

A Blockchain-Integrated Web Interface for Supply Chain Management in Medicine Industry

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Keywords: Blockchain-Integrated, Tracing, Pharmaceutical Company, Supply Chain Management.

Abstract: The mismanagement of supply chains in pharmaceutical companies has significantly increased the prevalence of counterfeit medicines. There is an urgent need for regular monitoring of drug ownership and the distribution of expired medicines. Blockchain technology offers a reliable remedy to these problems by enhancing transparency within companies. Utilizing a decentralized database, blockchain ensures data integrity. Leveraging the Ethereum Blockchain, it ensures the storage of immutable data through advanced cryptographic algorithms, providing comprehensive security and transparency in the system.

INTRODUCTION

In 2004, the term WEB 2.0, also known as the participative social web, highlighted the importance of user-generated content, usability, and interoperability for end users. More recently, the internet has evolved significantly with the advent of web 3.0, characterized by distributed ledger technology, commonly referred to as Blockchain. Blockchain introduces the concept of data decentralization. Initially, it was closely linked to digital currency, leading to the uprise of Bitcoin. Blockchain has gained substantial acceptance due to its decentralized and transparent nature, enabling the recording of transactions between non-trusting stakeholders. Simply put, Blockchain is a shared information database agreed by distributed network.

This study applies Ethereum-based Blockchain technology to enhance drug traceability in supply chain management. The supply chain consists of interconnected channels and points of control from production to distribution, with corporate and private networks at various levels. Little data is shared between these systems due to security or system barriers; therefore, often leaves it unclear and traceable. Maintaining system reliability is important, as reliance on a centralized server carries a risk of data loss during congestion. Ensuring the authenticity and authenticity of medication quantity and quality is essential to prevent counterfeit medication and ensure patient safety.

Blockchain is emerging as the best solution to achieve decentralization, security, traceability and transparency in the supply chain network. It operates as a peer-to-peer ledger system, using decentralized blocks to store data safely through asymmetric key encryption and hash functions. This approach not only ensures the integrity of drug information but maintains confidentiality among manufacturers and between users through smart contracts, which in the former are used to store patient histories in healthcare systems.

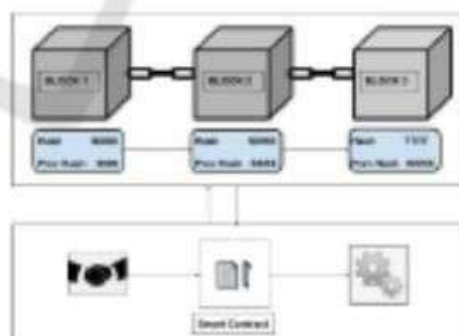


Figure 1: Smart Contract & Hash Function in Blockchain.

Data handling and security are important concerns in medicine, making process integrity of paramount importance. Counterfeit medicines with harmful ingredients pose a serious risk to consumers. The pharmaceutical manufacturing process encompasses end-to-end processes from sourcing active ingredients to manufacturing and delivery of the final product to