PROBLEM STATEMENT: EXACT SHIPMENT LOCATION DATA

Most logistics companies today offer only the location details of main locations like collection centre, city hubs and sorting facilities. The exact live location details are never known, and if the system fails, the entire data is lost.
Using blockchain, we can implement a system that collects location data from many interconnected systems and deliver exact location details to the customers. The application of this project can be extended to other areas like airlines to find lost baggage, car rentals for tracking rented car etc.

WHAT IS TRACK AND TRACE?

In the supply chain industry, track and trace refers to the ability to identify the past and present locations of all product inventory, as well as a history of product custody. Track and trace requires following products through a complex journey from raw material, through multiple geographic regions for processing and manufacturing, through regulatory control, and finally, to retailers and consumers. Tracking provenance throughout this journey is crucial to ensuring product authenticity.

Track and trace is often a challenge for today's supply chains due to outdated paper processes and disjointed data systems that slow down communication. The lack of data compatibility exposes supply chains to problems like visibility gaps, inaccurate supply and demand predictions, manual errors, counterfeiting, and compliance violations.

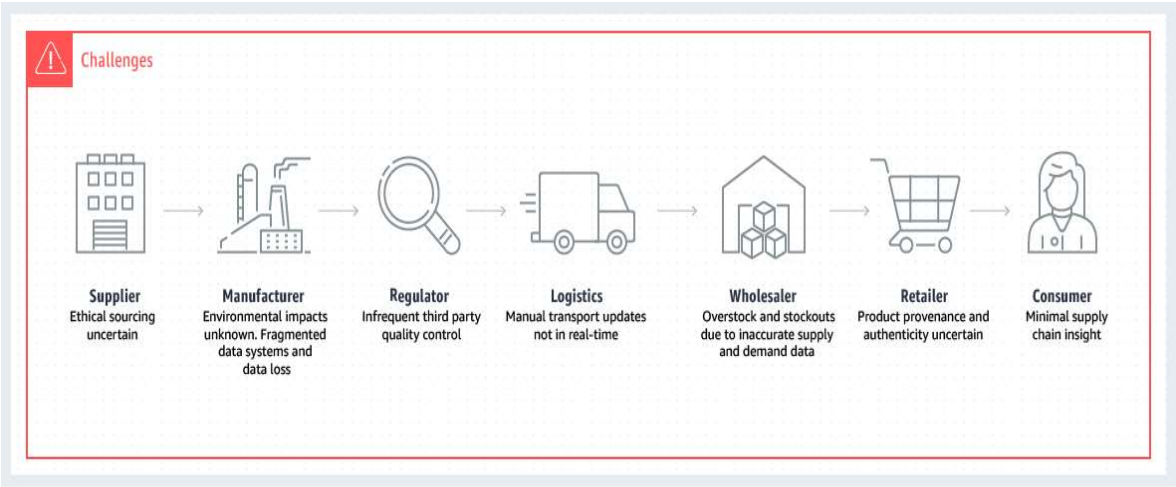
TRACK AND TRACE WITH BLOCKCHAIN

Blockchain technology can be used to build applications on which multiple parties can transact directly via a peer-to-peer network, without the need for a central authority to verify transactions. Each network participant has access to a shared ledger that immutably and cryptographically records all transactions, and there is no single network owner.

With blockchain, supply chain companies can document production updates to a single shared ledger, which provides complete data visibility and a single source of truth. Because transactions are always time-stamped and up to date, companies can query a product's status and location at any point in time. This helps to combat issues like counterfeit goods, compliance violations, delays, and waste. In addition, immediate action can be taken during emergencies (e.g., in the case of product recalls), and regulatory compliance is ensured by the ledger audit trail. Moreover, by combining blockchain with smart technology like Internet of Things, supply chains can automate tracking the conditions of production, transportation, and quality control. Companies can also choose to share track and trace data with their customers as a way to verify product authenticity and ethical supply chain practices.

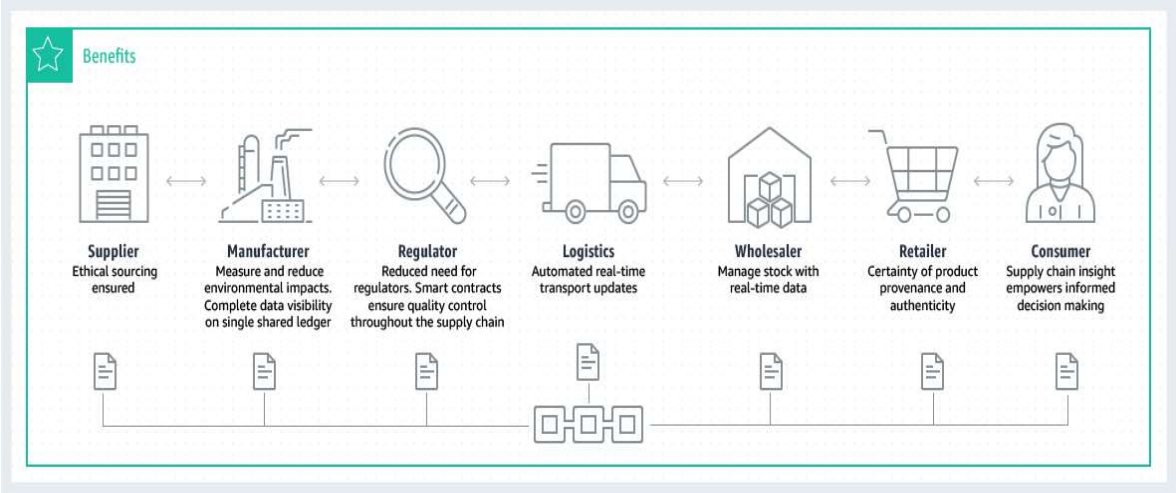
TRADITIONAL SUPPLY CHAINS

The given below figure shows how the traditional supply chains work.



SUPPLY CHAINS WITH BLOCKCHAIN

With the help of using the blockchain, we get the transparency of the whole system.



INDUSTRY USE CASES

- **Food and Agriculture**

Track products throughout the supply chain to respond quickly in the event of food safety emergencies. Differentiate your brand from the rest of the market and empower customers by providing detailed food supply chain insights. Compensate small farmers quickly and equitably.

- **Pharmaceuticals**

Reduce counterfeit medicines. Minimize patient risk by reacting quickly to medication recalls, and reduce overall pharmaceutical costs.

- **Manufacturing**

Inform consumers about the provenance of their clothes and shoes to demonstrate authenticity and ethical practices. Track spare auto parts and streamline auto safety recall processes to save money and reduce the number of affected customers.

- **Mining**

Ensure ethical sourcing and authenticity of raw materials. Accurately track environmental impacts of production, revealing new opportunities for sustainability.

Track and Trace on AWS with Amazon Managed Blockchain

Amazon Managed Blockchain is a fully managed service that allows you to set up and manage a scalable blockchain network with just a few clicks. Amazon Managed Blockchain eliminates the overhead required to create the network, and automatically scales to meet the demands of thousands of applications running millions of transactions. Once your network is up and running, Managed Blockchain makes it easy to manage and maintain your blockchain network. It manages your certificates and lets you easily invite new members to join the network. Get started building a blockchain network in minutes with AWS on Amazon Managed Blockchain.

FASTER AND LEANER LOGISTICS IN GLOBAL TRADE

Logistics is often considered the lifeblood of the modern world, with an estimated 90% of world trade carried out by the international shipping industry every year.9 But the logistics behind global trade is highly complex as it involves many parties often with conflicting interests and priorities as well as the use of different systems to track shipments. Therefore, achieving new efficiencies in trade logistics is likely to have significant impact on the global economy.

According to one estimate from the World Economic Forum, reducing supply chain barriers to trade could increase global gross domestic product (GDP) by nearly 5% and global trade by 15%.10.Blockchain technology can help alleviate many of the frictions in global trade logistics including procurement, transportation management, track and trace, customs collaboration, and trade finance. With over 50,000 merchant ships11 involved in the global shipping industry and multiple customs authorities regulating the passage of freight, a major area of focus for efficiency gains is ocean freight. Blockchain technology has huge potential to optimize the cost as well as time associated with trade documentation and administrative processing for ocean freight shipments. One example that highlights the complexities behind ocean freight today is the estimate that a simple shipment of refrigerated goods from East Africa to Europe can go through nearly 30 people and organizations, with more than 200 different interactions and communications among these parties.

To unlock efficiency in ocean freight, Maersk and IBM have started a venture to establish a global blockchain-based system for digitizing trade workflows and end-to-end shipment tracking. The system allows each stakeholder in the supply chain to view the progress of goods through the supply chain, understanding where a container is in transit.

Stakeholders can also see the status of customs documents, and can view bills of lading and other data. Blockchain technology ensures secure data exchange and a tamper-proof repository for this documentation. The two companies expect this solution to track tens of millions of shipping containers annually. It has the potential to significantly reduce delays and fraud, which could lead to billions of dollars in savings in the logistics industry.

Ocean carrier company ZIM has conducted a pilot to digitize the actual bill of lading, often hailed as a 'holy grail' application in logistics. The bill of lading is one of the most important documents in ocean shipping, and it acts as a receipt and a contract for the goods being shipped. The information stored on a bill of lading is critical as it contains all necessary details such as the shipment description, quantity and destination, as well as how the goods must be handled and billed. During the trial of a blockchain-based system developed by Wave, ZIM and pilot participants issued, transferred, and received original electronic documents successfully through the decentralized network.

The containers, shipped from China to Canada, were delivered to the importers (i.e., consignees) without a problem. Although still in pilot phase, industry adoption of a digital bill of lading would be significant. It could greatly support supply chains in reducing costs, enabling error-free documentation and fast transfer of original documents.

Accenture is developing a blockchain-based system also focused on replacing the traditional bill of lading as well as facilitating a single source of truth for all supply chain stakeholders for freight inquiries up to issuance of trade documents. Here, a decentralized network connects all parties in the supply chain and enables direct communication, eliminating the need to go through central entities and rely on intermediaries. According to Adriana Diener, Global Freight & Logistics Lead at Accenture, the proven value of this project is surpassing expectations: "Using blockchain to replace the traditional bill of lading documentation to ship goods will drive millions of dollars in process efficiency and operational cost reduction benefits across the supply chain for multiple parties in the trade ecosystem including shippers, consignees, carriers, forwarders, ports, customs agencies, banks, and insurance companies".