



# **S CHAIN: A BLOCK CHAIN SYSTEM FOR SMALL AND MEDIUM SIZED ENTERPRISES**

Anand Haridas<sup>1</sup>, Mrudula R<sup>2</sup>, Clincy Baby<sup>3</sup>

<sup>1</sup>Assistant Professor, <sup>1,2,3</sup>Department of Computer Science and Engineering, Ahalia School of Engineering and Technology, Palakkad, Kerala, India

## **Abstract**

**Block chain technology has the potential to create new horizons for Economic and Social revamp. Block chain based supply chain solutions have increasingly proven to reduce cost and increase efficiency in supply chain industry. The complexity of Supply chain management which aids in creation and distribution of commodities is comparatively high. The supply chain cycle spans across various stages with long time duration that involves various geographical locations and large number of transactions, stakeholders and entities based on the nature of the commodity involved. The existing block chain networks are meant for management of large scale supply chain networks. This paper proposes a new system: s Chain that categorically focusses on supply chain network management of small and medium sized enterprises . This paper is organized as Section I-Introduction, Section II-Block chain in Supply chain network, Section III-proposed system, Section IV-How Block chain revamps existing Supply chain, Section V-Conclusion.**

**Keywords: Block chain, Supply chain Management, s Chain**

## **INTRODUCTION:**

Block chain is a peer to peer Distributed Ledger Technology that shares data among all its members thereby increasing transparency and avoiding malicious transactions. The transactions are recorded in the ledger in the form of series of blocks replicated over different computers across the network. Since every new transaction block points to the previous blocks, the ledger is secure and can never be tampered with.

The block chain network has no central authority, it has a shared and immutable ledger, which is accessible for everyone. Block chain technology is transparent and the stakeholders involved are accountable for their actions.

Some of the highlights of this technology are-

- Completely decentralized
- The data is stored in encrypted form.
- It is immutable.
- Tracking of the data is easier by virtue of its transparent nature.

## **SECTION-II**

**Block chain in Supply chain network:** At the heart of the block chain technologies is the usage of the concept of crypto currency called as Bitcoin. It is transparent and highly secure as all the blocks are linked with each other and the transactions are duplicated across all the nodes. The block chain is highly efficient and scalable as it is a decentralized network. Hence, the efficiency and transparency of supply chains can be drastically improved by the usage of block chain and has a fair influence over all of the chain activities starting from warehousing of raw materials till delivery of the commodities. As all the chain components have same ledger version there are no conflicts in the chain regarding the transactions. Block chain records cannot be deleted or tampered with, which is a crucial factor for maintaining supply chain transparency.



(Fig 1. Supply chain cycle)

The Figure 1 shows the various links involved in a supply chain network.

The cyclic process starts from the point of demand made by the customer for any product or services. In order to meet the user demands production process starts from raw material acquisition by the supplier followed by manufacturer purchasing this raw material from supplier at a particular amount .The manufacturer after manufacturing the destined product hands over it to distributer who then transports it to the retailer before finally reaching the hands of consumer via retailer.

The each and every transactions that takes place at each and every phase of supply chain network needs to be recorded as immutable and permanent transactions that can never be

tampered with. This should be made visible to all the stakeholders located at various phases of supply chain network. This makes the transactions transparent across various phases within supply chain network thereby bringing in authenticity and reliability to the transactions.

At each of this cyclic level, the corresponding transactions are recorded as permanent transaction using the concept of block.

**SECTION-III**

**Proposed system:**

The proposed system that is s Chain has the potential to give a new lease of life to the Indian industrial supply chain networks as there are innumerable SMEs that are part of Indian economy that are in want of a reliable supply chain system that can give them a progressive and prosperous existence.

S Chain is an QR code based system that stores all the transactions starting right from raw material procurement to dispatch of finished product to the consumers. The consumer could verify and assure the authenticity of the product by scanning the QR code that is attached to each and every product . The QR code contains decisive and crucial data like the place of origin of the product, details of the industry that has processed it ,the date of production etc. These are the relevant data that can never be tampered with as all these sensitive data are stored in various blocks and permanently recorded in the block chain ledger.



(Fig 2.sChain in meat industry)

The use case of s Chain application in meat distribution industry is represented in the Fig.2. The QR code contains the information about the location and farm from which the meat has been procured ,the manufacturer who has processed this meat ,the date on which it has been processed and packed ,the logistic team that has done the shipment ,the date at which it has been received by the supplier and so on. Thereby ensuring the product transparency, which is going to be the most important factor as far as the product sales is concerned and thereby

providing an environment for the flourishing of the industry.

**SECTION-IV**

**How block chain revamps existing supply chain?**

At present the Supply chain is a vast ecosystem , with multiple stakeholders all of them trying to work together in tandem. Many of the supplied commodities pass through multiple stakeholders, unlike conventional networks of suppliers.

Most of the firms are yet to revamp their conventional supply chain network by using the capability of block chain and integrating them with supply chain management process thereby expanding their business presence to international levels.

The proposed system can be an outstanding system that can take the industrialization of any economy to the next level. It has the avenue to provide a transparent transactional experience by making the process of supply chain to look as a prototype. The highlighting features of s Chain are:

- Commodities tracking right from the finished stage to transit stage can be updated for all the involved stakeholders in the supply chain and backtracking to the point of origin can also be achieved for all the commodities.
- The application is internally powered by the usage of software program called smart contracts. A smart contract uses block chain to execute an agreement. An agreement can be considered as a set of business rules.

Fraudulent transactions can never take place due to the usage of smart contract. A smart contract triggers an event after taking input from a ledger. For example, after receipt of a payment as part of a transaction, the smart contract can trigger a delivery or it can trigger a penalty for unfulfilled requirements. Moreover smart contract usage can completely avoid delays and manual work thereby making the system faster and reliable.

## **SECTION-V**

### **Conclusion**

SME Companies can get access to real time account of digital transactions of the supply

chain participants through s Chain. Other benefits are improved visibility of various supply chain activities like procurement, transmission, record keeping of data and enhanced trust between the participants in s Chain.

Proper Implementation of s Chain can:

- Improve Revenues
- Improve organizational reputation
- Reduce time overhead
- Reduce Overall costs
- Minimize transactional error
- Maintain Data integrity
- Improve Quality of the commodities
- Increase product Sales

### **REFERENCES:**

1. Sporny M. (2017). Building Better Blockchains: Linked Data in Distributed Ledgers. Proceedings of the 26th International Conference World Wide Web Companion, 1431–1436.
2. Croxton K L, García - Dastugue S J, Lambert D M & Rogers D S. (2001). The Supply Chain Management Processes. The International Journal of Logistics Management, 12(2), 13–36.
3. Deloitte Touche Tohmatsu Limited, Blockchain technology in India, Opportunities and challenges April, 2017
4. Disruptor Daily (October 2018), BlockchainIn Supply Chain Management: 13 Possible Use Cases.
5. Nakasumi M. (2017). Information Sharing for Supply Chain Management Based on Block Chain Technology, 140–149.