eMudhra's emBlock solution can help the Government move earlier silo'ed land records securely on a Blockchain.

Industry
Real Estate

Business Matters
Non availability of encumbrance free land, non-updation of land records and resistance to joint measurement survey of land records delayed a lot of infrastructure projects in the state. Thus, a solution was required which would enable real time updation of land records (land registration, mutation, maps, boundary limits etc.) for all key stakeholders.

Approach
The State Government should be able to use emBlock which is based on a Hyperledger Fabric framework, allowing rapid deployment of a Blockchain system. With emBlock, the State Government need not custom code scripts to setup a Blockchain. emBlock supports the use of identity based Digital Certificates (that are asymmetric key pairs) to sign transactions into a block. This ensures traceability of transactions which is a pre-requisite for ensuring legal non-repudiation

Background
Land record management is controlled primarily by three departments, namely, Revenue Department for textual records and maintenance, Survey & Settlement Department for the maintenance of cadastral maps and Registration Department for verification of encumbrances. Since there is slow and minimal interdepartmental communication, the updation of records in any one of the department makes the records outdated in the other. Although the Central Government has addressed the above mentioned problem in their Digital India Land Records Modernization Programme project, the system is yet to be made real time and needs to include other key stakeholders.

India's land record management system is still in a transition phase and Integrated Land Management System is aimed at digitizing the records and improving communication between the silo'ed land management departments.

Once the information related to the property (current owner, cadastral survey, among others) is digitized under the current Digital India Land Records Modernization Programme initiative, the same can be put on a blockchain and regulated by certain rules (Regulatory Policies) using smart contracts. This in turn will be helpful to other stakeholders such as banks, courts, real estate agents and buyers who will be able to substantiate the veracity of a particular record in real time.

Web: www.emudhra.com

Address:
eMudhra Limited. Sai Arcade, 3rd Floor, No.56,
Outer Ring Road, Devarabeesanahalli, Bangalore - 560103

Contact:
Email: info@emudhra.com
Call: 080 4615 6902

Blockchain Technology

Blockchain also referred to as a 'distributed ledger' is a type of database in which transactions are copied to all the computers in a participating network. The information is stored in blocks and given the latest block, all the previous blocks linked together in the chain can be accessed, making the data verifiable and auditable.

Features of Blockchain

a) Participants in the network are used to reach a consensus
b) Identity is established using cryptography and Digital Signatures
c) Blockchain is time stamped and programmable
d) Records are immutable and changing historic records is near to impossible

Benefits

The State Government will be able to reap the following benefits with minimum latency and immutability

- Partition of plots and simultaneous updation of Cadastral Maps

- Reclassification of Land Use

- Correction of Land Records against Appeal cases & Court's Order.

- In the case of mortgaged property, banks and housing finance companies can validate the information and seek correction if there are any differences in the land pledged to them.
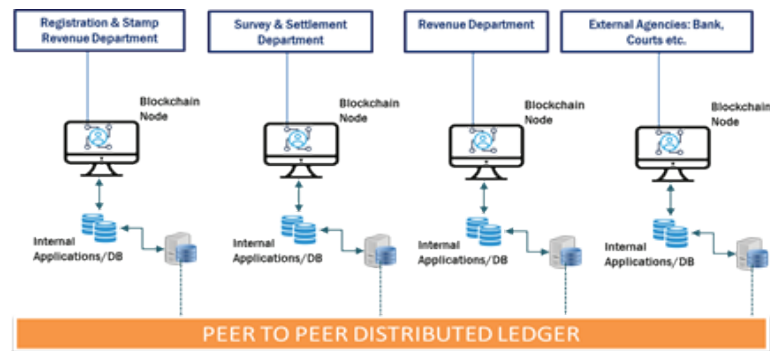
Solution

emBlock which is based on a Hyperledger Fabric has the following business blockchain components:

a) Registration and Stamp Revenue Department
b) Survey and Settlement Department
c) Revenue Department
d) External Agencies like Banks, Courts etc

The following information will be accessible to all the participants on the blockchain:
a) Registered sale deed between the seller and the buyer
b) Transfer or change of title of property
c) Updated land related data and maps (as provided by the survey & settlement department)
d) Data pertaining to the revenue collected
e) Banks can view land records and buyer's credit worthiness before issuing loans

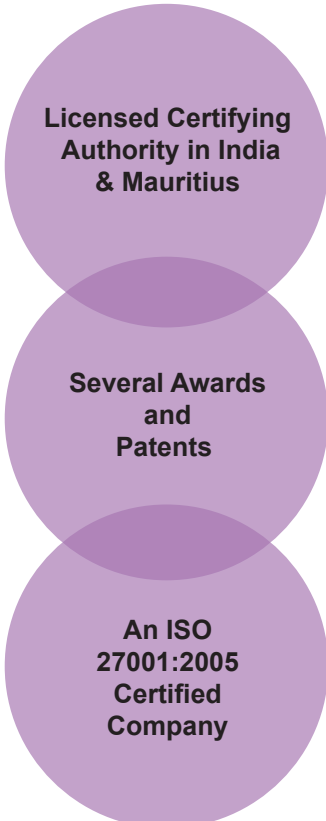emBlock which is based on a Hyperledger Fabric has the following business blockchain components:

• **Consensus Layer** - Responsible for generating an agreement on the order and confirming the correctness of the set of transactions that constitute a block.
• **Smart Contract Layer** - Responsible for processing transaction requests and determining if transactions are valid by executing business logic.
• **Communication Layer** - Responsible for transporting peer-to-peer messages between nodes that participate in a shared ledger instance.
• **Data Store Abstraction** - Allows different data-stores to be used by other modules.
• **Identity Services** - Enables the establishment of a root of trust during setup of a blockchain instance, enrolment and registration of identities or system entities during network operation, and the management of changes like drops, adds, and revocations. It also provides authentication and authorization.

• **Policy Services** - Responsible for policy management of various policies specified in the system, such as the endorsement policy, consensus policy or group management policy. It interfaces and depends on other modules to enforce various policies.
• **APIs** - Enables interface between clients, applications and the blockchain.
emBlock will have the following identities :

a. **Certifying Authority System:** A client-server system which is responsible for identity management and supports features such as registration of user and node identities, issuance of enrolment certificates and certificate lifecycle management.
b. **Peers/Nodes:** Peers play a vital role in performing any transaction, from storing a copy of the ledger; they can also take part in endorsing the transactions based on defined consensus logic. Peers have a logical association to the organization and each organization will need to possess an anchor peer through which other peers communicate.
c. **Admin:** Each organization will have an admin (a super user who is responsible for user management). The roles and entitlements of the admin or other super users can be created to mimic existing approval workflows within and across organizations.
d. **Channels:** Channels provide logical access control and can be defined based on use case to restrict participant access. For ex: Channel 1 could run a land records management use case while Channel 2 could run a KYC use case.
e. **Ledger:** The ledger is a sequenced, tamper-resistant record of all state transitions in the fabric.

Licensed Certifying Authority in India & Mauritius

Several Awards and Patents

An ISO 27001:2005 Certified Company

About eMudhra

eMudhra is a technology and digital identity and transaction management company providing solutions which ease financial and statutory needs of consumers. eMudhra was established in 2008 and is a Certifying Authority in India and Mauritius to issue Digital Signature Certificates.

eMudhra's current enterprise and consumer solutions include Digital Signature Certificates, emSigner – Paperless Office Solution, emAS – secure multifactor authentication for banks, emCA for Digital Signature issuance and management and Prism – Voice of Customer Analytics using Semantics.

eMudhra is a market leader in India and has worked with large Banks, Financial Services companies and several Government agencies in India to implement Digital Signature based solutions which include secure access and paperless workflows.

eMudhra won the e-Asia award, an award given by AFACT (A United Nations body) for implementing Digital Signatures based on India's National ID – AADHAAR to bridge Digital Divide.