Supply Chain Management System Using BlockChain

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Abstract:: The production and distribution of counterfeit drugs is an urgent and increasingly critical worldwide issue, especially in pandemics. The imperfect supply chain system in the pharmaceutical industry is one of the reasons for drug counterfeiting. Drugs ownership changes from manufacturers to wholesaler, distributor, and then pharmacist before it reaches the customer thus making it difficult to keep track of it. The system implemented using hyper ledger fabric ensures sharing, storing, transparency, and traceability of data in each link of the supply chain. On the other hand, Ethereum architecture utilized the features of smart contracts to manage the interactions between sender and receiver. Finally, the study mainly focuses on increasing the safety of pharmaceutical products and reducing the manual operation of the supply chain with the most efficient architecture. The worldwide drug industry is worth more than \$1 trillion and store network the board (SCM) is crucial for picking up monetary, ecological and social advantages in the supply chain industry. Nonetheless, customary SCM instruments generally experience the ill effects of a wide extent of issues, for example, absence of data sharing, long deferrals for information recovery, trickiness in item following and consideration of fake items. Blockchain innovation shows extraordinary potential to tackle these issues because of its striking highlights including changelessness, straightforwardness, and decentralization. Blockchain guarantees source to customer discernibility and following which makes a difference to improve productivity in the business by guaranteeing buyer insurance, building trust and improving the nature of administration. This project proposes a way to deal with upgrade detectability in the Pharma production network utilizing Blockchain Technology.
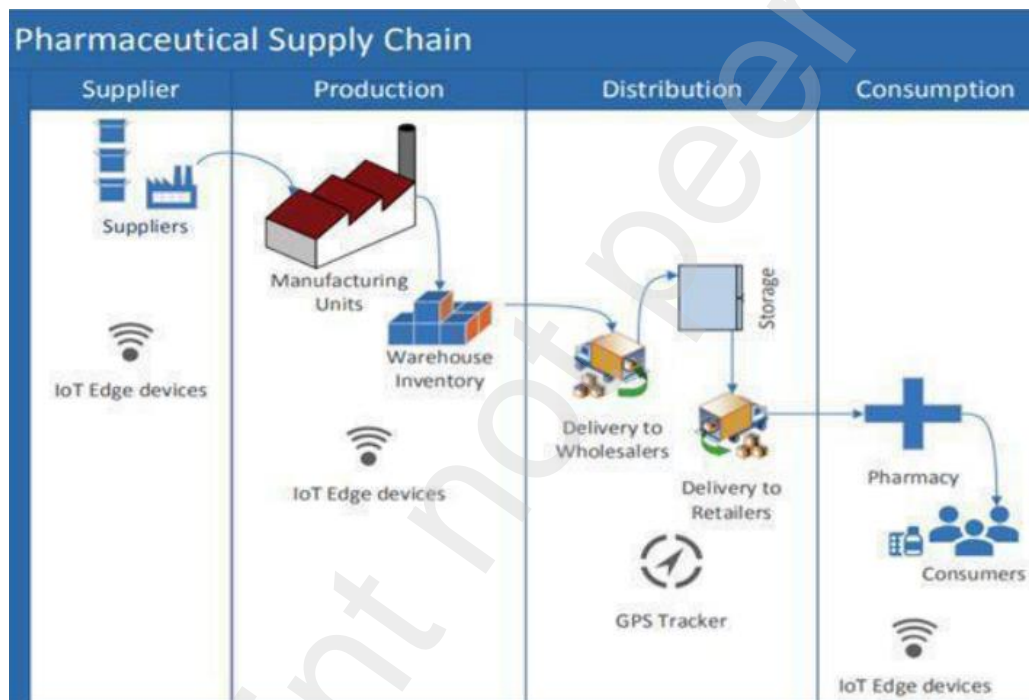
1.Introduction

The fundamental responsibility of the Pharmaceutical industry is consumer health and safety. The major threat to the industry's credibility is rampant circulation of counterfeit products. An ecosystem of a pharmaceutical company consists of suppliers of raw materials, research labs enabling innovation and drug formulation, retailers and customers,etc. Such data needs to be securely stored for processing and must be resilient to any attempts to tamper. 'Blockchain technology' can enable the pharmaceutical supply chain to have a robust track and trace capability. This is achieved by ensuring that the medicines at the point-of-sale can be traced back to the source of each individual ingredient. The essential obligation of the Pharmaceutical business is customer well-being and security. The significant danger to the business' validity is the widespread flow of ake items. A biological system of a drug organization comprises providers of crude materials, research labs empowering development and medication detailing, retailers and customers,etc. Such information should be safely put away for preparing and should be versatile to any endeavors at altering. 'Blockchain innovation' can empower the drug inventory network to have a vigorous track and follow capacity. This is accomplished by guaranteeing that the prescriptions at the retail location can be followed back to the wellspring of every individual fixings

2. Motivation

The supply chain industry in the Pharmaceutical sector directly or indirectly deals with the lives of millions of people. This particular sector can be easily exploited with the kind of architecture it currently possesses. This can cause a serious life threat to all the people connected to this supply chain. Counterfeit drugs can be introduced easily in current processes. Thus, it becomes really important to secure this supply chain industry to ensure the well-being of millions of people. Features like traceability, detectability, tracking, verification and accountability should be introduced in the Pharmaceutical sector to improve its overall efficiency

3. LITERATURE REVIEW

3.1 Existing Methodologies

The overall process can be divided into four steps :
1) Supply
2) Production
3) Distribution
4) Consumption.
 ● The core design relies on intelligent devices connecting the different parts of the supply chain, which in turn are connected to a cloud backend through intranet.
 ● The system architecture is powered by technologies such as IoT edge devices and GPS tracker to improve its efficiency.
 ● IoT devices and GPS tracker help to improve traceability of the system. ● The indicative approach for each of the nodes in the supply chain are described above in the illustration.

2

4.Scope

Primarily our project aims to introduce blockchain technology in the supply chain management of the Pharmaceutical sector to ensure its security. The application will also be able to track counterfeit drugs in the system, if any, along with its location of introduction. Further, the project also aims to introduce IoT based devices in the system to automate the system's working inorder to improve its efficiency.

5.Project Requirement

5.1 Functional requirement
1. Stable internet connection.
 2. Enough storage space to store and display information.
5.2 Non-Functional Requirement
1. Usability
2. Legal or regulatory requirements
3. Reliability
4. Performance
5.3 Hardware Requirement
Basic required storage capacity on the device, RAM usage (min 8 GB), and bandwidth are enough. No other special hardwares is required for this project.
5.4 Software Requirement
1. O perating System: Linux.
2. Internet Browser: Chrome(preferable), Mozilla Firefox, Internet Explorer.
3. Front-end: HTML 5, CSS, JavaScript, ReactJS.
4. IDE: Visual Studio CODE.
5. Backend: NodeJS ,Ganache, Truffle, ExpressJS, Redis

6.Conclusion

There are many stages in supply chain management which can be exploited and thus it becomes important to secure them to avoid counterfeit products. Malfunctioning can take place in the system which cannot be even tracked using the current architecture. Thus, technology like Blockchain can be used to provide security to the system, thus improving overall efficiency of the system. If any duplicate product has been introduced, it can be tracked along with its location of introduction. Thus, the proposed architecture also helps in reverse tracking of the system which inturn helps to secure the process.

3

7. Acknowledgment

8. REFERENCES

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