Short Communication

Technological and legal challenges for adoption of blockchain in land registry system

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The application of blockchain technology in land registry domain has gained momentum because of the availability of consortium-based blockchain, smart contracts and distributed ledger with no single failure and inclusion of trust. The relationship between the property, rights and legal validity is complex. This complex relationship needs to be preserved by the authentic transactions and transaction timestamp and immutability of the transaction. The transactions should be tamper-proof and should be legally valid and adapt to the present and future scope of the enhanced regulatory acts of a country. This article describes the transactions that need to be preserved for land records data, geospatial data and land registry domain. The various blockchain systems, technical and legal requirements, mechanisms and implementation details that need to be addressed in adaptation of blockchain system are discussed in this article.

Key words: Blockchain, ethereum, hyperledger fabric, property registration, smart contract

INTRODUCTION

Blockchain is technology is still hype and it remains mainly at the level of proof-of-concept, demonstration, or at a pilot level. The transactions are no more restricted to only the financial sector. The scope has enhanced to other physical attributes and boundaries of the split parcel, merged parcel, and geographic locations. Thus the proposed standards for encoding geospatial data and properties that are related to geography should also be included in the adaptation of blockchain technology (Sladić et al., 2021).

The consensus algorithm is Proof-of-Work (PoW) blockchain helps to reach a global view of the world (Sladić et al., 2021). The smart contracts help in enforcing the business logic of the system. The consortium-based blockchains like Hyperledger Fabric, Hyperledger Sawtooth are preferred over the ethereum kind of public blockchain where the transaction can be viewed by the public (Sandberg , 2021). The BigchainDB is also a promising alternative as it is a big data distributed database that adds blockchain characteristics (Mc Conaghy et al., 2016) FOAM protocol gives a spatial context that is not present in regular blockchains (King et al., 2017).

TRANSACTIONS DETAILS

There are two types of changes of data in the land information system that needs to be supported by the blockchain. The alphanumeric data like attribute data of spatial units or legal data about rights, owners, registration number usually gets updated as a result of the transfer of rights between parties (Khadanaga et al., 2021, National Strategy on Blockchain et al., 2021, Ashritha et al., 2019, Christopher, 2018, Torun, 2018). The spatial data like boundaries of cadastral parcels, coordinates of partitions of a piece of land, or legal boundaries of the building because of surveying activities. etc. These are mostly represented as polygon features. They can be represented in the vector format, such as Well-Known Text (WKT), Geography Markup Language (GML), and GeoJSON, and further hashed to be inserted in a blockchain transaction or use FOAM protocol and its system of Crypto-Spatial Coordinates (CSC) which need to be linked to form a polygon.

The identification and standardization of transaction for various for the domain is also stressed in National Strategy Blockchain, 2021, Ashritha, 2019, Christopher, 2018, Torun, 2018, National Strategy for Artificial Intelligence, 2018. The IT Act does not indicate any points related to transactions involving immovable property, wills, and negotiable instruments, or any other transactions in kind.

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Privacy section 43A of the IT Act, 2000 has not indicated or protected the activities (Digital Ledger Transactions) as most frequently used in blockchain. The use of cryptocurrency and FERA (Foreign Exchange Regulation Act) should be regulated. In a broad sense, the interoperability of the Smart Contract and blockchains should also be drafted (Sandberg, 2021). With changes in regulatory acts, there could be a requirement to alter the contents in transactions that deal with the physical nature and tangible objects of the earth's surface (Ashritha et al., 2019, Christopher, 2018).

CONCLUSION

The technical use of Chameleon hash functions through redacting a blockchain will enable modification of a block without changing other block contents and meet regulatory requirements of tangible objects. The technical enhancements of the blockchain system, transaction characteristics, regulatory requirements, and the use of redacting a blockchain will leverage the quick adaption of blockchain in the land registry domain.

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