

Technical Architecture

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Technical Architecture:

Designing the technical architecture for drug traceability in block chain involves selecting the appropriate block chain platform, defining data structures, and specifying the components of the system. Here's an overview of the technical architecture:

1. Block chain Platform Selection:

- Choose the block chain platform that suits the project's requirements. Consider options like Ethereum, Hyperledger Fabric, Corda, or a custom-built block chain.

2. Block chain Network:

- Create a private or consortium block chain network to ensure control and privacy among stakeholders in the pharmaceutical supply chain.

3. Smart Contracts:

- Develop smart contracts to automate and enforce traceability, compliance, and authentication processes.
- Smart contracts should include functions for recording drug details, verifying authenticity, and triggering alerts in case of issues.

4. Data Structure:

- Define the data structure for storing drug-related information on the block chain.

This should include:

- Drug ID or serial number.
- Product details (name, batch number, expiration date, manufacturer, etc.).
- Transaction history (timestamp, location, entities involved).
- Regulatory compliance data.
- Quality control information.
- Alerts and notifications.
- Digital signatures for authentication.

5. Consensus Mechanism:

- Select an appropriate consensus mechanism based on network requirements, e.g., Proof of Work (PoW), Proof of Authority (PoA), or Practical Byzantine Fault Tolerance (PBFT).

6. User Interfaces:

- Develop user-friendly interfaces for stakeholders to interact with the block chain system.
- These interfaces should allow users to input and retrieve data easily.

7. Integration with Legacy Systems:

- Ensure seamless integration with existing pharmaceutical supply chain management systems.
- Develop APIs or connectors to facilitate data sharing between block chain and legacy systems.

8. Security Measures:

- Implement robust security measures, including encryption, access control, and multi-factor authentication.
- Secure private keys and sensitive data.

9. Privacy Controls:

- Incorporate privacy-enhancing technologies to protect sensitive patient and drug information.
- Implement methods such as zero-knowledge proofs or off-chain data storage for confidentiality.

10. Scalability:

- Plan for scalability to accommodate the growing volume of transactions and data in the supply chain.