptographically. Each block contains transaction information, a timestamp, and a cryptographic hash of the block before it. Duplicate record keeping and third-party validations waste a lot of time in operations. Fraud and cyberattacks can compromise record-keeping systems. Data verification might be slowed by lack of openness. Transaction volumes have skyrocketed since the introduction of IoT. All of this slows operations, lowers profits, and signals the need for a better solution. Here comes blockchain. The timestamp ensures that the transaction data was present at the time the block was published, allowing the hash to be computed. They form a chain with each new block supporting the ones before it since each block has information about the one before it. Since data in a single block cannot be changed retroactively without also affecting all following blocks, blockchains are hence immune to data manipulation. A peer-to-peer network is widely used to maintain blockchains as a publicly distributed ledger, with nodes interacting and validating new blocks according to a protocol. Blockchain records may be seen as secure by design and a distributed computing system with strong Byzantine fault tolerance, despite the risk of forks. With the growing variety of blockchain systems, even those that only support cryptocurrencies, blockchain interoperability is quickly becoming a hot subject. The goal is to make it possible to move assets from one blockchain system to another. For business purposes, private blockchains have been proposed. The selling of such private blockchains without a sufficient security architecture has been dubbed "snake oil" by Computerworld. The main chain of the blockchain is made up of the longest sequence of blocks from the genesis block to the present block. Outside of the main chain, orphan blocks exist.

Benefits of Blockchain:

Duplicate record keeping and third-party validations waste a lot of time in operations. Fraud and cyberattacks can compromise record-keeping systems. Data verification might be slowed by lack of openness. Transaction volumes have skyrocketed since the introduction of IoT. All of this slows operations, lowers profits, and signals the need for a better solution. Here comes blockchain.

Great Trust:

As a member of a members-only network, you can trust that you will receive accurate and timely data from blockchain, and that your sensitive blockchain records will be shared only with network members to whom you have expressly authorised access.

More Security:

All network participants must agree on data accuracy, and all confirmed transactions are immutable since they are permanently recorded. A transaction cannot be deleted by anybody, including the system administrator.

High Efficiency:

Time-consuming record reconciliations are removed with a distributed ledger shared across network participants. A collection of rules called a smart contract may be placed on the blockchain and implemented automatically to speed up transactions.

Technologies:

Python:

Python is a powerful, interactive, object-oriented, and interpreted scripting language. High readability is one of Python's design goals. It has fewer syntactical structures than other languages and typically employs English keywords rather than punctuation. Data verification might be slowed by lack of openness. Transaction volumes have skyrocketed since the introduction of IoT. All of this slows operations, lowers profits, and signals the need for a better solution. Here comes blockchain.

Advantages of Python

1. Extensive Libraries to develop applications
2. Interpreted
3. Easy to develop Dynamic Applications
4. Readable
5. Portable

In this, Python's framework *Flask* worked as background framework for establishing the connection between Frontend *(HTML, CSS)* and *MySQL* database.

Flask:

Flask is python microframework which is used to develop web applications. It is also independent framework that means it gives full control to developer to build an application. It has a server and debugger built in. Faster debugging, reliable development, and experimentation freedom are all made possible by Flask's integrated unit testing mechanism. Machine learning and other similar technologies are compatible with Flask. cloud computing, Blockchain, and so on. We can develop dynamic websites with the help of flask framework. In this, python is combined with blockchain technology.

HTML:

HTML is a documents meant to be seen in a web browser should use markup language. The foundation of HTML pages are HTML components. HTML allows for the insertion of scripts written in scripting languages like JavaScript that modify the behaviour and content of web pages.

CSS:

Cascading Style Sheets is a style sheet language aimed at specifying the appearance of a document written in a markup language similar HTML.

Conclusion & Future Scope:

Traditional technology and Since they undermine openness and security, design patterns cannot be used in applications like tender portals where these goals are crucial. As was already said, a centralised tender platform alone cannot satisfy all security requirements for a tendering framework when contracts are established and bid on. The security and openness requirements of this kind of application can only be met by fair, open, decentralised technology like Blockchain and Smart Contracts. The purpose of this study is to show how such a system might be constructed by describing the various processes involved and their basic implementation.

There are two further study directions, which are as follows: The Smart Contract can be made more safe by encrypting its private information using more difficult cryptographic methods, such as SHA-256.In other government services, the usage of blockchain is being investigated further.

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