Blockchain Technology in Judiciary

A Concept Note

Center of Excellence in Blockchain Technology

National Informatics Centre

Bengaluru

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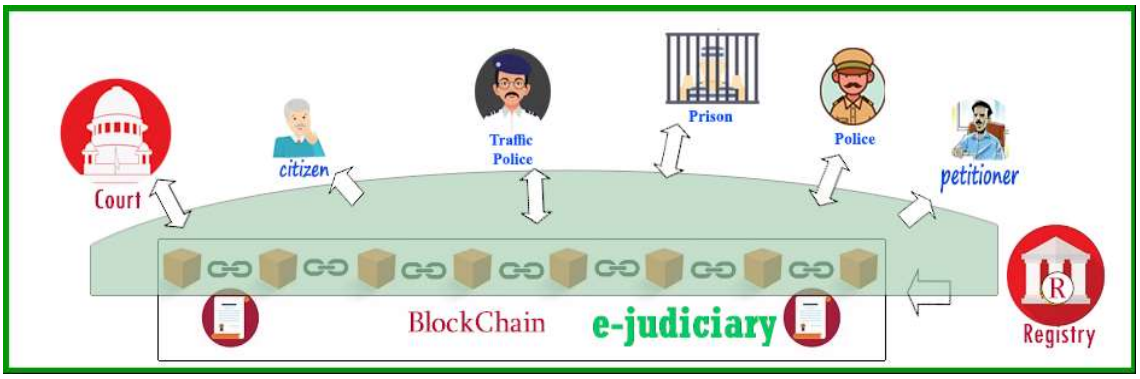
Background

The Indian Judiciary has been one of the early adopters of ICT. The Indian Judicial system comprises of the Supreme Court, High Courts, District and Tehsil courts. The e-Courts system has facilitated all the courts in India to record the case details, facilitate easy creation of documents such as summons, maintain a ledger of the certified copy requests / issued and a ledger for judicial deposits made by the party. The Judgments are digitally signed and stored in a repository. The use of ICT in the registries of these courts has provided transparency by providing the cause list, case status, judgments etc. in the respective web sites of the courts in India.

The Judicial process and the interaction with Stake holders

The Judiciary depends heavily on the documents from different pillars of the Criminal Justice System namely the Prisons, Police, Forensic labs. In addition, documents issued by the Government and other agencies are relied upon by the Judiciary in delivering Justice to the citizens.



While the civil cases could be filed by the advocates in the respective courts, the criminal cases are initiated with the police registering a FIR which is then sent to the Court. Receipt of FIR is acknowledged and if necessary, proceedings could be initiated. The police then prepares the charge sheet and submits the same to the court. Traffic police also issues challans which could be challenged in the courts. The proceedings take place in the Court. Notices, summons are issued to the party through the police. Bail orders / conviction orders are sent to the Prisons. In the process of hearing of civil matters, the details of the property and other assets are sought by the Judiciary to decide the matter. In some other disputes, documents issued by Government are sought.

The registry in the courts also maintain and issue various documents as certified copies to the citizens. The accounts of all the payments received as fees and judicial deposits are maintained by the registry.

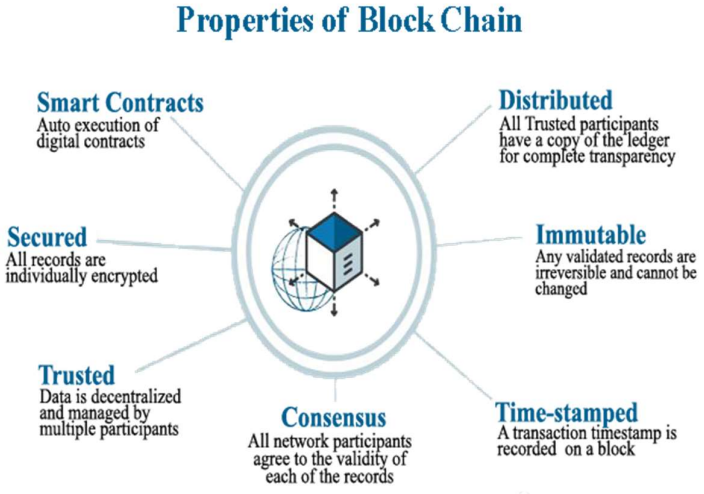
Thus there is a need for exchange of data between the different pillars of the criminal justice system, Government and Citizens. The need for trust between these systems and availability of immutable, time stamped document would facilitate quick delivery of Justice.

Blockchain Technology

In the traditional methods of recording transactions, the participants kept their own ledger/ records. There would be intermediaries like the auditors / regulators with whom agreements have to be made and to whom some fees has to be paid. There could be delay in synchronizing the ledgers. The duplication of efforts in maintaining multiple ledgers and vulnerability of the central system could cause the network to be affected.

Blockchain is a decentralized distributed database (ledger) of immutable records accessed by various applications over the network. The Blockchain network consists of nodes (Computer owned by the stakeholder) that are geographically distributed and each node maintains the same copy of the ledger.

Client applications of related sectors can read or append transaction records to the Blockchain. Transaction records submitted to any node are validated and committed to the ledger database on all the nodes of Blockchain network. Committed transactions are immutable because each transaction is linked with its previous block by means of hash and signature values. Consensus algorithms based on voting / leader selection / lottery and distribution algorithms such as Gossip, multicast etc. ensure that the submitted transactions are transferred to all nodes and committed on all Blockchain nodes consistently.



Centre of Excellence in Blockchain Technology

NIC has set up a Centre of Excellence (CoE) to overcome these challenges in line with MeitY's strategy. The CoE provides a platform that Governments can look to for consultancy, capacity building and as an incubation center where the departments can develop Proof of Concepts before moving on to production.

The CoE also helps Government departments to integrate their line-of-business application with Blockchain by developing the smart contracts and APIs. The CoE is providing the Blockchain related Services and ICT infrastructure for the government departments to integrate their systems and use the BCT.

The Centre has explored Blockchain protocols such as Hyper ledger Saw tooth and Fabric and Ethereum, and developed and deployed applications on State-of-the-Art Infrastructure. These development frameworks have been deployed on Docker and Kubernetes thus enabling scalability and high availability. As part of the project for Unified Blockchain Framework (UBF), funded by MeitY, infrastructure is being created at Hyderabad, Bhubaneshwar, and Pune.

Blockchain Implementations in Government

The CoE in Blockchain Technology and developed and deployed products such as Certificate Chain, Property Chain, Drug Logistics System, Blockchain for eForensics that can be rolled out for the country. These system can also provide access to the Judiciary for facilitating access to authentic data thus reducing the time for verification of the documents and data. The details of these systems are provided in Annexure-I

Use of Blockchain Technology in Judiciary

Blockchain can democratize access to the justice system by reducing complexity related to availability of Trusted, Immutable, time-stamped data and documents. Blockchain technology can be used under the following scenarios for the Judiciary:

a. Judicial Deposits - Passbook in the Ledger

Under certain circumstances, a party is ordered to deposit the money with the court. The registry then puts the money in fixed deposits in the banks. At various stages in the hearing of the cases, the court might also order that a portion of the judicial deposit be given to the other party. The Registry in the courts maintains these ledgers. There are instances when the deposits are not claimed by the parties due to various reasons. Maintaining the judicial deposit transactions in the blockchain to ensure that it is not tampered and also initiating the processes of refund automatically will be another use case in the Judiciary.

b. Transfer of FIR, Charge-sheet & traffic challan data from the Police

The FIR and charge-sheet are issued by the Police. These documents need to be presented to the court within a stipulated time. The details of the FIR are captured in the case information system in the courts and then registered as a case. Sometimes, even though the charge sheet is not filed, the hearings can be made based on the FIR. The charge sheet is submitted by the police to the prosecution after validating the admissibility and then it is handed over to the court. The Court then acknowledges the receipt and the charge sheet is admitted.

Instead, the police / traffic police department software can store the FIR, charge-sheet, traffic offence details & fine amount in the blockchain. This will facilitate the following:

i. Certified copies of the FIR / charge sheet document are also requested by the citizens. Storing these documents in the blockchain will facilitate the issue of hard copies through counters, thereby facilitating the downloading of soft copies by the agencies which need these documents.

ii. The Court can refer to the FIR metadata from the blockchain for further processing without waiting for the hard copy of the FIR.

iii. The fine on traffic violation can also be retrieved by the traffic court to dispose these cases quickly.

E. Publishing the notices and summons to the parties served by the Police

The time and effort needed to issue summons and notices to parties can be greatly reduced by ensuring that the registry stores these documents in the blockchain and enables the police staff to download these without the need to visit the court every day.

f. Issue of bail orders by the Court

Bail orders issued by the court are required to be presented in prisons in the shortest possible time. Enabling the bail orders to be stored in Blockchain will facilitate in-time retrieval of the bail order document. The immutability of these documents ensures that the authorities at the prison and the parties involved can trust the digital document.

g. Use of land records & Registration data

The land records & registration data on the blockchain can be used by the Judiciary during the different stages in the case proceedings to check for the transaction details and ownership of the land or property.

h. Use of certificates and documents issued by Government departments

Certificates such as marks-sheet, admission orders, caste, income, Birth, death certificates that are stored by the issuing authorities in the Blockchain can be used by the Judiciary as proof of claims.

i. Forensics Reports

The eForensics reports that are relied upon by the Judiciary can be retrieved from the Blockchain.

j. Securing evidence

Digital evidence stored conventionally on a CD or pen drive is more susceptible to data loss. The disc may be damaged or misplaced, whereas the data stored on a centralized system could be tampered with more easily. Blockchain could be used for securing evidence to be presented in court proceedings such as screenshots of websites, photos or any other digital or digitized content, and contracts without getting tampered. Uploading evidence to the blockchain in real-time, allows for reliable sourcing as well as storage.

Benefits

Implementing blockchain in Judiciary & other pillars of Criminal Justice System will provide the necessary trust that each of the stakeholders require. Specifically, following benefits are envisaged -

- Maintenance of the Judicial deposits registers will ensure that no tampering occurs and also automate certain business tasks which would have otherwise be dependent on human discretion.

- Since the documents are available in the blockchain, the need for certified copies of these will be reduced to a great extent as the participating agencies can directly refer to the documents in the blockchain.

- Reduction in time taken for movement of the documents between these pillars can improve the efficiency of the systems.

- The aggrieved parties will also be able to rely on the data available on the blockchain thereby reducing dependencies on lawyers.

- Verification of facts from documents issued by other departments such as land records, property registration etc. will help in quicker disposals.

Technology decisions

From the above, it is evident that there are two types of assets that could probably be stored in the blockchain.

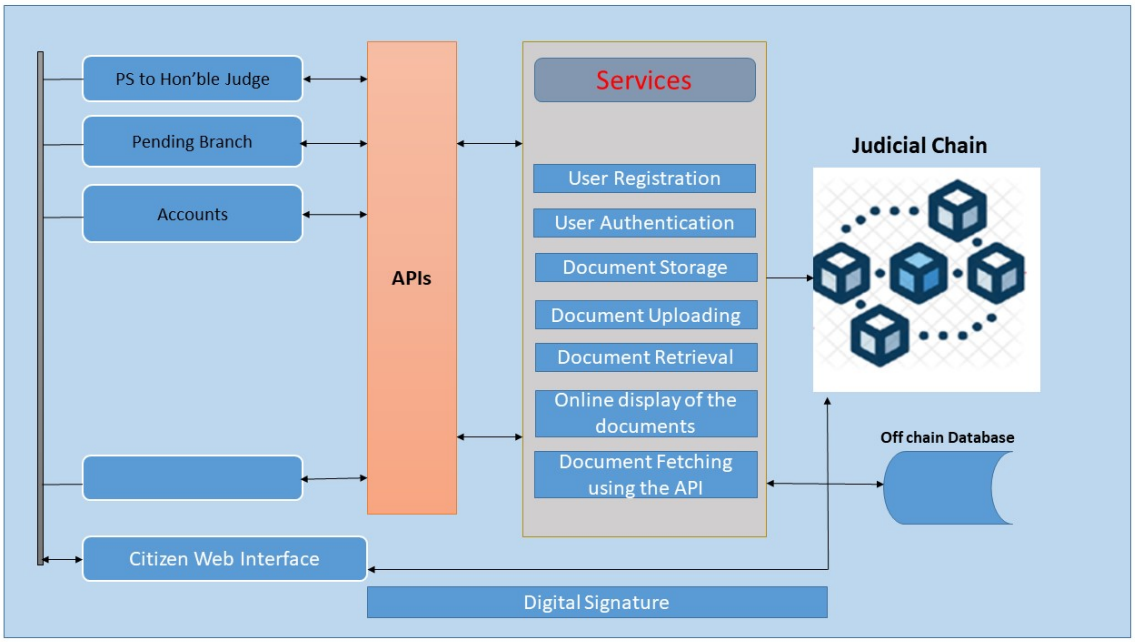
1. Documents - Such as case files including the Judgment. These would be bulky and could be stored in off-chain database (Document Management System) with their hash in the blockchain. Whenever these documents are being referenced, the authenticity of the documents could be verified.

2. Data of various departments used by the courts or sent by the courts to other departments. Critical parameters required for decision making can be stored in the Blockchain.

3. Financial transactions in terms of judicial deposits and payments to parties etc. is a potential candidate for which Blockchain could be leveraged.

Solution Architecture

Various sections of the Judiciary like Pending Branch, PS to Hon'ble Judges, Accounts sections would be storing data or documents into the Blockchain. Other stakeholders who act as consumers will be able to retrieve the documents. The on-boarding of the various stakeholders who would like to consume the data from the Judiciary Chain system or the use of API verification will be done by the portal. The architecture for facilitating these activities is given below in a pictorial form.



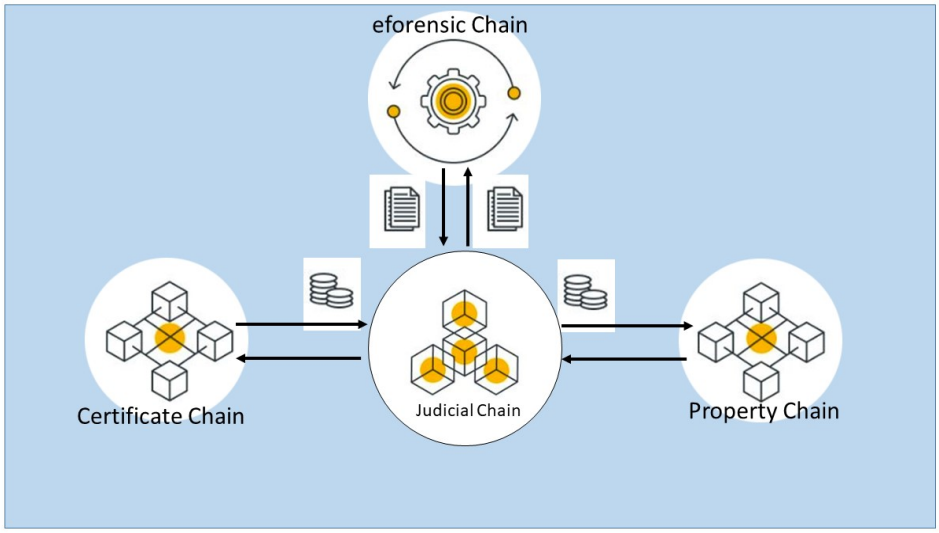
The process of storing the documents in the Blockchain will greatly aid as supplementary to the existing processes followed by various departments/offices, and organizations, etc. In computerized offices, the data is stored in the databases after the approval of the issuing authority. The existing processes will continue to work as before, except that the digitally signed documents will also be stored in the Blockchain by consuming APIs provided for the purpose. The Judiciary Chain system will also record the changes made to the documents as and when there is a change in the document by way of judgement and all, and the end-user will be able to view those changes.

Verification

Retrieval of documents from the Blockchain can be enabled through portal for verification for any verifying parties or Government Departments. The verifying authority will be able to view the details on the portal without depending on a third party for verification. The history of transactions on the case can also be viewed.

Alternatively, API can be used to fetch the case data and integrate with their applications for automatic verification.

Using the APIs provided by the other chains like Property chain, certificate chain and eForensic chain the data can be fetched and viewed for the purpose of judgement. Thus the different chains can exchange the data based on key parameters for the verification purpose.



Conclusion

Blockchain is a technology that enables the authenticated verification of the data. Integration with the existing Judicial system will ensure that all sensitive data related to the case documents are updated in Judicial Chain. This will control the data haking and manipulation of the data related to the case history.

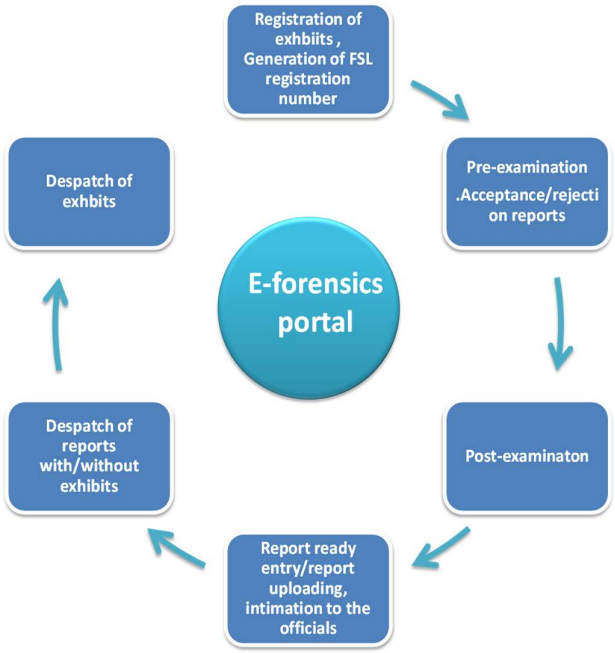
Annexure – I

Blockchain Solutions in Government

1. e-forensics

Online portal for the processing of forensics examination of exhibits.

Automates the complete workflow of the forensics examination from registration to dispatch of reports.



Registration of exhibits is done at the front desk of the FSLs and exhibits are assigned to concerned divisions.

Pre-examination of the exhibits is done, and acceptance/rejection of exhibits is recorded in the Blockchain.

In post-examinations observations, opinion, methods used and notes entry are captured. Report is prepared and the report readiness is entered in the system and the concerned officials stored in the Blockchain.

Features

- Registration of cases with forwarding authority and parcel details.
- Pre-examination - acceptance/rejection of exhibits.
- Post examination – observations, opinion, methods adopted and notes.
- Report ready entry – Email and SMS alert to forwarding authority.
- e-signing of reports and uploading of reports – Report sharing with police/court.
- Despatch of reports with/without exhibits.
- OTP authentication to login into eforenisics.
- Dashboards to various stake holders to know the status of cases and pendency monitoring

Highlights

- Software can be used by CFSLs/SFSLs/RFSLs.
- 102 FSLs are on-boarded into eforensics software.
- 11.29 lakhs registrations done in eforensics portal far.
- Data sharing with police and court and integration with ICJS portal.
- Dashboards to various stake holders to know the status of cases and pendency monitoring.
- E-signing of forensic report and uploading of reports.
- APIs developed to share data and reports with the forwarding authority.

Impact

- Registration of exhibits is made easy as FIR data is fetched from ICJS portal.
- Status of examination and pendency monitoring.
- Dashboards for various stake holders to monitor the progress of examinations.

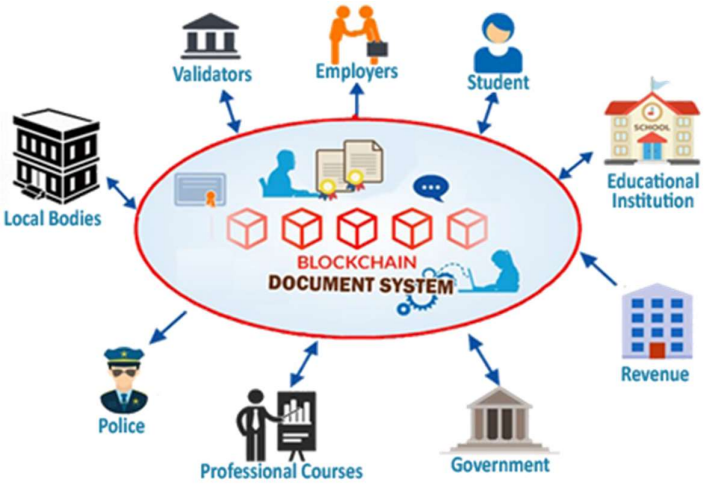
Future plan

- Mobile app for e-forensics system.
- Parameters capturing for the forensic examinations

2. Certificate Chain

The challenges in the current system of issue and use of the certificates amongst the stakeholders include rampant use of fake documents for exploiting Government benefits, enhanced paperwork for document verification, delay in the process for service delivery etc.

To overcome the above problems associated with paper-based documents, National Informatics Centre (NIC) has adopted Blockchain technology to build 'Certificate Chain' for secured storage and retrieval of such records. The main advantage of this Certificate Chain system is that the Certificate can be accessed online by any authorised person / institution and be assured that it is genuine and not tampered – all this without the need for an intermediary. This provides the necessary trust to the agencies which use these documents to ascertain the eligibility for providing benefit to the citizens.



CBSE Chain has been built to record marks-sheet of Class X and XII students. Marks-sheet of three years totalling about 1 Crore are available in Blockchain. Certificate Chain for Karnataka has been established and certificates of X and XII from year 2012 to year 2021 have been stored in this chain. About 1.2 Crore marks-sheet stored in the chain can be used by other agencies for verification.

Some states are testing this in the staging environment. Certificate Chains are planned to be used for the admission to professional colleges, beneficiary schemes and recruitments in Karnataka from this year for verification of eligibility.

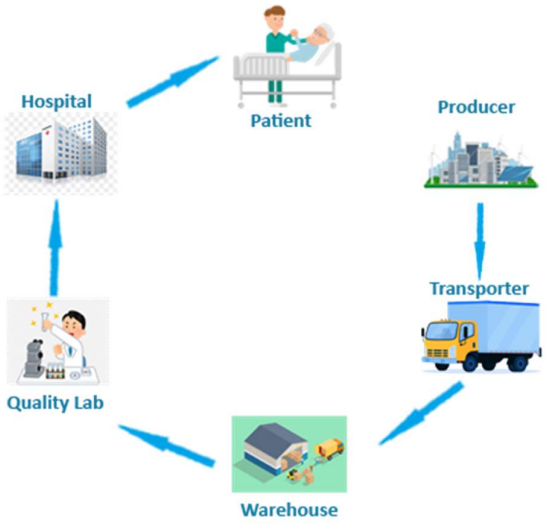
3. Document Chain

Document Chain is a single platform that provides the issuing authorities and consuming entities a standard procedure for storage and retrieval of any document issued by the government such as caste, income, ration card, driving license, birth & death certificates etc.

The Document Chain provides a mechanism for any agency to verify the details of the applicant. It could help government departments, educational institutions, job providers and financial institutions to get the documents verified without the need for a third party.

Birth and Death Certificates of Planning Department-Karnataka, from April 2022, have been getting recorded. Caste and Income Certificates of Revenue Department-Karnataka, from Jan 2018 are getting recorded. These Certificate Chains are being used by the systems for admission to professional colleges in Karnataka from the year 2022. Some states are testing this in the staging environment.

4. Logistics Chain

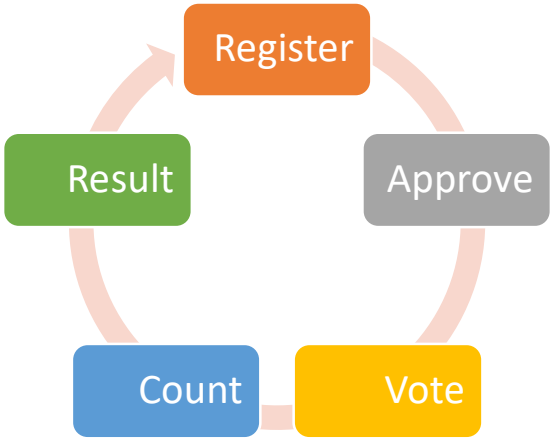


One of the use cases of Logistics chain is the online Supply Chain Management System for medicines (Aushada) of Karnataka. The Aushada system is integrated with Blockchain to record the transactions related to movement of drugs from the manufacturer to supplier to warehouse and then to the hospitals including quality checks. Smart contracts provide the checks and balances at each stage in the supply chain and also ensure that non-standard drugs are not moved down the supply chain.

Patient can check the details of the manufacturer, expiry details & quality of the medicine before consumption. It provides traceability in the transactions (track & trace) reducing the changes of entry of spurious drugs, enhances precision and brings transparency. Efficient recall system can be implemented when the quality of the drug is found to be not-of-standard. The resulting integrated supply chain system brings in all stake holders to a common platform. This system is working since last three years.

5. Remote Voting Chain - PoC

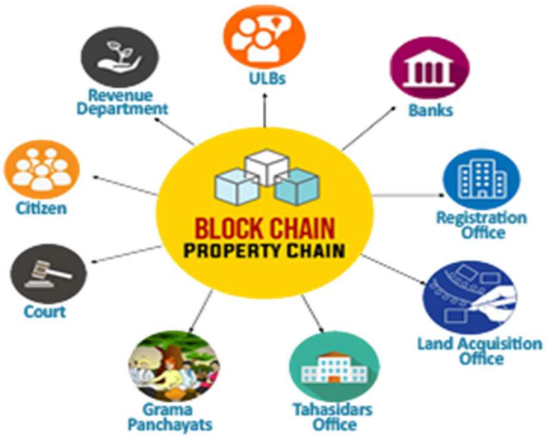
The remote voting system is blockchain-based distributed system developed to enable migrants and other in-service voters posted at different locations to cast their votes from their place of work (Host Constituency) without commuting to their Parent constituencies, thereby saving time and money, and enabling higher voter turnout. A Proof of Concept (PoC) was developed as per the directions of Election Commission of India and demonstrated.



The system enables secured storage of details of remote votes, ballots, and encrypted vote in the Blockchain. The returning officer of the parent Constituency only would be authorised to download all encrypted votes from the Blockchain on the day of counting and decrypt the same to count the votes.

6. Property Chain

Blockchain powered property management system enables the availability of common ledger of the property facilitating a single source of truth. The property details and all the transactions on the property (pledge, release of pledge, inheritence mutation, sale, gift , acquisition initiation, allienation, etc) would be stored in the blockchain so that even while the process of the mutation is being executed in the land records system to reflect the transactions on the property, all the stakeholders will be able to see the complete history before taking decision. The prospective buyers will benefit greatly in ascertaining the ownership and also the rights , liabilities , details of GPA etc. This will greatly reduce the litigations and speed up the disposal of disputes/cases.



Bhoomi, e-asthi, e-swathu applications of Karnataka are integrated with Property Chain for recording the agricultural and non-agricultural property details and transactions on them.