Chapter 18
Distributed Ledger Technology based Property Transaction System with Support for IoT Devices

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ABSTRACT

Blockchain-based distributed ledger technology (DLT) is transforming the existing operational models of economy, financial transactions and other government machineries so as to allow these to operate in a much more secure and decentralized manner. This research focuses on providing framework for decentralized and secure P2P infrastructure for handling e-stamp and property registration mechanism along with interface for verification of document originality. The proposed efficient consensus mechanism reduces the overhead of broadcasting a new block by more than 50% coupled with saving CPU computation power along with network bandwidth. To ensure that even people at remote locations with constrained resources are able to participate and harness these benefits, a cloud server architecture & web interface for verification of property registered deed is also proposed.

INTRODUCTION

For transferring of any land or property from one entity to other requires payment of tax in the form of stamp duties. Once this stamp duty or transfer tax has been paid, property documents can be submitted for change of ownership. Stamp duty is a government-imposed tax that is levied on documents that include majority of legal documents such as property and land transactions, marriage licenses and court fee. A

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physical stamp also termed as a revenue stamp has to be attached to or impressed with the document to denote that stamp duty had been paid before the document is legally submitted for accessing any service [https://en.wikipedia.org/wiki/Stamp_duty, 28.08.2018].

Procuring these stamp duties calls for visit to authorized vendors that may be far from the user. One also has to undergo tedious procedures for obtaining these. Further, numerous cases have been reported where fake stamp papers have been used to record property transactions in order to dupe the buyer. Most of the countries still don't have electronic recording systems in place where buyer / seller or general public can enquire about any property or title deed. Even in India, the electronic recording has begun in last decade, but older records are still not visible to general public except for agriculture land records. Once all the required documents have been submitted for property transfer, the property registry office processes these documents.

With advent of newer computation and storage technologies coupled with evolution of high-speed networks are redefining how digital services shall be available in future. Mills et al. (2016) find that Distributed Ledger Technology (DLT) is fast growing as solution to various financial applications that require secure and tamper proof transactions system. The very intrinsic nature of blockchain i.e. immutable records of transactions on distributed ledgers renders itself useful for use by various functionaries of Government as explored by Singh et al. (2018). Government offices offer various public services and most of these involve finances. Hence, there is need for a system that is efficient, fast, fraud free, tamper proof and trust worthy. Most of these can be offset by moving to DLT. The DLT is inspired by the robust Bitcoin architecture proposed by Nakamoto (2008). Bitcoin is a crypto-currency that is prevalent worldwide.

The blockchain technology maintains the transactions in the distributed ledger which is recorded in the form of the linked blocks and every block in the blockchain is immutable. The Ledger is distributed over the peer-peer network. This blockchain technology uses cryptographic hash and digital signatures to secure the blocks and the transactions. The ledger that is distributed over the network is secure and synchronized with the help of the consensus mechanism. The consensus mechanism plays important role in the mining of the new block in the blockchain. The mining is the process of verifying the transactions to be recorded into the blockchain, composing fixed number of transactions into a new block to be added in blockchain and the achieving the consensus of the network participants for adding any new block to the existing blockchain.

In order to ensure widespread adaptability of this DLT based application, the ever expanding universe of edge devices, architectures that can support IoT with blockchain shall cause disruption and increase participation of continuously growing cryptographically secured data that is protected against alteration, modification or frauds. This shall transform banking, taxation, property transaction and others. Hence, an efficient, fast, fraud free, tamper proof and trust worthy blockchain based architecture supporting IoT is need of the time. This shall ensure that even people at remote locations with constrained resources are able to participate and harness these benefits. A user should be able to perform lookup operation for any property by attributes such as registry number, barcode embedded on the document, sellers name or Permanent Account Number (PAN) or a unique id issued by government such as Aadhaar number in India through a web interface or through Short Messaging Service (SMS). These attributes ought to be part of the block.

Hence, there is need of an open source platform-based property transaction architecture that is based on blockchain technology with support for constrained devices. This research focuses on providing framework for decentralized and secure P2P infrastructure for handling e-stamp and property registra-