SUPPLY CHAIN MANAGEMENT

(ELECTRONIC GOODS)

USING

HYPERLEDGER FABRIC

PROBLEM STATEMENT

- Global supply chains are often fragmented, with multiple parties (manufacturers, suppliers, distributors, retailers) involved.
- Lack of transparency leads to counterfeit products, fraud, inefficiencies, and trust issues.
- Manual tracking of products is time-consuming and prone to errors.

SOLUTION

- A blockchain-based solution where product information is securely stored and shared between all supply chain stakeholders.

- Ensures transparent tracking of products from manufacturing to retail, enabling real-time updates and tamper-proof records.

SOLUTION

Decentralized ledger & Permissioned network:

Allows all stakeholders to maintain and update the product journey on the blockchain
Ensures only authorized participants can access or modify records.

Smart contracts (Chaincode)

Automates product status updates, ownership transfer, and certification validation.

Immutable records

All transactions are recorded in a tamper-proof way to ensure transparency and trust.

WHY HYPERLEDGER FABRIC

Hyperledger Fabric offers a permissioned environment, ensuring only trusted participants (manufacturers, suppliers, etc.) have access to the supply chain data.

Scalability and Performance:

Hyperledger Fabric can handle complex supply chain networks with high transaction volumes while maintaining fast processing times.

Smart Contracts for Automation:

Automate key processes like product tracking, ownership changes, and certification checks using chaincode (smart contracts).

Security and Privacy:

Ensures that data is encrypted and only accessible to authorized participants, protecting sensitive information.

WORKFLOW

- 1. Manufacturer:
  - Produces goods, records details (e.g., batch number, production date) on the blockchain.
  - Registers products with unique IDs for traceability.
- 2. Supplier:
  - Supplies raw material to manufacturer.
- 3. Distributor:
  - Verifies product information from blockchain when receiving products.
  - Updates shipment status as products move further down the chain.

ASSETS AND PARTICIPANTS

- Asset 1: Product (Electronic Goods) Details
  - This asset represents the finished electronic products as they move through the supply chain. It includes important product details such as:
  - ProductID: Unique identifier for the product.
  - ProductType: Type of electronic product (e.g., smartphone, tablet, etc.).
  - ManufacturingDate: Date the product was manufactured.
  - QualityCertification: Certification verifying the product meets specific quality standards.
  - Location: Current location of the product (e.g., warehouse, retailer).
  - **Visibility**: This product asset is public and accessible to all participants in the network: Supplier, Manufacturer, and Distributor. This ensures that each participant can track the movement and status of the product throughout the supply chain.
- Asset 2: Raw Material Details
  - This asset contains information about the raw materials provided by the Supplier and used by the Manufacturer to create the finished products. It includes:
  - RawMaterialID: Unique identifier for the raw material.
  - MaterialType: Type of material (e.g., metal, plastic, etc.).
  - Quantity: Amount of raw material provided.
  - SupplierID: Identifier of the supplier providing the raw material.
  - ManufacturingDate: Date when the raw material is expected to be processed into finished products.
  - **Visibility**: The Raw Material Details asset is stored in a Private Data Collection (PDC) between the Supplier and Manufacturer, ensuring that sensitive information such as pricing, quantity, and other contractual details are not shared with the Distributor

TRANSACTIONS

- Product (Electronic Goods) Details
  - Transaction 1: Product Registration (Initial Creation)
  - Transaction 2: Read Products, Read product by Id.
  - Rich Queries to access the public data.
- Raw Material Supply Update
  - Action: Supplier updates raw material details.
  - Manufacturer can read private details about raw materials
  - Raw Materials location update. (when shipment reaches manufacturer’s location)

FURTHER ENHANCEMENTS

- Order Assest can be added as a private data between distributer and manufacturer
- More details about asset can be added, like certification details that adds a trust on the product.
- For certification, other participants needs to be added to the network.
- Vendor/retailers can be added.

THANK YOU