

Block Chain-Based Smart Agri-Food Supply Chain Management

Seema Kale¹ Akanksha Apte² Shubhangi Raut³ Supriya Doraje⁴

^{1,2,3,4}Author

^{1,2,3,4}Department of Computer Engineering

^{1,2,3,4}PDEA COE, Manjari, Pune, India

Abstract—Blockchain is a localized linked data structure that is characterized by its inherent resistance to data variation, but it is deficient in search queries primarily due to its inferior data formatting. Divided database is also a decentralized data structure which features quick query processing and well-designed data formatting but Permit from data actuality. Associated agri-food supply chains are one of the most capable aggressive tools in today's globalizing business economy. For agricultural products, favorable supply chain development projects reduce not only the process price but also the corporate obstacle that divided personal links in traditional divided into channels. They grant participants to accomplish higher levels of service and to apprehend substantial additional value thereby serving as leverage points for economic increases. Growing environmental, social and ethical concerns and increased alertness of the effects of the agrifood area have led to increased stress by all involved agrifood supply chain. The framework goals towards the development of the agrifood supply chain design, planning and process through the fulfill of appropriate agrifood supply chain management and logistics principles. More particularly, focus is put on the minimization of the environmental stress and the maximization of supply chain sustainability of the agrifood supply chain.

Key words: Data Provenance, Blockchain, Security, Reliability, IoT

I. INTRODUCTION

In our proposed system, we have a tendency to gift Agri Block IoT, a totally suburbanized traceability system for the Agri-Food provide chain management. In the proposed system, we provide the Agri-food supply chain management between a merchant, supplier, and customer.

The agri-food industry is a sector of key economic and political importance. It is one of the most regulated and protected sectors, with major implications for sustainability such as the fulfillment of human needs, the support of employment and economic growth, and its impact on the natural environment. Supply chains are complicated entities that provide many functions. They are a corporate adjustment that link producers, processors, marketers, and distributors. Supply chains are part of the industrial organization which grants buyers and sellers who are divided by time and space to more and more add and expand value as package pass form one member of the chain to the another.

- Agri-foods move from merchant to customer;
- Technology and progressive techniques are disseminated among merchant, supplier, and customer;
- Ownership rights pass from merchant to customer and ultimately to a supplier;

II. LITERATURE REVIEW

1) *Paper name: A Supply Chain Traceability System for Food Safety Based on HACCP, Blockchain & Internet of Things.*

Author: Feng Tian

Recently, food security has increased academic and business concern. In the supply chain area, with the rapid growth of internet technologies, many emerging technologies have been implemented in traceability systems. However, until now, all these systems are centralized, which are monopolies, unlimited and Apache, which can cause trust issues like fraud, corruption, harassment and wrong information. In addition, the centralized system is likely to collapse because there is a possibility of whole system crash due to a point of breakdown. Today, a new technology called the blockchain which is an innovation in decentralized information technology offers a whole new perspective. However, there are some fundamental flaws even though this is the beginning stage of technology, in which if there is real world mass data then the scalability becomes a primary and quick.

In this paper, we will be creating an agrifood supply chain traceability system for real-time food tracing based on HACCP, the blockchain, and an internet of things, which can provide openness, neutrality, reliability and security and transparency information platform to all supply chain members.

In addition, we present a new concept BigchainDB to fill the gap in decentralized systems. The paper offers a description of a use case & challenges of implementing blockchain technology in the future food supply chain traceability systems.

2) *Paper name: Inventory transparency for agricultural produce through IOT.*

Author: S. Srinivasan, D. Shanthi, and Aashish Anand

It is more necessary to reconstruct traditional inventory management practices to optimize transparency and accuracy of a supply chain of agriculture products. A flexible and transparent inventory management system is becoming a necessity of any agricultural commodity. It was noticed that the major setback for the farmers who are the suppliers of the farm produce is due to poor supply chain integration. The recent arrival technologies and IT explosion can have a big impact on the process of storing, tracking and distributing agriculture produce of day to day life. The main aim of this paper is to integrate IoT into inventory management. The unique features of agricultural produce like a prediction of supply, demand, the location of warehouses, distribution and tracking of inventory can be integrated through IoT.

This paper offers a conceptual framework for inventory management transparency involved in the supply chain of agrifood.

3) *Paper name: Do you need Blockchain?*

Author: Karl wust, artthur garvaise

The blockchain is being appreciated as a technological innovation that makes revolutionizing how society trades and interacts. This reputation is in particularly characterized by mutual untrustworthy institutions for exchange of financial value and allowing their interaction without trusting a third party. A blockchain technology provides integrity protected data storage and transparency.

In this paper, we mainly analyze whether a blockchain is the appropriate technical solution for a particular application scenario. We differentiate between permissionless and permission blockchains and contrast their properties to those of a centrally managed database. We provide a structured methodology to analyze the appropriate technical solution to solve a specific application problem. According to our methodology, we analyze the deep three things: Supply Chain Management, Interbank, and International Payments, and Decentralized Autonomous Organizations.

4) *Paper name: Performance Characterization of Hyperledger Fabric*

Author: Arati Baliga, Nitesh Solanki, Shubham Verekar, Amol Pednekar, Pandurang Kamat and Siddhartha Chatterjee

Hyperledger Fabric is an assent Swell Ktavni platform designed to be highly modular and extensible, delivering privacy and scalability to Enterprise blockchain. With Fabric's production category availability in mid-2017, enterprises to determine something with Fabric for building real-world blockchain applications. In this paper, we distinguish the presentation and scalability features of the current production release of Fabric (v1.0). This paper takes an experimental approach, where we study the throughput and latency categories of Fabric by subjecting it to dissimilar sets of workloads. Through a suite of microbenchmarks, custom-built for Fabric, we tune dissimilar settlement and chain code parameters and study how they affect transaction latencies. Finally, we also conduct experiments to study Fabric's performance characteristics while growing the number of chain codes, channels, and peers

5) *Paper name: Blockchain Access Privacy: Challenges and Directions.*

Author: Ryan Henry ,Aniket Herzberg ,A Kate

Most blockchain users remain susceptible to privacy attacks. Many researchers felicitous using innominate communications networks, such as Tor, to ensure access privacy. We challenge this approach, showing the need for mechanisms through which non-anonymous users can publish and fetch transactions without enabling others to link those transactions to their network addresses or to their other transactions.

6) *Paper name: A Model for Smart Agriculture Using IoT.*

Author: Prof. K. Patil, Prof. R. Kale.

Weather changes and rainfall has been irregular upper to the past decade. Due to this in the recent era, weather-smart methods called as bright agriculture is adopted by many Indian farmers. Smart agriculture is an automated & directed information technology implemented with the IOT (Internet of Things). IOT is developing rapidly & widely applied in all wireless environments. In this paper, sensor technology &

wireless networks integration of IoT technology has been studied and reviewed based on the actual situation of the agricultural system. A combined approach with internet & wireless communications, Remote Monitoring System (RMS) is proposed. The main objective is to collect real-time data of agriculture production environment that provides easy access for agricultural facilities such as alerts through Short Massaging Service (SMS) and advice on weather pattern,crops.

III. EXITING SYSTEM

In this system, its intrinsic capability of providing immutable and tamper-proof records, along with its potential of facultative trust and responsibility among untrusted peers represent too enticing options, preventing this technology to remain relegated into one sector.

IV. PROPOSED SYSTEM

In our proposed system, to implement blockchain as a layer of our system, implementing Agri-food supply chain management between a merchant, supplier, and customer. In the proposed system we providing direct traceability between merchant to a customer using private blockchain technology. for providing traceability between merchant and customer we are using a weight sensor to generate the weight of the product to both sides and by using OR code we generate bill

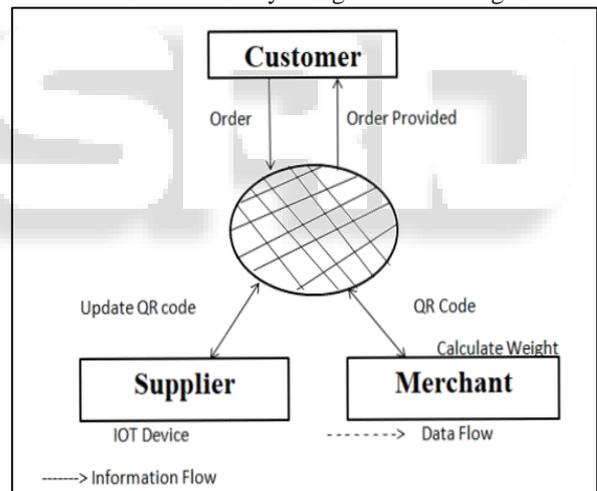


Fig.4.1: Architecture Diagram

Figure 4.1 depicts a simplified version of such a process whose involved actors are briefly introduced in the following:

- 1) Merchant: Calculate the weight of the product using a weight sensor and Generate OR code of the product.
- 1) Supplier: Using QR code show the traceability between the merchant and customer.
- 2) Customer: This is the final element of a chain who can order the product and replace the product if the product was not correct.

V. CONCLUSION AND FUTURE SCOPE

AgriBlockIoT allows the mixing of IoT and Blockchain technologies, making clear, and fault-tolerance, immutable associated auditable records which might be used for an Agri-Food traceability system. Terribly sensible test:

notwithstanding the Hyper ledger Saw tooth-based implementation had higher ends up in terms of measured metrics with relevance the Ethereum one, each implementation has totally different properties and capabilities that require to be thought of before selecting one over the opposite. In some cases, it should be convenient to trade off the high-latency of Ethereum with its quantifiability and reliableness, since it allows larger numbers of participants and its computer code maturity are much on top of Hyper ledger Sawtooth.

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