

# **Fake Product Identification Using Blockchain**



# **FAKE PRODUCT IDENTIFICATION USING BLOCKCHAIN**

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Blockchain can help prevent counterfeit products by creating a tamper-proof record of each product's journey from its origin to its destination.

PAPER	AUTHOR	YEAR OF PUBLICATION	DESCRIPTION
Detection of Copper-Fill Encasings using Radiolabels	Frank W. Wenzel, John Sorenson, Bartholomew Ward, and Sandra Pagan	2003	Fluorescing radiolabels of ethylene glycol impregnated with radiolabeled model
Glucosylated, leucyl-esterified epoxy resin for the immobilization of nucleosides present	M.S. Potho, W.R. Soren, S. Jambor, C.R. Farnel, N. Wadsworth, R. Kinnel	2008	Modified description of epoxy-resin model using Glucosylated

- **lungmap** = 1st 10<sup>th</sup> gene index
- **strategies** for
- **rule** high-thresh

- **Google**
- **Microsoft**
- **Visual Studio**
- **Web Browser**

The diagram illustrates the three phases of the Design Thinking process:

- INSPIRATION**: Includes 'Problem Statement', 'Empathize', 'Define', and 'Select a Problem to Solve'.
- IDEATION**: Includes 'Generate Concepts', 'Develop Concepts', 'Prototype', and 'Test'.
- IMPLEMENTATION**: Includes 'Launch', 'Monitor', and 'Evaluate'.

Arrows indicate a sequential flow from Inspiration to Ideation, and then to Implementation.

The diagram shows three network topologies:

- Star Topology:** A central node connected to multiple peripheral nodes.
- Ring Topology:** Nodes connected in a closed loop where each node has exactly two neighbors.
- Mesh Topology:** Nodes connected in a multi-dimensional grid pattern, allowing multiple paths between nodes.

[illegible]

By enabling all parties involved in the supply chain to have access to a transparent and irrefutable record of the product's journey, blockchain can enhance accountability and traceability, making it easier to detect and eliminate counterfeit products.

[illegible]

THANK YOU 🙏



# Introduction

**Fake products are a growing problem that affects many industries, from luxury goods to pharmaceuticals.**

**Counterfeiters have become increasingly sophisticated, making it harder for consumers, regulators, and businesses to detect fake products.**

**Blockchain is a decentralized, distributed ledger that can record transactions and data in a secure and transparent way.**

**Blockchain can help prevent counterfeit products by creating a tamper-proof record of each product's journey from its origin to its destination.**



# Objectives

**A Fake Product Identification Systems may be prolonged overdue, A imperative factor of Failure and more than one Counterfeits of Fake Products because of Intermediaries makes it tough for the consumers to determine whether or not the product is authentic or not.**

...

## Problem Statement

**A Fake Product Identification Systems may be prolonged overdue, A imperative factor of Failure and more than one Counterfeits of Fake Products because of Intermediaries makes it tough for the consumers to determine whether or not the product is authentic or not.**



## Solution

**Create a unique identifier :** Each product can be assigned a unique identifier, such as a serial number or a barcode.

**Record the product's journey :** Each time the product changes hands, or moves through the supply chain, the transaction can be recorded on the blockchain.

**Use smart contracts :** Smart contracts can be used to automate certain aspects of the product journey, such as quality control checks, or customs inspections



...

# Literature Survey

<b>PAPERS</b>	<b>AUTHOR</b>	<b>YEAR OF PUBLICATION</b>	<b>DESCRIPTION</b>
<b>Detection of Counterfeit Products using Blockchain</b>	<b>Kunal Wasnik, Isha Sondawle, Rushikesh Wani, and Namita Pulgam</b>	<b>2022</b>	<b>Working technique of blockchain implemented anti-counterfeit model.</b>
<b>Blockchain-based supply chain for the automation of transaction process</b>	<b>M.A. Habib, M.B. Sardar, S. Jabbar, C.N. Faisal, N. Mahmood, M. Ahmad</b>	<b>2020</b>	<b>Detailed description of supply-chain model using blockchain.</b>

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# Literature Survey

PAPERS	AUTHOR	YEAR OF PUBLICATION	DESCRIPTION
<b>A Blockchain-based Supply Chain Quality Management Framework</b>	<b>Si Chen, Rui Shi, Ren, Jiaqi Yan, Yani Shu,</b>	<b>2017</b>	<b>Recent quality scandals reveal the importance of quality management from a supply chain perspective. Although there has been many related studies focusing on supply chain quality management, the technologies used still have difficulties in resolving problems arising from the lack of trust in supply chains.</b>

...

# System Requirements

## Hardware :

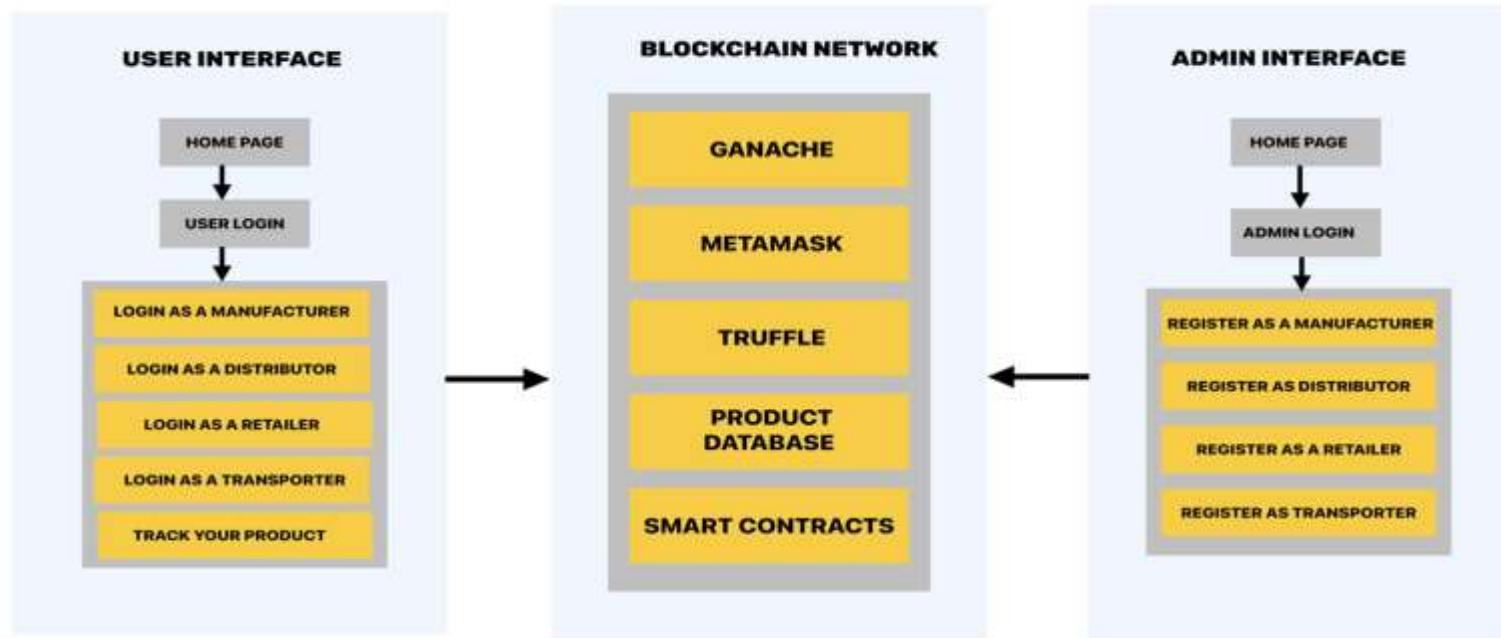
- Laptop – i5 10<sup>th</sup> gen min
- Windows 10
- Min 8gb Ram

## Software :

- Ganache
- Metamask
- Visual Studio IDE
- Web Browser

...

# System Design



# Implementation

## Setting up Blockchain network on Web 3.0 :



**Setting up Blockchain network on Web 3.0 :**

## **Ganache SetUp :**

**Ganache can be useful for testing and developing the smart contracts and blockchain network that will be used for tracking and verifying the authenticity of products.**



## **MetaMask SetUp :**

**Metamask is a web wallet available as a browser extension that provides private – public key pairs for managing cryptocurrencies and interacting with decentralized applications (dApps) on the Ethereum blockchain.**





### **Solidity SetUp :**

**Solidity is a programming language used to write smart contracts on the Ethereum blockchain. Smart contracts are self-executing contracts that can facilitate, verify, and enforce the negotiation or performance of a contract.**



### **Node JS SetUp :**

**Node.js is a popular runtime environment for building server-side applications using JavaScript.**





## Module Description :

***Create User Interface :*** Create a user interface for the registration and login process. This interface should allow users to create a new account, log in to an existing account, and register products.

***Create a blockchain network :*** The next step is to create a blockchain network that will be used to record and verify product authenticity. The blockchain network can be either public or private, depending on the specific requirements of the system.

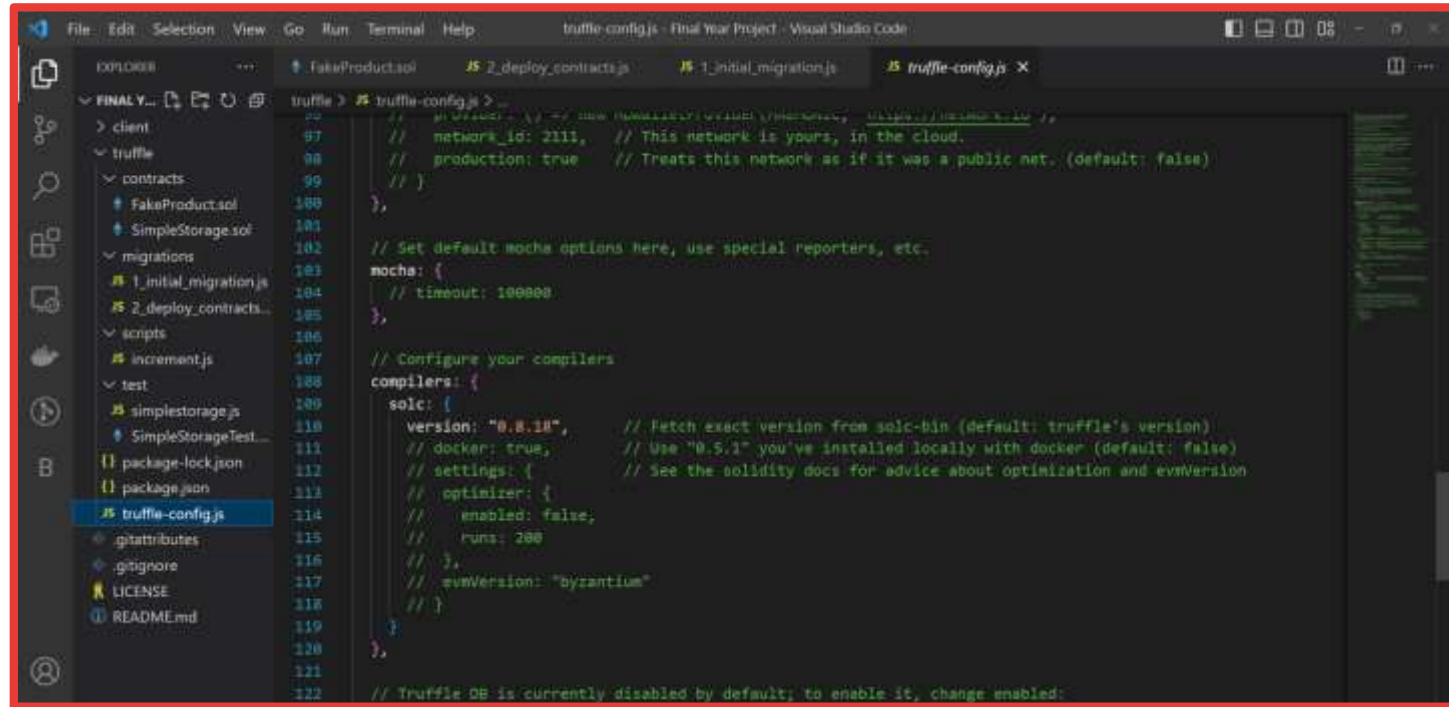
***Design the Smart Contract :*** The next step smart contract should include the necessary fields for registering products, such as the product name, manufacturer, and unique identification number.



## Smart Contract:

```
truffle > contracts > SimpleStorage.sol
1 // SPDX-License-Identifier: MIT
2 pragma solidity >=0.4.22 <0.9.0;
3
4 contract SimpleStorage {
5     uint256 value;
6
7     function read() public view returns (uint256) {
8         return value;
9     }
10
11     function write(uint256 newValue) public {
12         value = newValue;
13     }
14 }
15
```

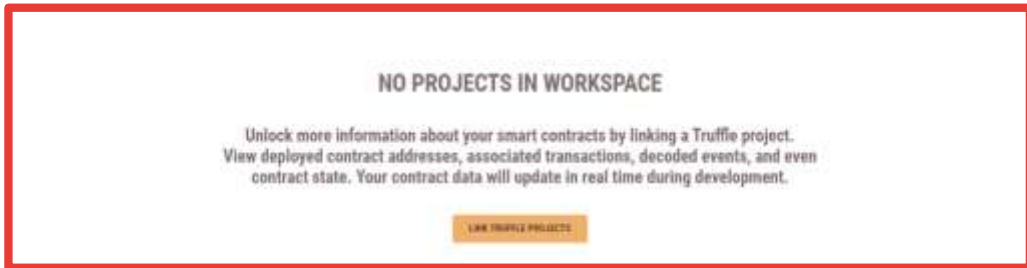
## Truffle-config.js file:



```
truffle > $ truffle-config.js > ...
// Project paths, see https://truffleframework.com/docs/truffle/guides/truffle-config.js
97 // network_id: 2111, // This network is yours, in the cloud.
98 // production: true // Treats this network as if it was a public net. (default: false)
99 // }
100 },
101 // Set default mocha options here, use special reporters, etc.
102 mocha: {
103   // timeout: 100000
104 },
105 // Configure your compilers
106 compilers: {
107   solc: {
108     version: "0.8.18", // Fetch exact version from solc-bin (default: truffle's version)
109     // docker: true, // Use "0.5.1" you've installed locally with docker (default: false)
110     // settings: { // See the solidity docs for advice about optimization and evmVersion
111       // optimizer: {
112         // enabled: false,
113         // runs: 200
114       // },
115       // evmVersion: "byzantium"
116     // }
117   },
118   // Truffle DB is currently disabled by default; to enable it, change enabled:
119   // to true
120 },
121
122 // Truffle DB is currently disabled by default; to enable it, change enabled:
```



## Ganache and linking the truffle project:





## Migrating the project into blockchain network :

```
C:\WINDOWS\system32\cmd X + =  
Microsoft Windows [Version 10.0.25314.1010]  
(c) Microsoft Corporation. All rights reserved.  
  
C:\Users\VINODA\OneDrive\Desktop\Final Year Project\truffle\contracts>truffle migrate --reset
```

```
Starting migrations...  
*****  
> Network name: 'ganache'  
> Network id: 5777  
> Block gas limit: 6721975 (0x6691b7)  
  
1_initial_migration.js  
*****  
  
Replacing 'SimpleStorage'  
-----  
> transaction hash: 0x09bdd5ede1dae8c877dca74a3c63e9066833b9e58b20be09946a55c95894032e  
> Blocks: 0  
> contract address: 0x7Cec8Ec892d9183d09ED2F26660E8A97232D17FC  
> block number: 1  
> block timestamp: 1658094164  
> account: 0xb41FA8Ebc8D64fDA5b3d265a82E1307596df1793  
> balance: 99.999575921125  
> gas used: 125653 (0x1ead5)  
> gas price: 3.375 gwei  
> value sent: 0 ETH  
> total cost: 0.000424078875 ETH  
  
> Saving artifacts  
-----  
> Total cost: 0.000424078875 ETH
```

## Frontend Server Deployment:

```
webpack
Microsoft Windows [Version 10.0.25314.1010]
(c) Microsoft Corporation. All rights reserved.

C:\Users\VINODA\OneDrive\Desktop\Final Year Project\client\public>npm start

> truffle-client@0.1.0 start
> webpack serve

<i> [webpack-dev-server] Project is running at:
<i> [webpack-dev-server] Loopback: http://localhost:8080/
<i> [webpack-dev-server] On Your Network (IPv4): http://192.168.93.245:8080/
<i> [webpack-dev-server] On Your Network (IPv6): http://[fe80::caf3:4f39:5225:3ea4]:8080/
<i> [webpack-dev-server] Content not from webpack is served from 'C:\Users\VINODA\OneDrive\Desktop\Final Year Project\client\public' directory
3 assets
78 modules
webpack 5.75.0 compiled successfully in 9892 ms
```

## Frontend Sever Deployment:



## Registration Page :

Select whom you want to Register



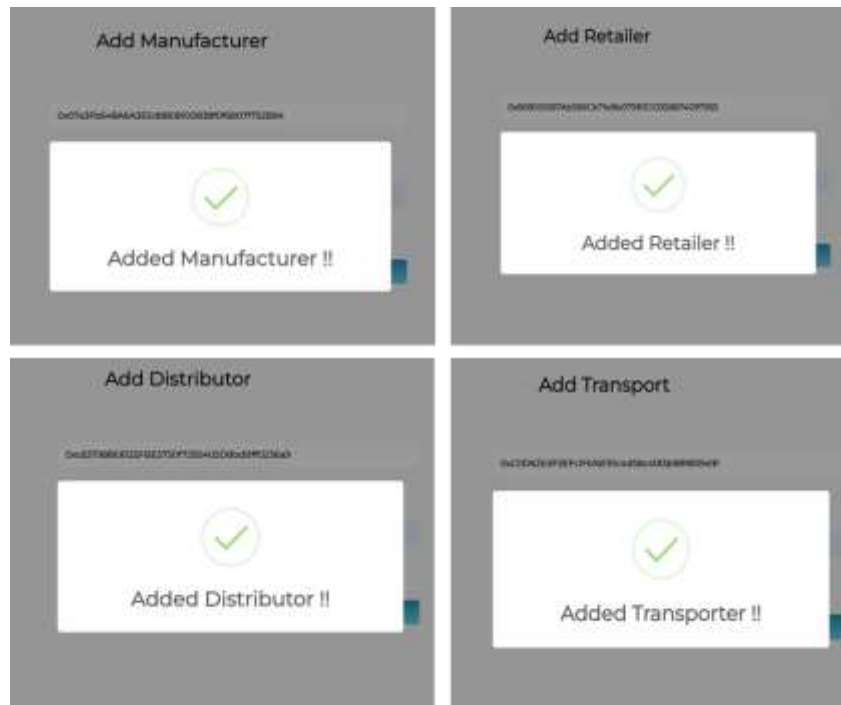
Register Manufacturer



Register Distributor



## Registration Page :





## Login Page :

Select your Role



Login as Manufacturer



Login as Distributor



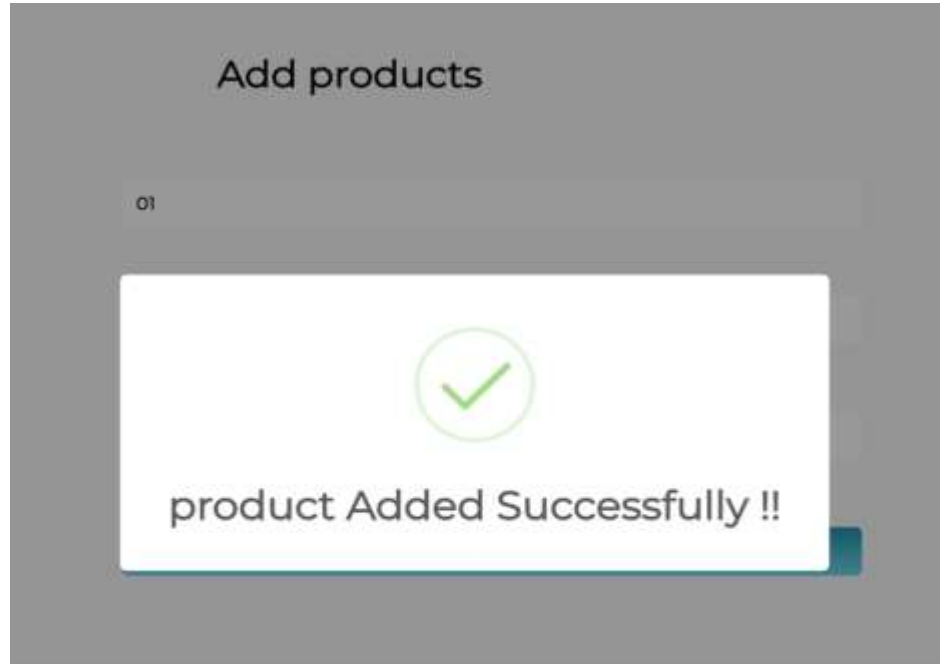
Login as Retailer



Final product



## Product Added By Manufacturer :



## Retailer Creating Purchase Order:

Create Purchase Order

DI



Request Created Successfully !!

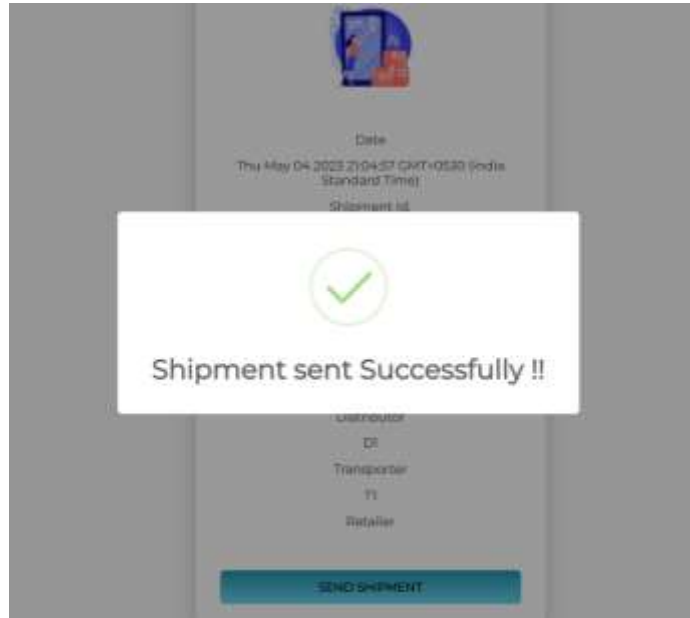
Request products

MI



Request Created !!

## Distributer sending Shipment details :

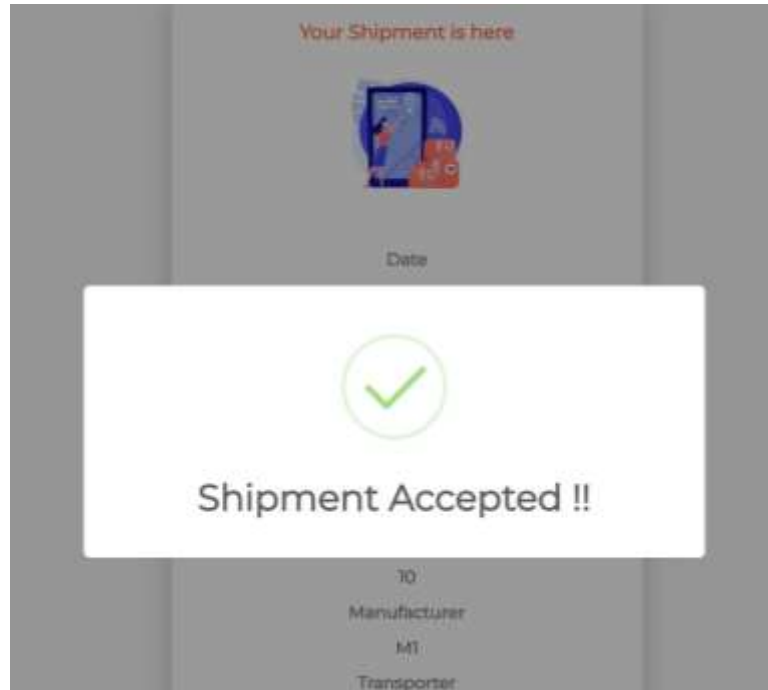


The screenshot shows a mobile application interface for sending shipment details. At the top, there is a blue header bar with three white dots. Below the header, a small icon of a person in a blue uniform is visible. The main content area is a light gray form with the following fields:

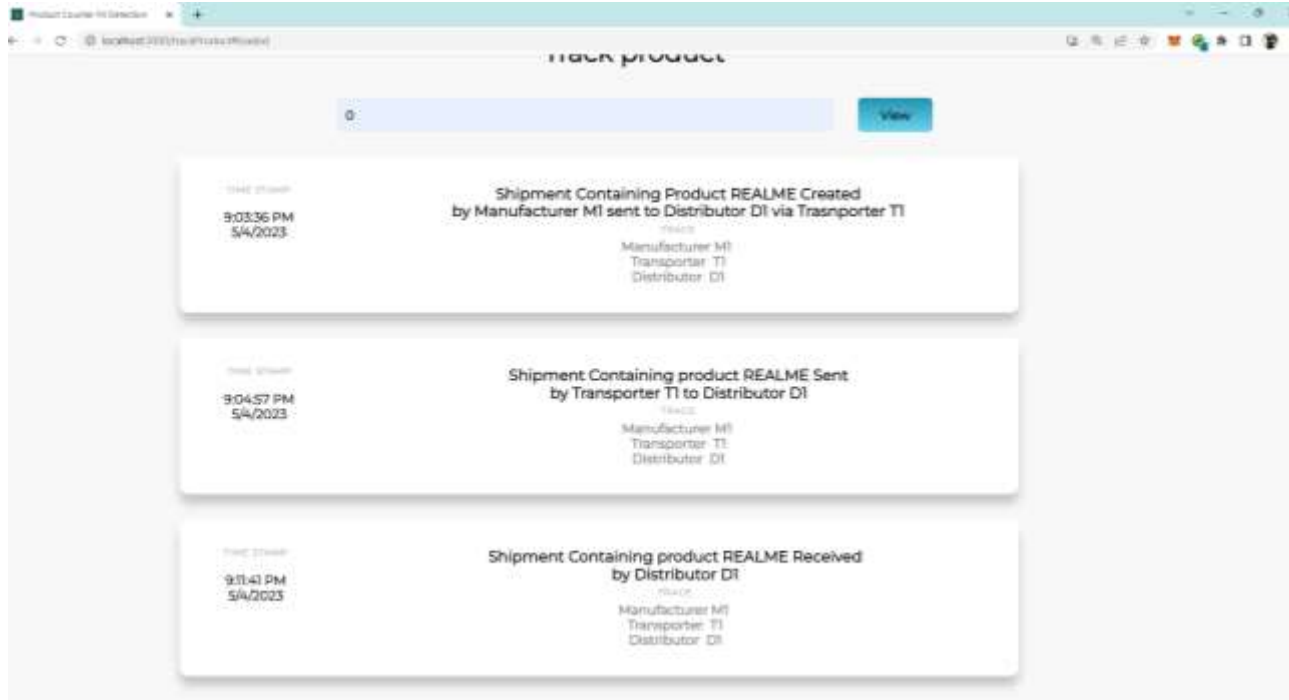
- Date: Thu May 04 2023 21:04:37 GMT+05:30 (India Standard Time)
- Shipment Id
- Distributor
- DR
- Transporter
- TI
- Retailer

A white modal box with a green checkmark icon and the text "Shipment sent Successfully !!" is centered over the form. At the bottom of the form, there is a blue button labeled "SEND SHIPMENT".

## Transporter will Accept the shipment:



## User uses Shipment Id To track the product:



9:03:36 PM 5/4/2023	by Manufacturer M1 sent to Distributor D1 via Trasnporter T1
TIME STAMP	TRACE Manufacturer M1 Transporter T1 Distributor D1
9:04:57 PM 5/4/2023	Shipment Containing product REALME Sent by Transporter T1 to Distributor D1
TIME STAMP	TRACE Manufacturer M1 Transporter T1 Distributor D1
9:11:41 PM 5/4/2023	Shipment Containing product REALME Received by Distributor D1
TIME STAMP	TRACE Manufacturer M1 Transporter T1 Distributor D1
9:12:10 PM 5/4/2023	Shipment Containing product REALME Sent by Distributor D1 to Retailer R1 via Transporter T1
TIME STAMP	TRACE Transporter T1 Distributor D1 Retailer R1



# Conclusion

**In conclusion, the use of blockchain technology to identify fake products through supply chain details, specifically the shipment ID, has the potential to revolutionize the way we combat counterfeiting.**

**By enabling all parties involved in the supply chain to have access to a transparent and immutable record of the product's journey, blockchain can enhance accountability and traceability, making it easier to detect and eliminate counterfeit products.**



# References

<b>1</b>	<b>Si Chen, Rui Shi, Ren, Jiaqi Yan, Yani Shi, "A Blockchain-based Supply Chain Quality Management Framework", 14th, IEEE International Conference on e-Business Engineering, 2017.</b>
<b>2</b>	<b>Blockchain Based Fake Product Identification in Supply Chain www.irjet.net: Ajay Funde, Pranjal Nahar, Ashwini Khilari, 2019.</b>
<b>3</b>	<b>Chen Fangfang, Cao Peng, Zhu Jianle, Wang Xuan, Research on Anti-counterfeiting Image Generation Algorithm Based on Halftone-Micro-Character, 2018.</b>
<b>4</b>	<b>H. Dang, T. T. A. Dinh, D. Loghin, E.-C. Chang, Q. Lin, B. C. Ooi, Towards Scaling Blockchain Systems via Sharding, Proc. of 2019 International Conference on Management of Data, page 123–140, 2019.</b>

The background is a solid light orange color. On the left side, there are several abstract shapes: a large light orange shape at the top, a dark blue star-like shape below it, and a red shape at the bottom with white wavy lines. On the right side, there are white wavy lines and a dark blue shape at the top right.

**THANK YOU 😊**