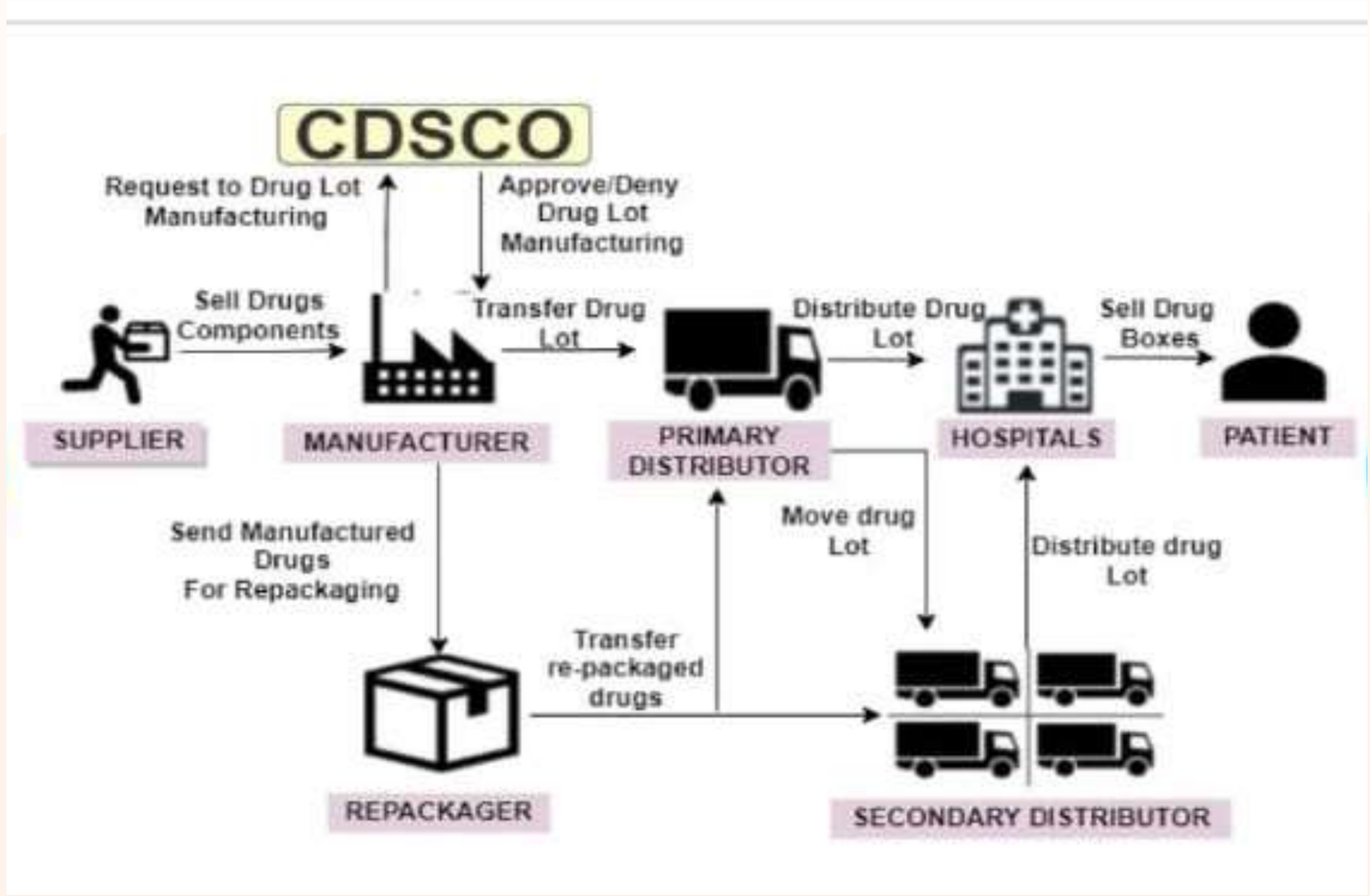
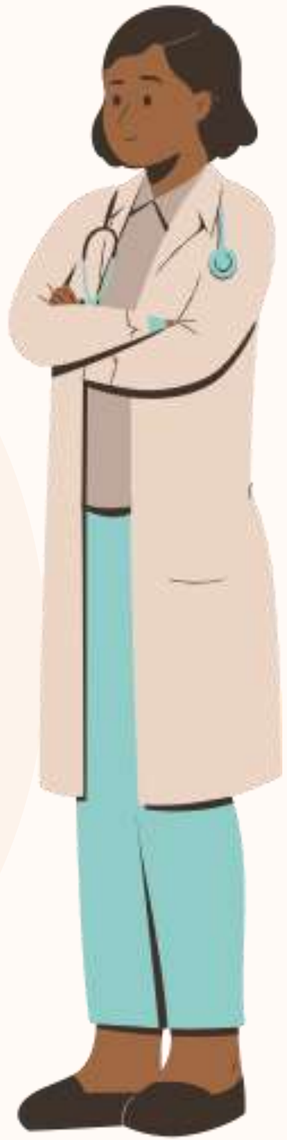
TECHNOLOGY AND ARCHITECTURE DESIGN

ARCHITECTURE



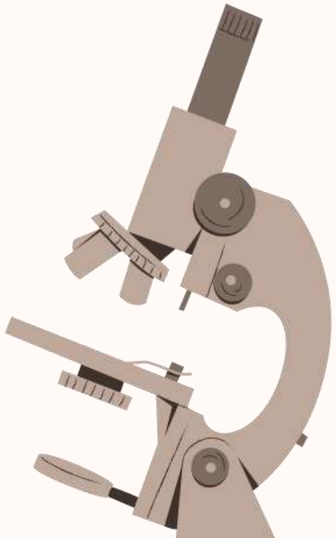


Flow of information between the components

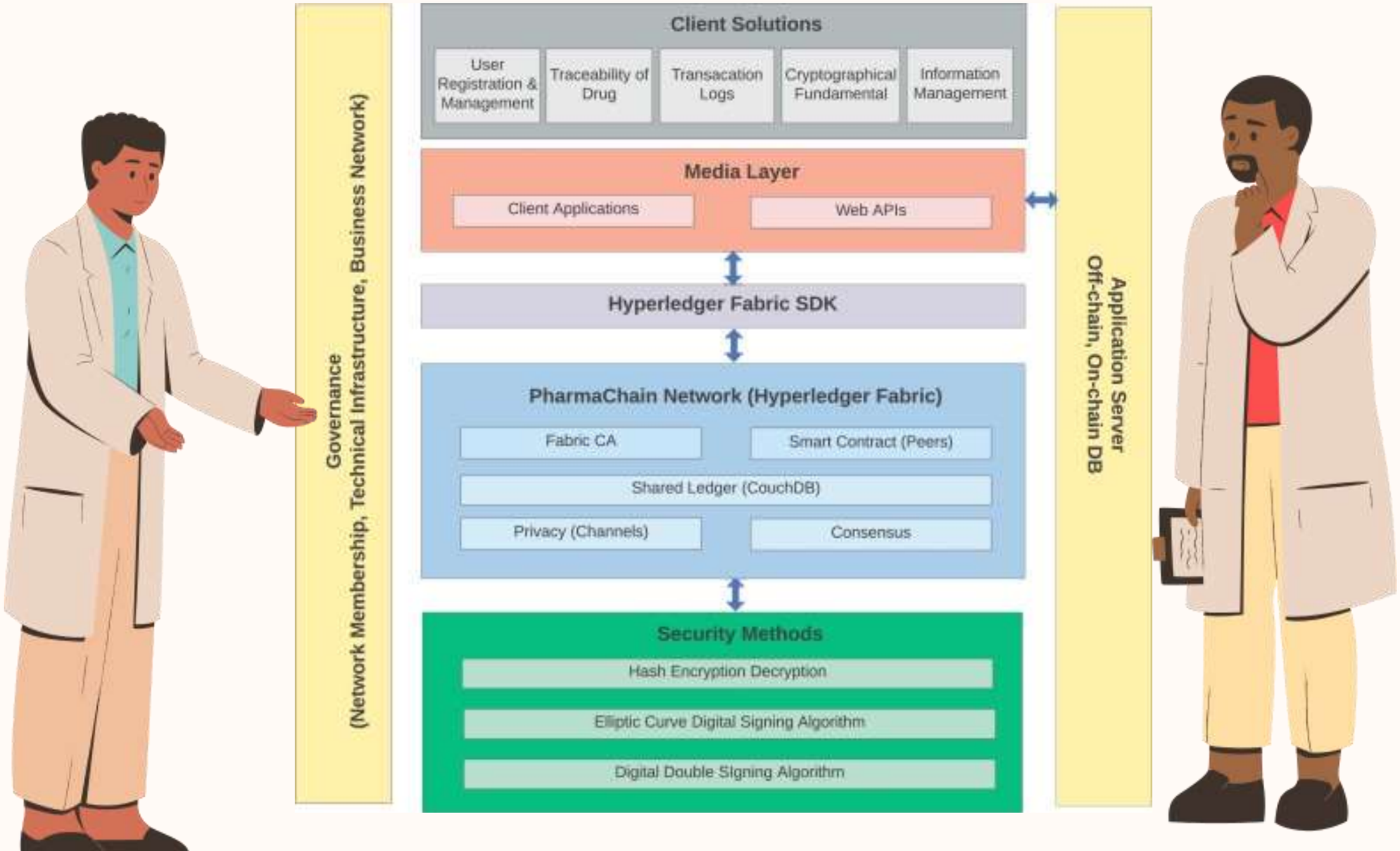
- Manufacturer → CDSCO: Requests approval for drug lot manufacturing.
- CDSCO → Manufacturer: Approves or denies drug manufacturing.
- Supplier → Manufacturer: Provides drug components.
- Manufacturer → Primary Distributor: Transfers approved drug lots
- Manufacturer → Repackager: Sends drugs for repackaging.
- Repackager → Distributor: Transfers repackaged drugs.
- Primary Distributor → Secondary Distributor: Moves drug lots for further distribution.
- Distributors → Hospitals: Supply drug lots.
- Hospitals → Patients: Dispense drugs to consumers.

BLOCKS FUNCTIONALITY

- CDSCO – Approves or denies drug manufacturing requests.
- Supplier – Provides drug components to manufacturers.
- Manufacturer – Produces drugs and sends them to distributors or repackagers.
- Primary Distributor – Distributes drug lots to hospitals and secondary distributors.
- Repackager – Receives drugs for repackaging and sends them back into the supply chain.
- Secondary Distributor – Further distributes drugs to hospitals.
- Hospitals – Dispense drugs to patients.
- Patients – Receive and consume the drugs.



DESIGN FLOW DIAGRAM

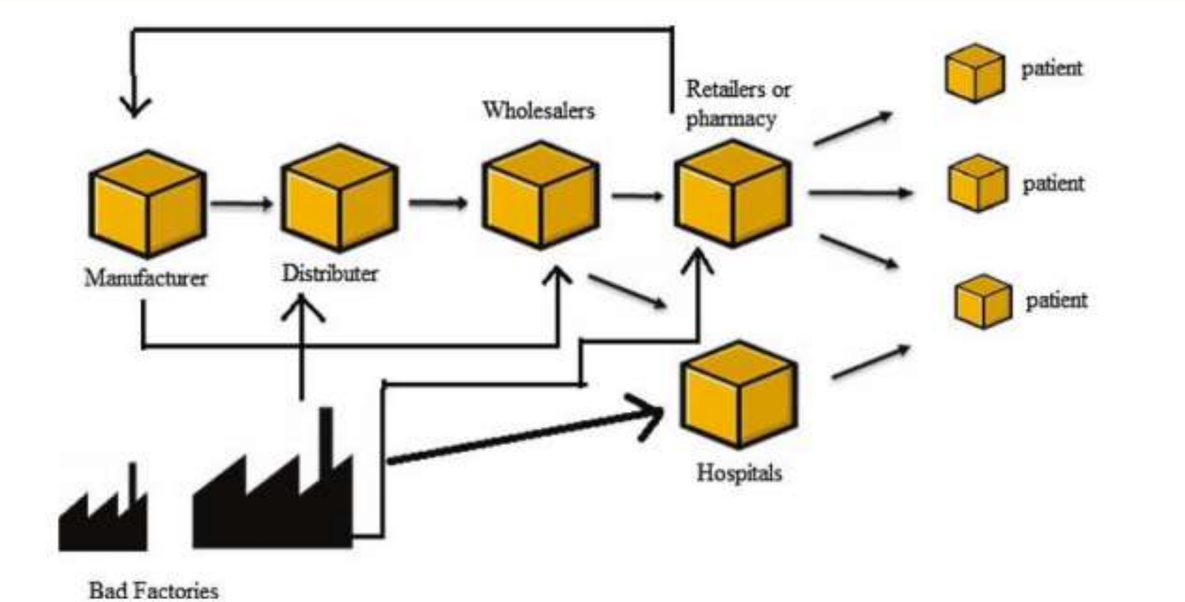


TECHNOLOGY

Counterfeit drugs pose a significant threat to public health, leading to ineffective treatment, financial losses, and, in severe cases, fatal consequences. To combat this issue, integrating Blockchain Technology into the pharmaceutical Supply Chain ensures transparency, security, and authenticity across the entire drug distribution process. This project proposes a blockchain-enabled system that tracks and verifies drugs from manufacturing to the end-user, ensuring trust and eliminating counterfeit risks.

The front-end of the blockchain-based counterfeit medicine prevention system uses EJS, HTML5, CSS3, and JavaScript for dynamic web pages, with jQuery and Bootstrap enhancing responsiveness and UI efficiency. Key features include adding and searching medicines, tracking locations, viewing history, and updating status. Visual Studio Code (v1.68) is used for development and debugging, ensuring a user-friendly and interactive interface.

COUNTERFEIT SUPPLYCHAIN



The diagram represents the pharmaceutical supply chain, depicting the movement of medicines from manufacturers to distributors, wholesalers, retailers, hospitals, and ultimately patients. However, it highlights a critical issue—the infiltration of counterfeit drugs from unauthorized sources (bad factories) into the legitimate supply chain. This contamination leads to serious public health risks, reduced drug efficacy, and financial losses. Implementing blockchain-based traceability solutions can enhance transparency, secure the supply chain, and ensure the distribution of authentic and safe medicines to consumers.