

PRODUCT TRACKING AND TRACING WITH DECENTRALISED BLOCKCHAIN

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ABSTRACT

Blockchain is one of the developing technologies and has been attracting a lot of attention among the industry. The blockchain is a technology which can perform tremendous things when combined with Internet of Things. Blockchain provides the key features that has been lacking in the previous developments such as, send large amount of encrypted data over the internet and provides decentralized access to those data with no need for a third party. In this paper, we use this technology and provide a solution for the supply chain management. The Distributed Ledger (DL) Tag and Ethereum blockchain is used to provide customers a trustable and verifiable platform. The customers will be provided with smart tags such as QR, NFC for tracking and tracing the product across the blockchain. The transactions across the blockchain will be stored in multiple blockchain. Then the customers and the stakeholders can verify the products origin and authenticity. This method is secure, cost efficient and decentralized, so it will completely prevent product duplication and manipulation across the supply chain.

KEYWORDS

Blockchain, Supply Chain, Distributed Ledger (DL), Traceability, QR Tags.

INTRODUCTION

Supply chain management is a large network which involves the manufacturers, distributors, suppliers, retailers, and finally the customers. The product cycle through the supply chain is complicated and not a transparent or, a trustable one. The information regarding the product journey must be trusted by the customers though it is from a third party. The Internet of Things (IOT) has been used for storing all the product information across the supply chain cycle. But the drawback is, IOT being a centralized as it involves a third party, and the customer will have to trust the third party without any evidence. This is where blockchain comes into existence.

The blockchain when combined with IOT can be very useful in supply chain management. The blockchain is first introduced for the Bitcoin network. But during this time, the people were interested in cryptocurrencies more than the technology behind it which is blockchain. The Distributed Ledger (DL) and Ethereum is used to provide a distributed and secure transactions. As this is an append only platform and also a distributed platform, the customers can trust and buy a product by checking their information stored in the blockchain using the provided QR Tag.

EXISTING SYSTEM

The TagItSmart (TIS) is one of the solutions which has been used for the supply chain management. This is an IOT

based system which stored all the information and transactions happening across the stakeholders in the supply chain. The TagItSmart is a centralized system and is also less secure solution. The tags are physically transferred between the stakeholders.

The Dynamic QR tags made with special inks are used and, this also changes and are affected due to environmental factors like rain and sunlight. So, the customers will not be provided with a trustable product information. And if there happens a tag duplication or product change along the supply chain, the system will not be able to identify at which part of the supply chain cycle it has taken place.

PROPOSED SYSTEM

The Distributed Ledger (DL) Tag is proposed as a solution for supply chain management. This tag is distributed, which makes the system decentralized. The Ethereum blockchain used here is a append only blockchain. The blockchain technology is combined with Internet of Things. It helps us to store large amount of product data in encrypted format in a secure way. The stakeholders record each transaction into the blockchain.

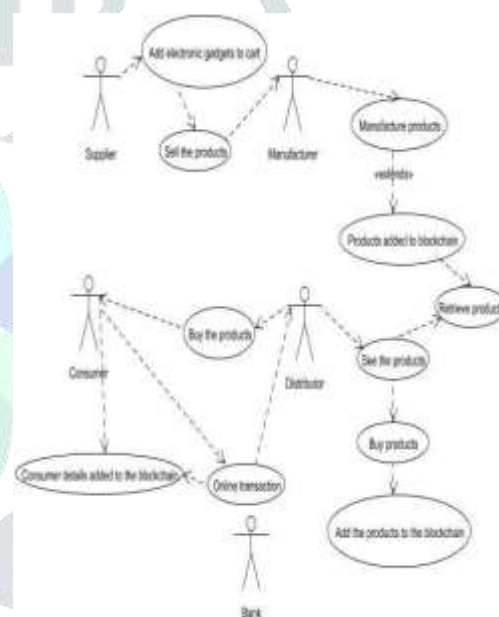
The customer on another hand is provided with a smart tag such as QR, or NFC, through which the customer can track and trace the product throughout the supply chain. This method prevents product duplication and manipulation, and provides the customer a trustable e- commerce platform to purchase original products from original manufacturers. The proposed system is cost efficient and the best one to our knowledge.

BLOCKCHAIN

Satoshi Nakamoto is the one who implemented the first blockchain. Blockchain is for recording information in a secure way. The characteristics of blockchain are decentralization, security, and transparency.

As the name indicates the information are stored in terms of blocks. All blocks are connected to each other and forms a chain. Some of the applications of blockchain are payment processing, data sharing and supply chain management.

SYSTEM DESCRIPTION



Use Case Diagram

Supplier first register in the application and login. Then they sell the products to the manufacturers. An account is created by the manufacturer. The raw materials are analysed by the manufacturer. Then the manufacturer will request quantity of raw materials to supplier. Then the request was accepted by the suppliers and raw material will be added to the manufacturer

inventory. The product ID will be sent to block chain by the manufacturer and product will be added to manufacturer shipment.

The product will be retrieved by the manufacturer from block chain. The distributor and the login details are present in the registration part. The distributor will see the product in the cart. If distributor buys the product then that will be added to blockchain.

The KYC form is maintained by the distributors. Consumers are of two types. Without knowing the product details one will order. Therefore, it is difficult for them to identify the product is duplicate or original. The second type of customer is the one who views full details of the product what they are willing to buy, so these types of consumer view the overall blockchain content.

CONCLUSION

The application of blockchain in supply chain management is a boom now a days. Blockchain has a great feature like traceability, decentralisation, transparency and immutability. These features are implemented in supply chain management.

With the help of this distributed ledger technology, the duplication of smart tag will be prevented. Several interactions occur between Stakeholders during product exchange. These interactions between the participants are stored on blockchain. Since blockchain is a decentralised network, all the transaction details are stored in blockchain.

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