

A Secure Based Land Registry Decentralized Framework Using Blockchain On Cloud

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Abstract — Land Registry System in India is a very time-consuming procedure involving many middlemen, thereby increasing the fraudulent cases. The use of Blockchain technology for land registry management in India will solve these issues. This paper talks how we can.

implement simple land registration system on cloud using blockchain. The paper describes how we have used cryptographic algorithms to solve the problems like middlemen and frauds, availability of smart contract is more helpful than offline land registration. By creating a smart contract, the lands are registered on the Blockchain network. For different institutions and procedures involved in buying and selling a property, the proposed studies.

will provide some features to stakeholders, including effectiveness, accountability, trustworthiness, and honesty. Essentially, the framework provides services that provide a complete history and unaltered information about a property to prevent the record from being tampered with. And it will give the option to the buyer to request for the land.

Keywords: Cloud, Dapp, Land registration, cryptographic algorithms, smart contract, Blockchain.

I. A. INTRODUCTION

Blockchain allows to store data in encrypted form and it is similar as keeping records offline. Distributed ledgers are digital record books that have various copies and are updated at the same time, making it almost impossible to change the data without the consent of everyone who has a copy of the ledgers. The key benefit of blockchain is immutability in transactional records, the records cannot be changed so that there is no fraudulent case. Blockchain permits the transaction on the basis of keys that only the buyer and seller has, therefore no middlemen. There is not involvement of banks, blockchain are considered as digital assets. We can enable smart contract to encrypt or decrypt contracts that will be stored in blockchain.

B. Ethereum

Ethereum is a free opensource framework that enables developers to create and deploy decentralized applications such as smart contracts and other complex legal and financial applications. Ether is the platform's native cryptocurrency. It

is the second-largest cryptocurrency of market capitalization after Bitcoin. Unlike the Bitcoin protocol, Ethereum has been designed to be flexible and adaptable. The creation of new applications on the Ethereum platform is easy. Developers can use Ethereum to easily create shared ledgers, digital organizations, and other endless solutions to problems that require immutable data and agreements, all without the need for a moderator or a realtor. Therefore, Ethereum is ideally suited for building a ledger that can store transactions during the procurement of land by the buyer and initiate tasks with the use of smart contracts when certain events occur on the system.

C. Solidity

Solidity is a high-level contract-oriented programming language that was created specifically for the Ethereum blockchain. Solidity has developed from its initial conception in 2014 to becoming one of the most important languages for the Ethereum network and other blockchain technologies. Solidity is based on Javascript, Python and C++. Since Solidity is built on JavaScript, it has a lot in common with the language's syntax. Since the transaction will take effect as soon as the arrangements or laws are settled upon, the contracts or agreements are referred to as smart contracts or self-executing contracts.

D. Decentralized Application

The process of distributing and dispersing power away from a central authority is known as decentralization. The majority of current financial and governmental systems are centralized, which means that they are managed by a single highest authority, such as a central bank or state apparatus. This method has some significant drawbacks, which derive from the fact that every central authority still serves as a single point of failure in the system: any error at the top of the hierarchy, whether accidental or deliberate, has a negative impact on the entire system. Its underlying technology, Blockchain, is what enables this decentralization because it allows any user to become one of the network's many payment processors. In order to reach a degree of decentralization, they frequently use the Blockchain.



E. India’s current process of land registration

- i) **Deed drafting:** Regardless of how the property was acquired, it is important that you have the right deed. If it's a donation, for example, a gift deed is required. If it was bought, a sale deed detailing the contract, payment, agreed-upon terms and conditions between the seller and the purchaser, payment tenure, and so on. Encumbrance certificate: This form verifies that the property is free of civil obligations such as debts and mortgages.
- ii) **Stamp paper preparation:** A tax must be paid to the government to complete land transactions and associated paperwork such as conveyance deeds, contract deeds, and sale agreements. It's

- iii) **Deed execution:** The deed must be administered at the Registrar's office, and all parties must be present to sign the papers properly. If one of the parties, either the seller or the buyer, is unable, a Power of Attorney may be granted to carry out the transaction.
- iv) **Registration:** The property will be registered after all of the records have been checked and determined to be in order. PAN, Aadhar, and other personal records Unlike residential and industrial houses, property is subject to government field review.

II. Background

A. Table

SL No.	Author/Year	Title	Objective	Advantages	Disadvantages
1	RUIGUO YU, JIANRONG WANG, TIANYI XU. (nov,8 2017)	Authentication with block-chain algorithm and text encryption protocol in calculation of social network [4].	RSA algorithm. MD5 algorithm.	User authentication. Text encryption	To improve the security and performance planning to change structure of Block chain and framework.
2	Yuan Zhang, Chunxiang Xu, Hongwei Li, Haomiao Yang. (2019)	Chronos: Secure and Accurate Time-stamping scheme for digital Files via Block chain [3].	Time – stamping	Secure. Precise. Accurate.	Inadequate results. <input type="text"/>
3	QI TAO, XIAOHUI CUI, XIAOFANG HUANG (APRIL 29,2019)	Food safety supervision system based on hierarchical multi-domain blockchain network[1]	• <u>HMDEC</u> network architecture. Two-level verification Mechanism. • improve the overall performance.	•System Security. •Smart Contract.	It can't take more than 33% nodes that are broken.
4	Gunda Abhishek, Dr. Sandeep Shukla (2019)	Property Registration and Land Record Management via Blockchain[2]	Hyper ledger Open source.	•Designing •Performance Evolution.	Many new and updated tools have been released. Not storing the entire data.
5	Rizwan khan, Saksham Sachdeva, Shadab Ansari, Sneha Jain. (April 2020)	Blockchain based land registry system using Ethereum Blockchain [5].	Ethereum. Liquefaction of land.	Create immutable records. Smart contract.	Ethereum cost alter at very high rate
6	Meghali Nandi, Rajat Kanti Bhattacharjee, Amrit Jha, Ferdous A. Barbhuiya. (2020)	A secured land registration framework on Blockchain [8].	Ownership. Transparency using smart Contract. System management.	<u>Publically</u> verifiable ledger system.	Uncertainty about the cost required for each transaction. Ethereum cost is very <u>high rate</u> .
7	Archana Sahai, Rajiv Pandey. (2020)	Smart Contract definition for land registry in blockchain [7].	Efficiency in time spam. Automated ledger.	Automate the ledger update to speed up the operation.	To avoid failure records must be stored in public.
8	Krishnapriya S, Greeshma Sarath (2020)	<u>Securing Land Registration using Blockchain [6].</u>	To secure land from <u>attacker</u> . Easily maintain records.	high speed. <u>Independence of the random number generator</u> . High performance.	More space.

III. Proposed scheme

A. *Ethereum client*

The two types of blockchains are permissioned and permissionless blockchains. Permissioned blockchains are a form of private blockchain network to which only approved user have access. Permissionless blockchains are open to everyone. There are no limitations on who can read or write on the public blockchain ledger database. Ethereum is a public blockchain network with a shared ledger. Ethereum is a crypto currency. External and Contract accounts are the two forms of Ethereum accounts. A user-controlled account is one in which someone else is in charge. It represents the external agents in a network, such as users, miners, and so on. These accounts are protected using public-private key cryptography, such as RSA algorithms.

The most common way for users to connect to the Ethereum blockchain is via external accounts. A contract account is a smart contract, which is a collection of code that regulates blockchain. There are accounts, each of which is located at a specific address. Contract accounts are often evoked using external accounts or other contract accounts. These contracts are written in the high-level scripting languages Solidity and Serpent. Ether will be stored in each of these accounts. Ether is Ethereum's digital currency, denoted on crypto currency exchanges by the letters "ETH." It's used for transaction fees and services on the Ethereum network. This is used to pay for petrol or to finish transactions. Gas is a cryptocurrency that is used to pay for cryptographic work done during the execution of a smart contract or other transactions. Ether may be used to buy petrol.

The decentralized application, or DApp, is built on the Ethereum blockchain. An Ethereum smart contract written in Solidity is used for land registry. A client-side user interface has been created to register Ethereum accounts. In this implementation, the Truffle Platform is used to verify the smart contracts and deploy them to the blockchain. Truffle is a decentralized software development, testing, and deployment platform. It provides a platform for building blockchain networks. Smart contracts can be created, built-in contracts can be compiled, linked, and deployed using the Truffle programming framework.

Ganache is an essential part of the truffle ecosystem. It provides access to a private blockchain for Ethereum developers. It's akin to an Ethereum application. It can be used to verify the decentralized truffle structure. It can be used to deploy contracts as part of decentralized app growth. It also makes blockchain and smart contract simulations a lot simpler. After passing the ganache scan, the program can be run on an Ethereum client such as Geth. Ganache provides a

local and collaborative blockchain for science. Ten international user accounts are open. A unique Ethereum address and a private key have been assigned to each Ganache account. All accounts are preloaded with 100 'false' ethers.

Ganache is available in both CLI and UI versions. There is a CLI variant of this implementation. It's a blockchain simulator that's fast and easy to customise. It helps you to make blockchain calls without the burden of running an Ethereum server. Transactions are "mined" in real me. There are no charges for processing. Accounts can be re-cycled, reset, and instantiated for a specified amount of Ether (no need for faucets or mining). You can adjust the price of gas and the pace at which you mine. A quick rundown of the test chain's operations is provided by a user-friendly graphical user interface.

B. *Smart contracts*

Smart contracts are self-executing technology that run on blockchains. This is similar to conventional commercial agreements, and it is used by two parties to discuss an ethics code. Smart contracts are automatically executed when the specified conditions are met. It's an object-oriented programming language similar to JavaScript or Python in syntax. Smart contracts have many benefits over conventional contracts, including cost savings and improved efficiency. Smart contracts are popular because they are easily verifiable by all users and provide a sense of security to all parties involved.

C. *Flask (Middleware)*

We can easily harness the power of middleware with modern web frameworks. Middleware is a function or collection of functions that is performed before a request is passed to a controller in a web application. Flask is a Python-based microweb framework. It is referred to as a microframework because it does not necessitate the use of any specific resources or libraries. It doesn't have a database abstraction layer, form validation, or any other components that depend on third-party libraries to perform common tasks.

Extensions, on the other hand, may be used to incorporate application functionality as if they were built into Flask itself. Object-relational mappers, form validation, upload management, various open authentication technologies, and other framework-related tools all have extensions. Flask helps to record the transactions, which encryption is a user data key and land data key is decryption(transaction).

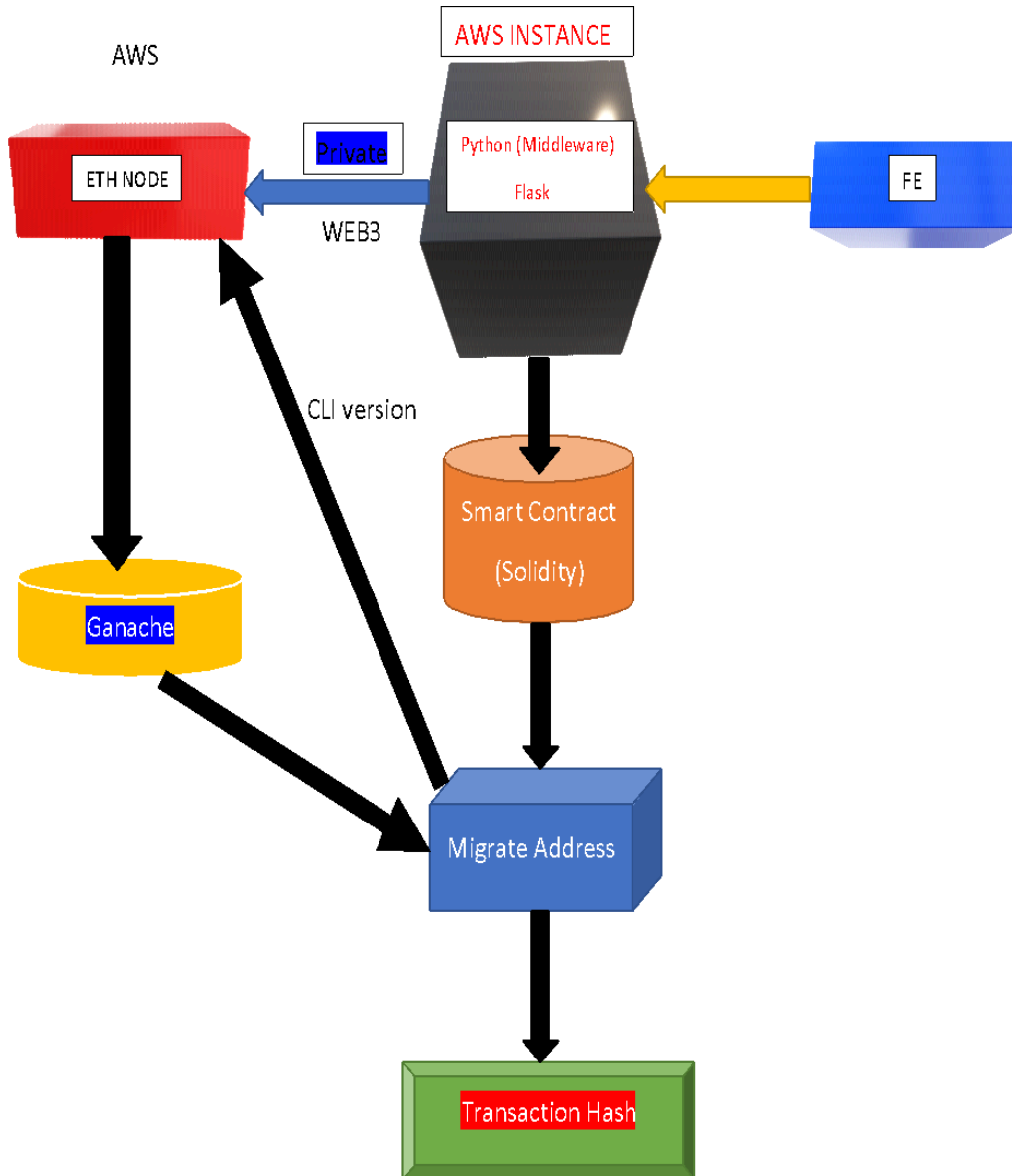


FIG. Proposed architecture of land registration

Flask cap is running on another AWS, flask cap communicate with the Ethereum note through web3 Api. Ganache is the Ethereum client it comes under truffle tools. When front end request to enter data land records data to middleware. Then middleware then calls to smart contract functions and create transaction. Migrate address is when smart contract is deployed to the ganache Ethereum node it return as contract address. It does not shared with anything. When a records is added to the block it return as a transaction hash.

web3 is a collection of libraries that allow you to interact with a local or remote Ethereum node using HTTP, IPC or WebSocket.

Web3 as well as providing an API reference. Provides methods for symmetric encryption/decryption using Ethereum addresses. Usually when we use a web3 provider on a browser, such as MetaMask, Fortmatic, Bitski, etc., we do not have access to the private keys of accounts. Since we may want some secure mechanism for a user to store data on a server and retrieve it later, we need a workaround. The method employed in this library is to take some arbitrary salt which the client can be assumed to always have access to, create a signature of that salt using the web3 provider, then use that signature as a symmetric key to encrypt some data. So long as the signature is never revealed, this should be a secure encryption method when we do not have access to private keys.

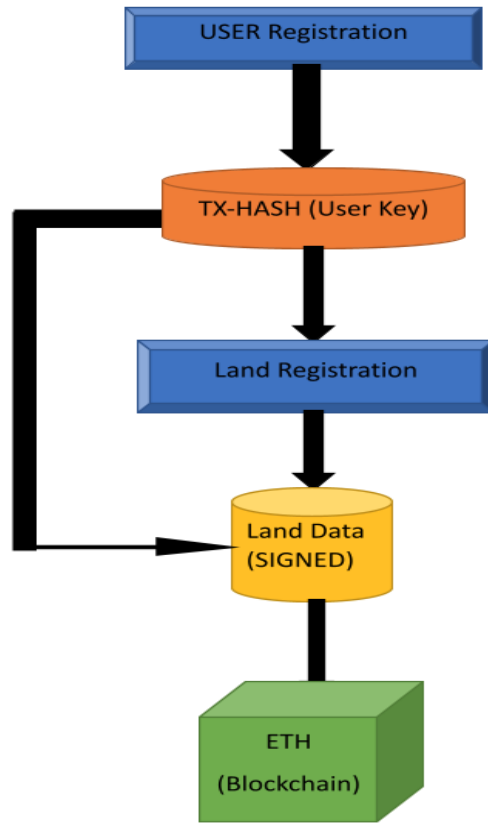


Fig. Proposed Algorithms

IV. Smart contract algorithm

```
pragma solidity >= 0.5.0 < 0.7.0;

contract LandRegistry {

    string public payload;

    function setPayload(string memory content) public {
        payload = content;
    }

    function getPayload() public view returns(string memory) {
        return payload;
    }

    function sayHello() public pure returns (string memory) {
        return 'Hello World!';
    }
}
```

The SetPayload component lets you update the payload of the message. Set Payload is basically like a creating a

response message for a request-response pattern. The GetPayload component retrieves the payload that has been

set on the Subscription object prior to posting. SayHello is used as a test function and used to check if the contract is successfully deployed.

V. Conclusion

In this article, we propose a streamlined, simple-to-use, and hassle-free framework for facilitating land registration. There are many issues that are still faced during the process of land registration, such as the presence of traders or middlemen, time delays, and so on. This platform would solve the problems associated with land registry in India and many other countries. This report goes through all of the procedures taken in the land registry process in detail. Making land registry paperless would simplify the procedure while still ensuring the security of the documents of land ownership. Thanks to its safety capabilities, blockchain technology is quickly gaining traction. As a result, using blockchain to save land record transactions is a viable option for creating permanent documents. Numerous features can be added to the land registry platform.

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