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Blockchain Based Agri-Food Supply Chain

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ABSTRACT: We've completed the entire blockchain-based agriculture and food (agri-food) supply chain repair. In this work the functioning of blockchain technology and the possible use or impact it may have on current SCM Registry systems and the role of legal experts are described. The spread of blockchain is bad for anyone in the trust business government authorities that are deemed sufficiently trustworthy to handle transactions. As a result, a dependable system is needed in the Agri-Food supply chain to ensure traceability, trust, and distribution mechanisms. In the proposed structure, all transactions are written to the blockchain, uploading the data to the Interplanetary File Storage System (IPFS). The storage method generates a hash of the Blockchain's data, ensuring that the solution is efficient, secure, and dependable. Our framework provides smart contracts and their algorithms to illustrate the interaction of system entities. Smart contract simulations and tests and security and risk assessments are all part of this project. We surveyed to determine the potential obstacles and advantages of blockchain-based applications. Given the current state of the supply chain and logistics industry, this thesis could allow various businesses to collaborate with blockchain based application developers. The main objectives were to define how blockchain can change the supply chain and logistics industry. The typical challenges in these spheres were considered and the main key features of blockchain that can solve these difficulties were marked. In survey we were find out possible challenges or benefits of blockchain based applications. Considering the current situation in the supply chain and logistics industry, this thesis can empower different businesses to start working with the companies that are creating blockchain- based applications.

KEYWORDS: Accountability, Blockchain, Credibility, Reputation, Supply Chain, Traceability, Trust

I. INTRODUCTION

Traceability plays a vital role in food quality and safety management. Tracing products and processes across complex supply chain networks has become an integral part of current supply chain management. Block Chain Technology: A block-chain is a database that is shared across a network of computers. Once a record has been added to the chain it is very difficult to change. The term" block-chain technology" typically refers to the transparent, trust, publicly accessible ledger that allows us to securely transfer the ownership of units of value using public key encryption and proof of work methods. The technology uses decentralized consensus to maintain the network, which means it is not centrally controlled by a bank, corporation, or government. In fact, the larger the network grows and becomes increasingly decentralized, the more secure it becomes Blockchain networking system works on to build the control, configuration, and management. Distributed computing framework is highly virtualized computing infrastructure which provides hierarchical computing facilities. This study focuses on the applicability of Blockchain technology in banking transaction by (1) identifying potential Blockchain use cases in banking transactions (2) providing a case study that implements Blockchain technology evaluating design considerations when applying this technology in transactions.

II. REVIEW OF LITERATURE

Food supply chain is defined by Folkerts and Koehorse [25] (p. 11), as "a set of interdependent companies that work closely together to manage the flow of goods and services along the value-added chain of agricultural and food products, in order to realize superior customer value at the lowest possible costs". When compared to other industries, food production takes place in more vulnerable value chains, which requires more attention over handling processes, such as producing and storing [16,26,27]. In addition, food has the natural feature of changing in quality all the time, which makes ensuring food safety and quality a challenge [16]. Outer environments, such as temperature and transport, can also affect food products' quality and freshness. Processed food with longer shelf lives might have significantly complex producing procedures with a mixture of multiple ingredients. The complex

food production also means higher risks of product failure and requires extra attention on the raw material quality and production process [6,26,28]. Food products failure includes food borne disease, food poisoning, low quality food, counterfeit products, or mislabelling and undeclared ingredients after production. Every step and every supplier in a food supply chain matters to the final food products. Therefore, food supply chain requires higher efficiency and closer partner collaboration to maintain the value chain and eliminate products failure.

III. EXISTING SYSTEM

As shown in Figure 1, supply chains have a traditional structure. A central database containing data regarding all processes is created by using this approach. An administrator manages the database. Several limitations apply to this approach. This system uses a server to manage the database. Therefore, if that server fails, the entire system will go down. An administrator who is dishonest could change the data without the stakeholder's knowledge [4]. Those manipulations are inadmissible to trackback. Thus, this centralized approach is opaque and untraceable as well. Among the major challenges of the traditional supply chain ecosystem are traceability of products, transparency of stakeholders, and trust in collaborative systems. In the traditional approach, there are a lot of intermediaries, causing trust problems and performance problems [7]. Various supply chain entities include farmers, distributors, retailers, etc. Consequently, any outbreak involving food products will be extremely difficult to trace [10]. It is essential to examine the functional impact, social impact, and economic impact of emerging technologies in the supply chain ecosystem. Furthermore, the traditional supply chain ecosystem is highly centralized. This leads to trust issues when multiple organizations collaborate. A centralized process makes it easy to manipulate data without the knowledge of other stakeholders. Any carelessness in the food supply chain may put the lives or health of people at risk [8]. This is a big concern when it comes to traceability. Trust issues within the supply chain can result in significant losses for companies. Companies put the utmost effort into creating trust among consumers. Providing access to data while protecting it from being altered by others should resolve these issues. By utilizing emerging technologies in the supply chain, we can resolve these issues. With blockchain technology, supply chain performance can be improved, and issues can be eliminated. Furthermore, it has some features that make it useful for addressing supply chain concerns beyond its use of distributed ledger technology. As a result of its immutability and distributed nature, it provides a secure and reliable record that cannot be altered or altered. Food supply chain ecosystems can be improved by transparency and the use of emerging technologies [14].

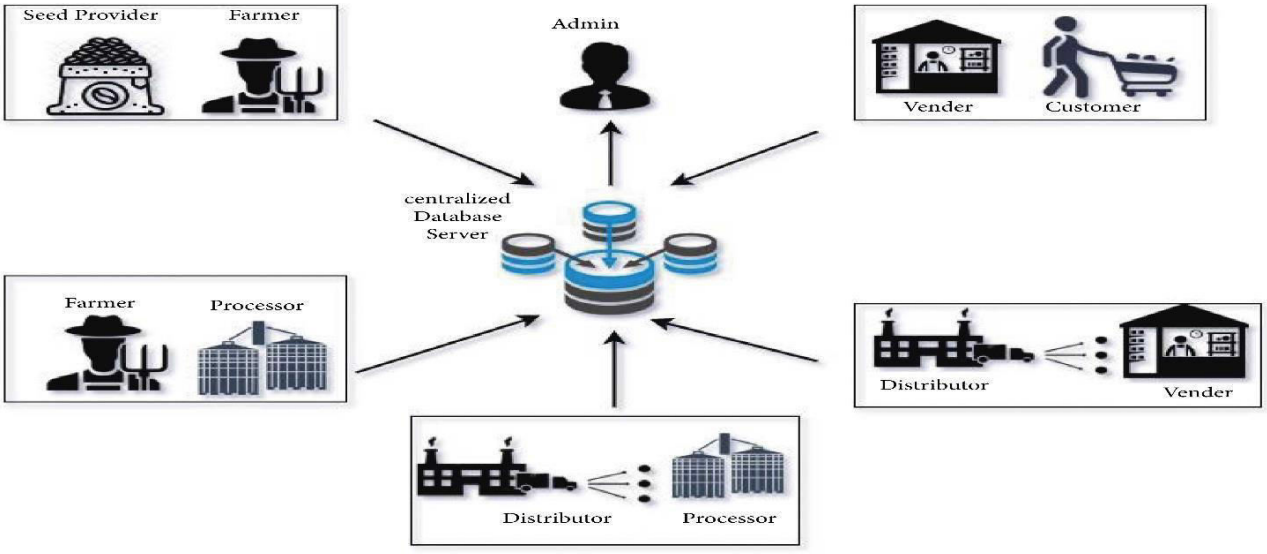

Figure no. 1

IV. PROPOSED SYSTEM

The system contains following modules:

Supply (Farmer)- A farmer is first entity in agri-food supply chain, first one to invoke smart contract for trading.
User's Group: The maintains warehouse by(processing , storing & managing)supply of goods from producers & certification of various product standards & authentication regarding quality.

NGO: NGO- To purchase consumer-products and to collect leftover food from different places.

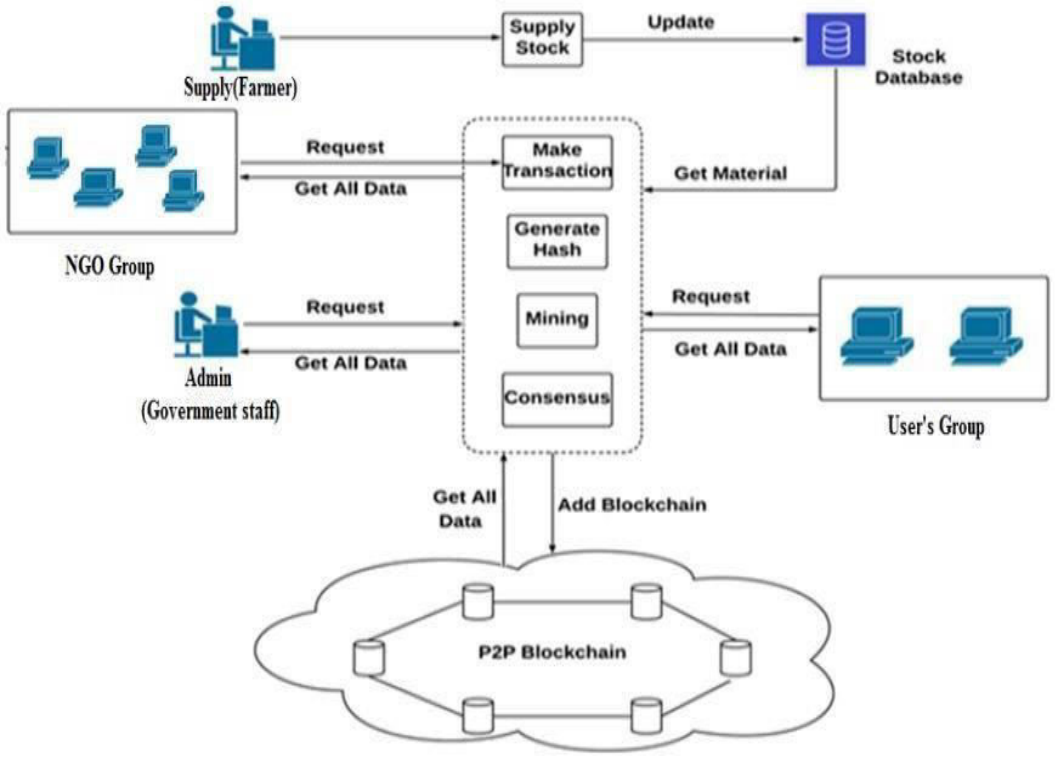

Figure 2. Proposed System

V. APPLICATIONS

1. Money and time efficient classification for the farmer and end users.
2. NGO/needy people can get food by this system.

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