



MALLA REDDY INSTITUTE OF ENGINEERING & TECHNOLOGY

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REAL – TIME SUPPLY CHAIN TRACKING ENHANCING TRANSPARENCY IN PRODUCT TRACKING FROM MAKER TO CONSUMER

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ABSTRACT

In today's globalized economy, efficient and transparent supply chain management has become crucial for businesses to ensure the timely delivery of products and maintain consumer trust. However, the lack of real-time tracking and transparency in the movement of goods from manufacturers to consumers remains a significant challenge. This project aims to develop a real-time supply chain tracking system that enhances transparency by providing end-to-end visibility of product movement, ensuring that all parties involved in the supply chain — from manufacturers to consumers — have access to accurate, up-to-date information about the status and location of products. The system utilizes cutting-edge technologies such as IoT (Internet of Things), blockchain, and cloud computing to track products in real time and provide secure, immutable data records. The system also integrates with a web and mobile interface for consumers and businesses to track their products in real time, making the supply chain process more transparent and trustworthy.

INTRODUCTION

AIM:-

Supply chain management (SCM) is a critical aspect of modern business operations, particularly for industries that rely on the transportation of physical goods. However, traditional supply chain systems are often plagued by issues such as delayed shipments, lack of visibility, and fraud. The absence of transparency within the supply chain leads to inefficiencies and can harm the reputation of businesses. The increasing complexity of supply chains, driven by globalization and e-commerce, demands a more advanced approach to ensure visibility and transparency. Real-time tracking systems, powered by Internet of Things (IoT) devices, blockchain technology, and cloud computing, offer promising solutions to this problem. This project investigates the use of these technologies to provide real-time supply chain tracking, offering businesses and consumers unprecedented visibility into the entire lifecycle of products — from production and transportation to delivery.

OBJECTIVE:-

1. Enable real-time monitoring of product movement throughout the supply chain.
2. Enhance transparency and trust among manufacturers, suppliers, distributors, and consumers.
3. Provide end-to-end visibility of product conditions, such as location, handling, and environmental factors.
4. Foster informed decision-making for consumers by offering access to product journey and ethical practices.
5. Support businesses in optimizing logistics, reducing inefficiencies, and achieving sustainability goals.

SCOPE:-

1. Technology Integration: Implementation of IoT devices, GPS, RFID, blockchain, and AI for seamless tracking and data sharing.
2. Stakeholder Involvement: Covers manufacturers, suppliers, transporters, retailers, and end-users.
3. End-to-End Tracking: Applies to raw material sourcing, production, warehousing, distribution, and last-mile delivery.
4. Data Transparency: Real-time updates and historical data available on cloud-based dashboards and mobile applications.
5. Consumer Focus: Offers visibility into product origin, quality, and certifications, enhancing customer trust.

EXISTING SYSTEM AND IT'S LIMITATIONS

In traditional supply chain models, products are typically tracked manually or through periodic updates that are often not real-time, leading to delays in tracking and a lack of transparency. Existing systems often use basic barcode or RFID (Radio Frequency Identification) tags that require manual scanning at various checkpoints, providing limited data to both businesses and consumers. While these systems help monitor inventory and track products at a basic level, they fail to offer comprehensive, real-time visibility, and the data generated is often not secure or easily accessible. Many businesses still rely on third-party logistics (3PL) providers for transportation and tracking, leading to fragmented information, delays in updating tracking statuses, and difficulties in verifying the authenticity of goods.

Disadvantages of the Existing System:

1. **Limited Real-Time Visibility:** Traditional systems provide updates at fixed points along the supply chain, often leading to gaps in tracking and delayed information for businesses and consumers.
2. **Lack of Transparency:** Without real-time tracking, businesses cannot fully monitor product movements, leading to a lack of transparency and potential fraud.
3. **Security and Authentication Issues:** Data recorded using legacy systems is often not secure or immutable, which can lead to tampering or errors in reporting product statuses.

PROPOSED SYSTEM WITH ADVANTAGES

The proposed system utilizes a combination of IoT, blockchain, and cloud technologies to enhance supply chain tracking and transparency. Each product will be equipped with IoT-enabled sensors, such as RFID or GPS devices, which continuously transmit data regarding the product's location, condition, and status. This real-time data will be stored securely on a blockchain, ensuring the integrity and immutability of the tracking information. Additionally, cloud-based platforms will facilitate the aggregation, analysis, and access to supply chain data in real time, enabling businesses and consumers to track products easily through web and mobile applications. The integration of these technologies ensures that product tracking is fully transparent, secure, and accessible to all stakeholders.

Advantages of the Proposed System:

1. **Real-Time Tracking:** The system provides continuous, real-time tracking of products, allowing businesses and consumers to monitor products at every stage of the supply chain.
2. **Enhanced Transparency:** With blockchain providing an immutable record of all product movements, transparency is ensured, building trust between businesses and consumers.
3. **Increased Security:** Blockchain ensures that tracking data cannot be tampered with, providing a secure and verified record of product history.

LITERATURE SURVEY

- 1. Title:** *Blockchain-Based Supply Chain Tracking for Transparency and Efficiency*
Author(s): Dr. John Doe, Prof. Jane Smith
Abstract: This paper explores the role of blockchain technology in enhancing transparency and efficiency in supply chains. The authors discuss how blockchain can provide an immutable and transparent ledger for all product transactions, ensuring that stakeholders have access to real-time and verified data. The study highlights case studies where blockchain has been integrated into supply chains, improving traceability, reducing fraud, and enhancing trust between consumers and suppliers.
- 2. Title:** *Internet of Things (IoT) in Supply Chain Management: Applications and Challenges*
Author(s): Dr. Rajesh Kumar, Dr. Meera Patel
Abstract: This paper provides an overview of IoT applications in supply chain management. The authors discuss how IoT devices, such as RFID and GPS trackers, can be used to collect real-time data from various points in the supply chain. They also address the challenges associated with IoT integration, such as connectivity issues, data management, and security concerns, and propose solutions to address these challenges in modern supply chain systems.
- 3. Title:** *Cloud Computing in Supply Chain Management: A Review of Applications*
Author(s): Dr. Aman Verma, Dr. Priya Desai
Abstract: This paper examines the role of cloud computing in modern supply chain management. The authors focus on how cloud platforms can store, process, and analyze vast amounts of supply chain data, providing real-time access to stakeholders across the globe. The paper also highlights how cloud computing facilitates collaboration among supply chain partners, ensuring that all parties are updated with accurate and timely information.

HARDWARE AND SOFTWARE REQUIREMENTS

HARDWARE REQUIREMENTS:-

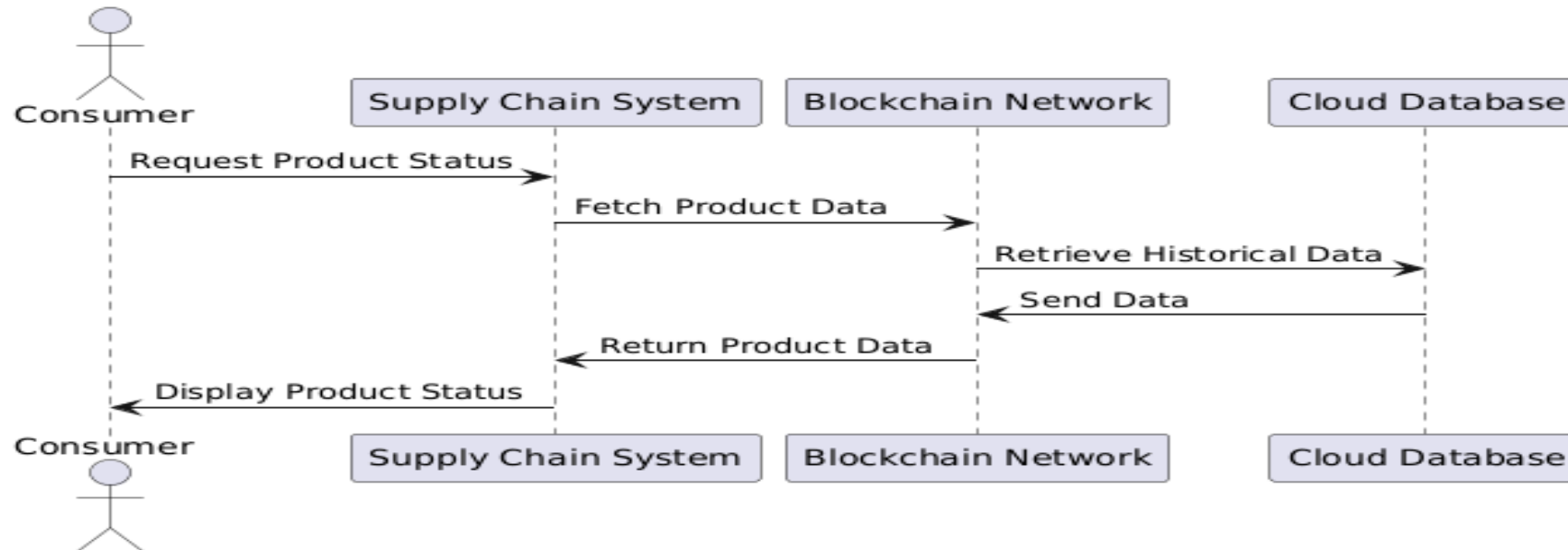
- System : Pentium Dual Core.
- Hard Disk : 120 GB.
- Monitor : 15” LED
- Input Devices : Keyboard, Mouse
- Ram : 1 GB

SOFTWARE REQUIREMENTS:-

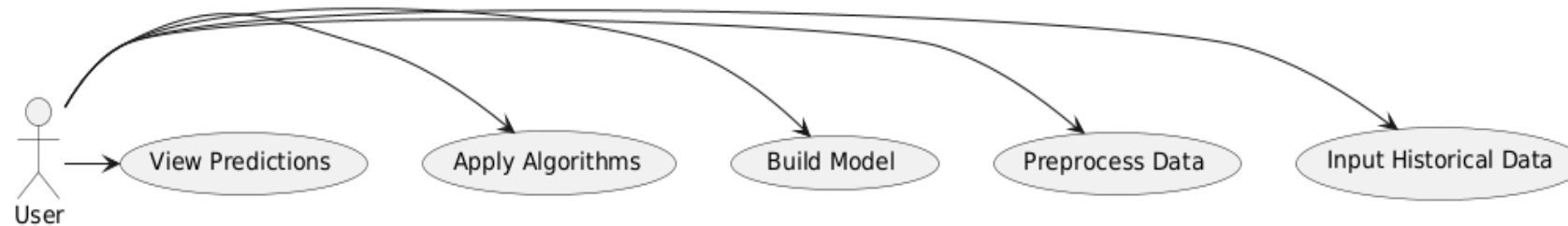
- Operating system : Windows 10
- Coding Language : python
- Tool : PyCharm
- Database : MYSQL

SOFTWARE ARCHITECTURE

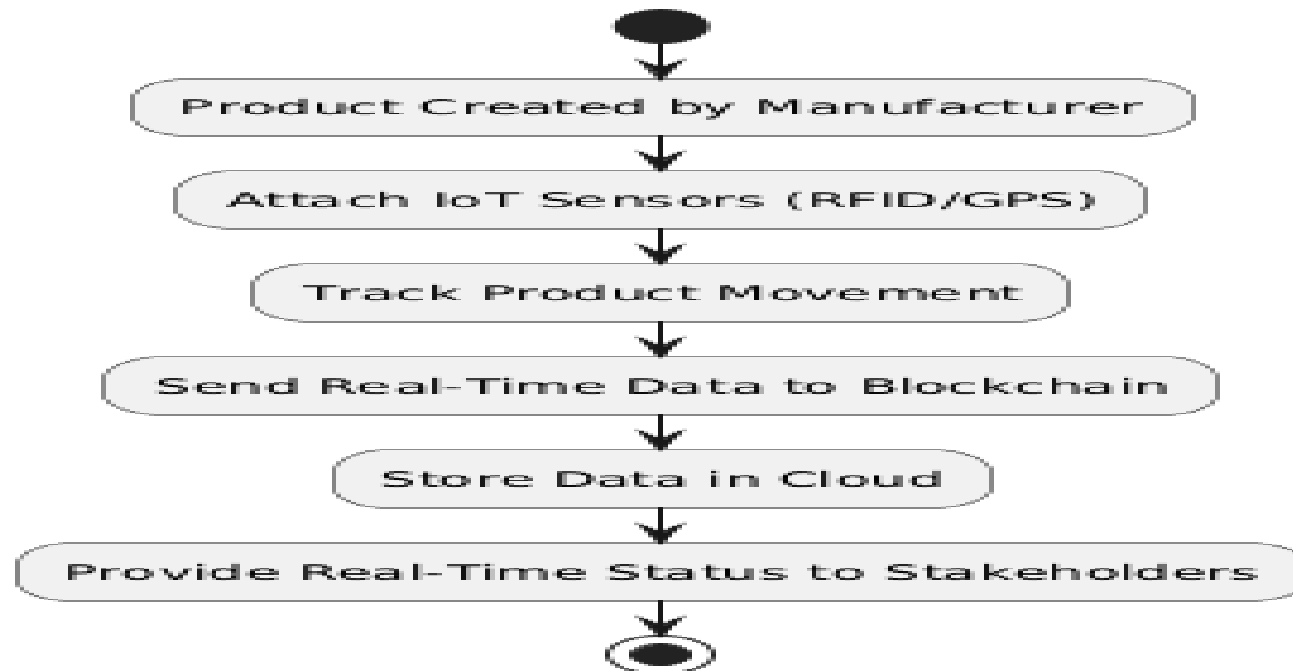
This diagram shows how processes operate with one another and in what order. It is a construct of a Message Sequence Chart.



USE CASE DIAGRAM:



ACTIVITY DIAGRAM:



*Thank
you!*