

eMudhra's emBlock solution can help pharmaceutical companies counter the issue of counterfeit drugs by tracking the drugs throughout the supply chain process.

Industry

Pharmaceutical Industry

Business Matters

The pharmaceutical sector of India was valued at US\$ 33 billion in 2018 and is the largest provider of generic drugs globally. However, the industry faces issues of counterfeit drugs and nearly 10% of the drugs in India are fake. A blockchain solution powered by emBlock, based on Hyperledger Fabric framework can help tackle this concern.

Business Needs

Counterfeit medicines pose a threat to patient's safety, public health, and business continuity. With the e-commerce boom, this problem has further aggravated. Apart from patient's safety which was of paramount importance for the company, there were other business implications as well. Counterfeit medicines have a potential to damage company reputation and its bottom line. Therefore a solution was needed that would allow customers across the supply chain to authenticate the genuineness of the medicine.

Approach

The pharma company should be able to use emBlock which is based on a Hyperledger Fabric framework, allowing rapid deployment of a Blockchain system. With emBlock, the supply chain partners 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.



Background

A patient receiving an authentic drug in India has become a major challenge now. According to the World Health Organization, the counterfeit drug market in India is over Rs. 4000 crore and nearly 20% of the drugs sold in India are counterfeit. Thus, a secure pharmaceutical supply chain requires an end-to-end solution that provides integrity, traceability, and transparency which can be achieved in a data sharing framework, which includes raw material suppliers, manufacturers, third-party logistics, wholesalers, and pharmacies.

A hash (Unique ID) will be assigned to the medicine and it would be registered on the blockchain. Every ID is treated as an asset on the blockchain. At each juncture where the medicine changes ownership, the activity would be time-stamped and recorded on the blockchain. Everyone along the chain can verify the source of origin but at the same time cannot alter it. Moreover, in the case of a defective drug recall, the manufacturer can view the pharmacies that received the affected drug and the pharmacies in turn can directly contact patients who had received those drugs from them.

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.

Blockchain Technology

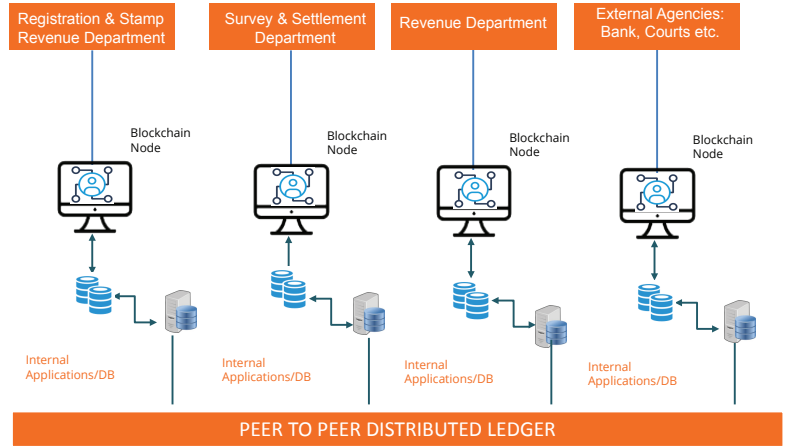
Blockchain also referred to as a 'distributed ledger' is a type of database in which transactions are copied to all the computers in a participating network. The information is stored in blocks and given the latest block, all the previous blocks linked together in the chain can be accessed, making the 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 supply chain is traceable and drugs are easier to track
- Information systems will hold expiry date details, which improves stock control and rotation
- All parties can see every stage of the drug journey to ensure the drug authenticity
- In case of any defect, recalls are very easy
- Promotes electronic prescriptions and decentralized, trust-based, authenticated data exchange.



Solution

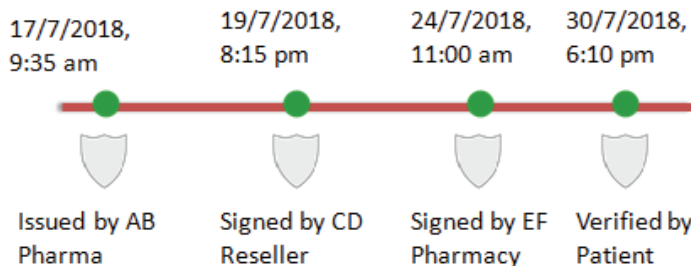
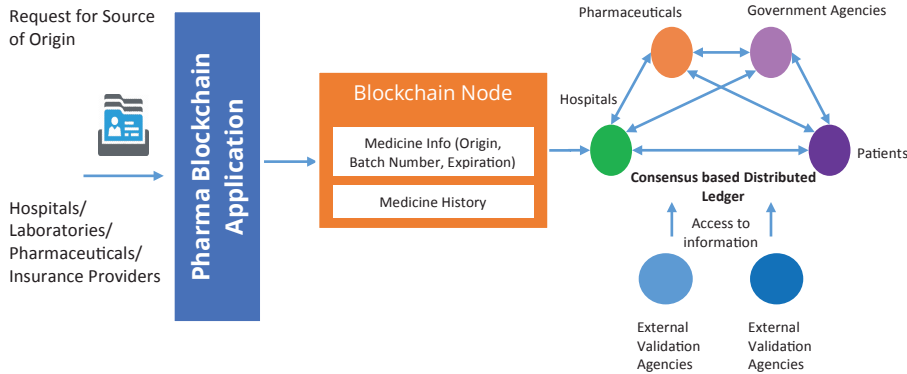
The blockchain will have the following participants:

1. Hospitals
2. Patients
3. Drug Manufacturer, wholesaler, distributor
4. Government Agencies

The participants in the blockchain can record and view transactions. Using smart contracts an immutable ePOD (electronic proof of delivery) an indisputable record of the freight's history will be created.

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.





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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 – AAD-HAAR to bridge Digital Divide.