

## BLOCKCHAIN MINI PROJECT

**Title of Mini Project:** A blockchain-based supply-chain system to detect and prevent fake products using QR-linked provenance and Sepolia ETH payments.

**Group Members of Mini Project:**

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**Theory:**

**Problem statement:**

Counterfeit goods cause financial loss, brand damage, and safety risks. Current centralized supply-chain records are easily altered or forged, making it hard for consumers and downstream partners to verify a product's authenticity and full provenance.

**Concept / Overview:**

Use a public blockchain as an immutable ledger to record product lifecycle events (manufacture → supplier → retailer). Each manufactured item is assigned a unique serial number and a public QR code that links to its on-chain record. Role-based actors (manufacturer, supplier, retailer) update product state and pay small transaction fees (Sepolia test ETH in development) via a connected wallet (MetaMask). An admin manages user accounts in the web app. The QR code lets any participant or consumer fetch the canonical history and verify authenticity.

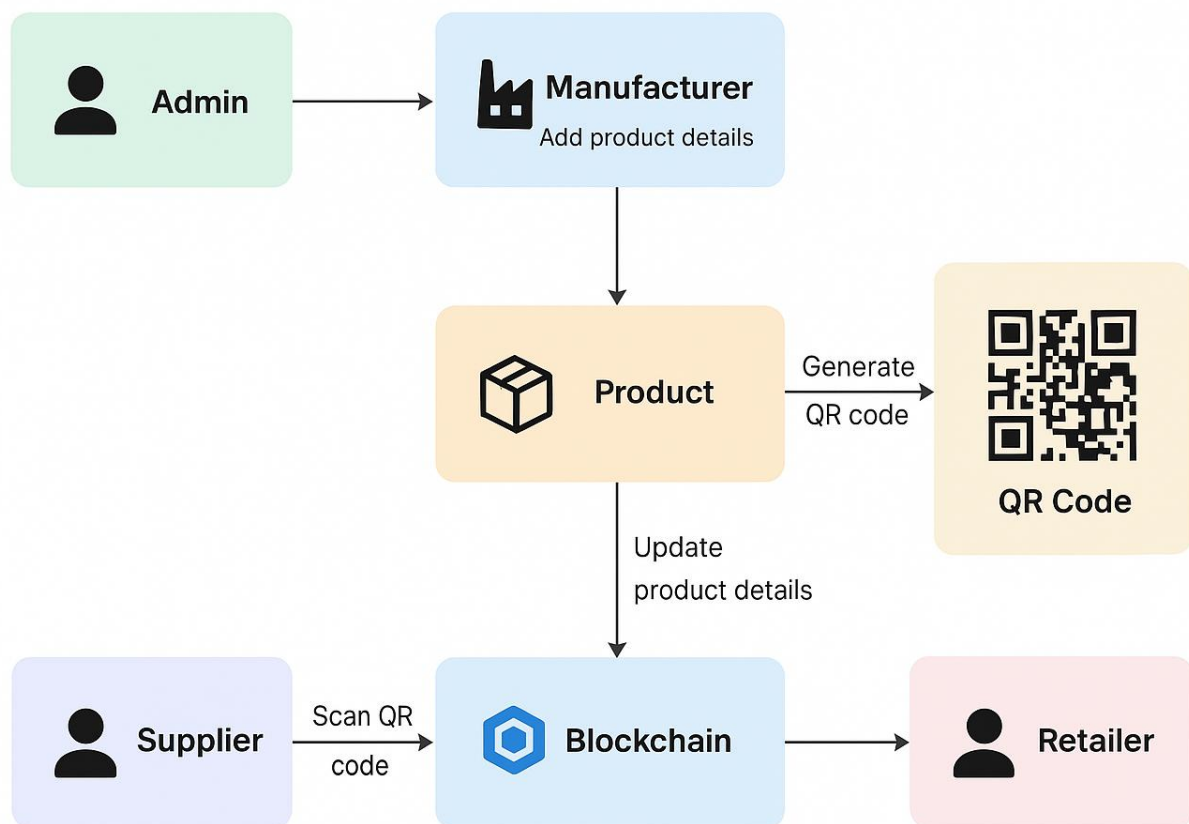
**Key features:**

- **Immutable provenance:** Every state change (creation, transfer, update) is recorded on-chain so history cannot be silently altered.
- **Role-based workflows:** Admin, Manufacturer, Supplier, Retailer each have defined permissions (create, update, verify).
- **QR code issuance:** After on-chain registration, a QR (containing contract address + serial) is generated and published for scanning.
- **Wallet-based payment & signing:** Actors pay transaction gas and sign actions with their wallets (MetaMask).
- **Off-chain metadata + on-chain anchor:** Detailed product data (images, descriptions,

location) stored off-chain (or IPFS) and anchored on-chain via hashes to save cost.

- Public verifiability: Anyone scanning the QR can query the contract to validate the canonical record.
- Audit trail & timestamps: On-chain timestamps provide tamper-proof time ordering for all events.

### Flowchart:



### Applications:

- Luxury goods anti-counterfeiting: Handbags, watches, jewellery.
- Pharmaceutical supply-chain: Track batches and expiry to prevent fake/expired medicines.
- Electronics and spare parts: Validate origin of components.
- Food provenance: Verify farm-to-shelf history for high-value or regulated foods.

**Use Case:**

1. Admin — manages web app accounts (create manufacturer/supplier/retailer).
2. Manufacturer — creates a product record in the web UI (name, image, description, location, manufacture date). The dApp:
  - uploads image/metadata off-chain (or to IPFS),
  - calls contract to register product (serial number, metadata hash),
  - pays Sepolia ETH via MetaMask, and
  - receives a public QR code (contract address + serial) to attach to the item.
3. Supplier — scans QR, fetches canonical data, updates shipment/receiving events on-chain (signed & paid via wallet).
4. Retailer — scans QR on receipt or at point-of-sale to confirm authenticity and update sale or shelf status.
5. Consumer/Verifier — scans QR and reads the complete on-chain provenance to confirm authenticity and ownership history.

**Advantages:**

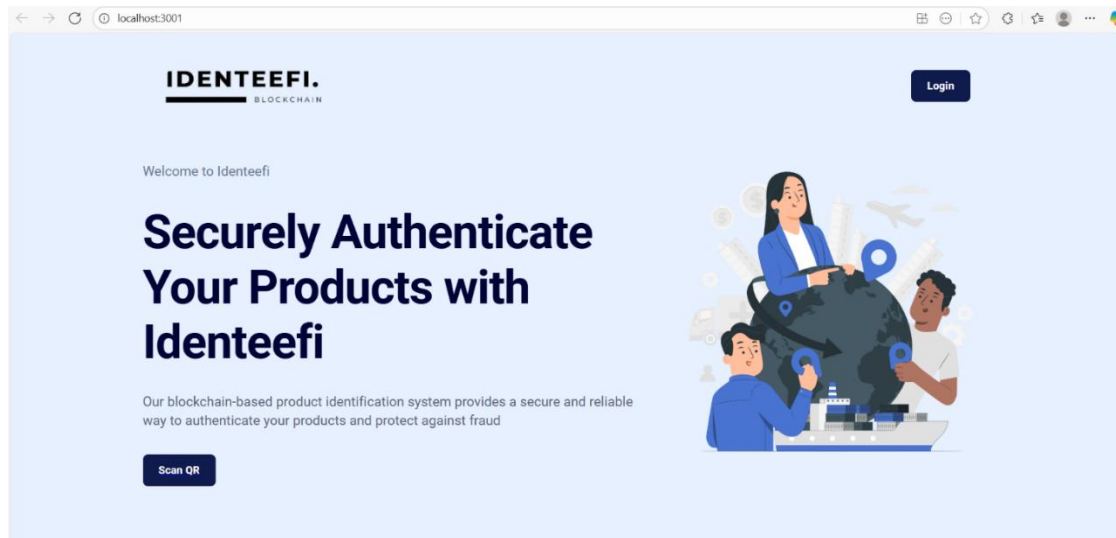
- Tamper resistance — record immutability discourages and detects fraud.
- Transparency — easy public verification without trusting a single central authority.
- Accountability — every actor's actions are signed by their wallet address.
- Interoperability — standard contract interfaces let other services integrate verification.

**Limitations & considerations:**

- Gas costs & UX: On-chain transactions cost gas — use test net (Sepolia) for development and consider batching or Layer-2/main net optimizations for production.
- Off-chain data integrity: Store large data off-chain (IPFS/S3) and anchor cryptographic hashes on-chain to prevent tampering while keeping costs low.
- Privacy: Public on-chain data is transparent—avoid storing sensitive PII on-chain; store only hashes or encrypted payloads off-chain.
- Key management: Actors must securely manage wallet keys (MetaMask). Lost keys = loss of ability to sign updates.
- Trust bootstrapping: The system's effectiveness improves with ecosystem adoption—brands and partners must participate.

## Output:

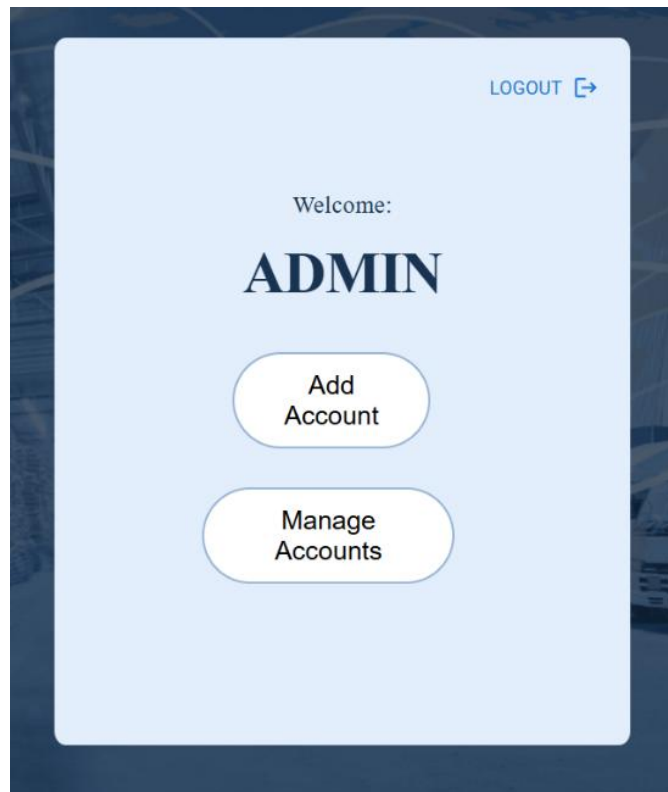
### 1.1 Landing Page



### 1.2 Login Page

A screenshot of the IdenteeFi login page. The page has a light blue background with a dark blue border. At the top, the text 'IDENTEEFI' is displayed in a large, bold, serif font, followed by 'Login' in a smaller, sans-serif font. Below this, there are two input fields: 'Username \*' with the text 'admin' and 'Password \*' with five dots. Below the password field is a checkbox labeled 'Remember me'. At the bottom, there is a large blue button labeled 'LOGIN' and a smaller blue button labeled 'BACK'.

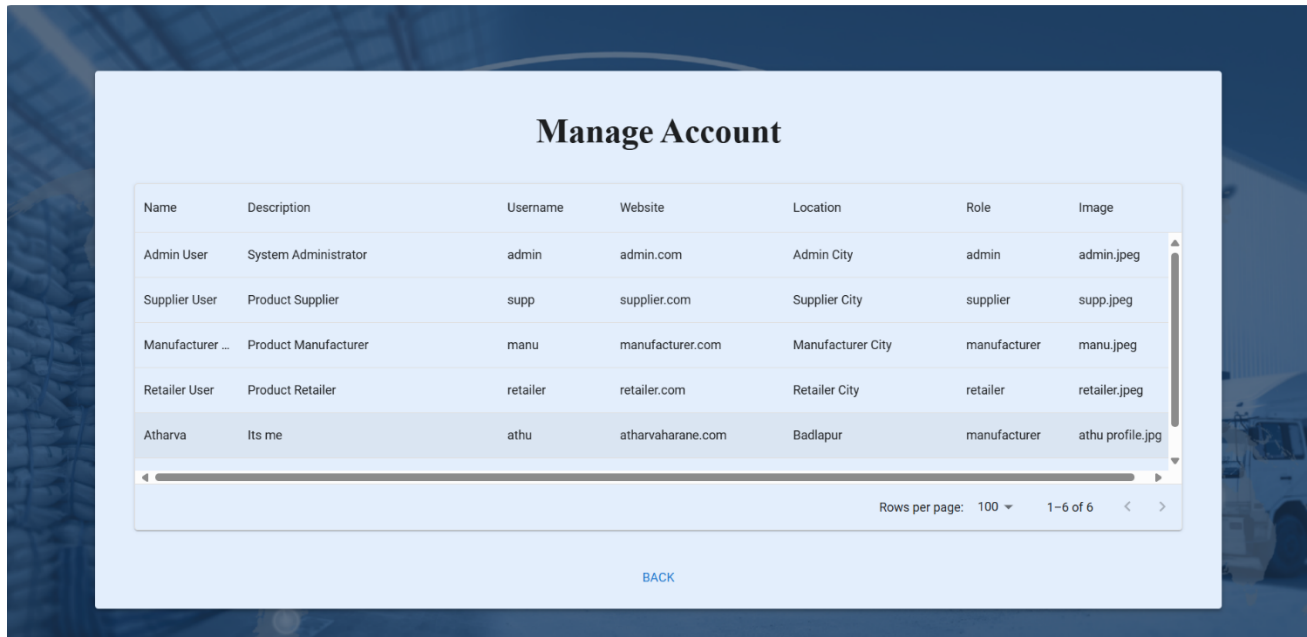
## 1.2.1 Add Account by Admin



A screenshot of the 'Add Account' form. The title 'Add Account' is at the top. The form contains the following fields and controls:

- Username:** Text input with value 'athu'.
- Password:** Password input with masked characters '....'.
- Confirm Password:** Password input with masked characters '....'.
- Role:** Dropdown menu with value 'manufacturer'.
- UPLOAD IMAGE:** A button for uploading a profile picture.
- Name:** Text input with value 'Atharva'.
- Description:** Text input with value 'Its me'.
- Website:** Text input with value 'atharvaharane.com'.
- Location:** Text input with value 'Badlapur'.
- ADD ACCOUNT:** A large button to submit the form.
- BACK:** A link to return to the previous page.

## 1.2.2 Manage Accounts by Admin



## 1.3.1 Add New Product by Manufacturer

The screenshot displays the 'Add Product' form. At the top, the title 'Add Product' is centered. Below it is a yellow warning box with a triangle icon and the text: 'MetaMask is not installed. Please install MetaMask to use blockchain features.' Below the warning box is a button labeled 'INSTALL METAMASK'. The form contains several input fields: 'Serial Number', 'Name', 'Brand', and 'Description'. Below these fields are two buttons: 'UPLOAD IMAGE' and 'ADD PRODUCT'. At the bottom, there is a 'BACK' button.

### Add Product

⚠ MetaMask is not installed. Please install MetaMask to use blockchain features.

INSTALL METAMASK

Serial Number

Name

Brand

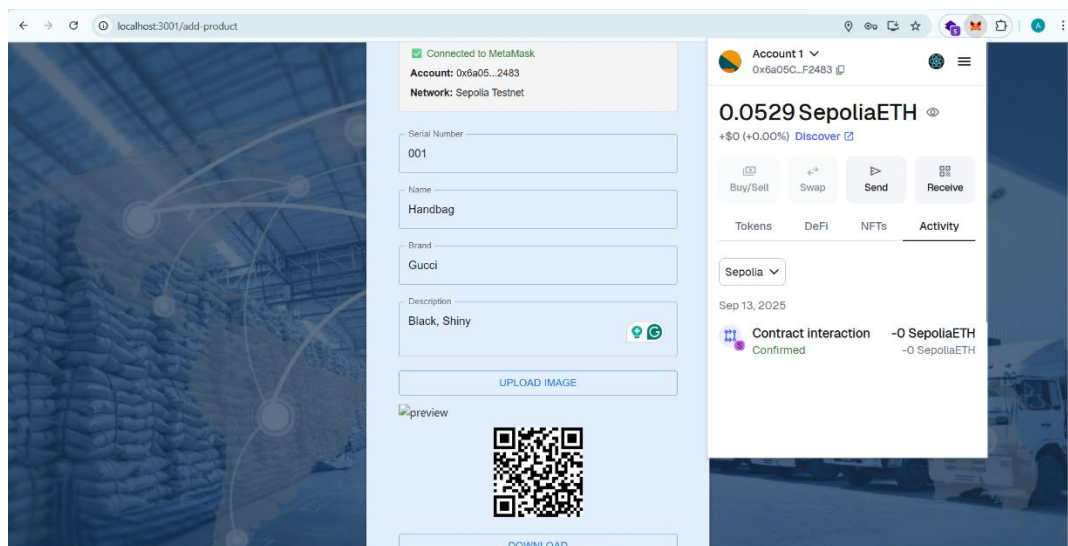
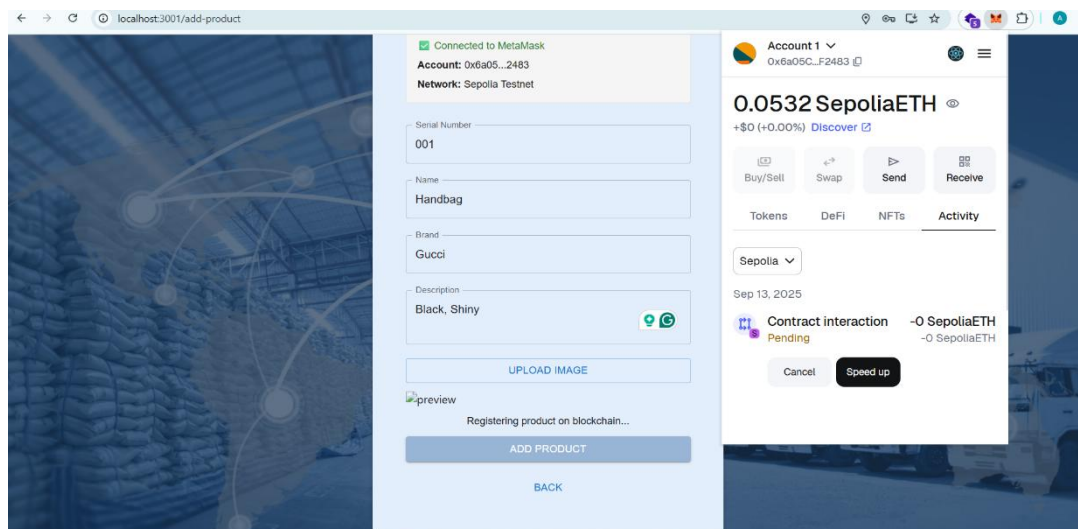
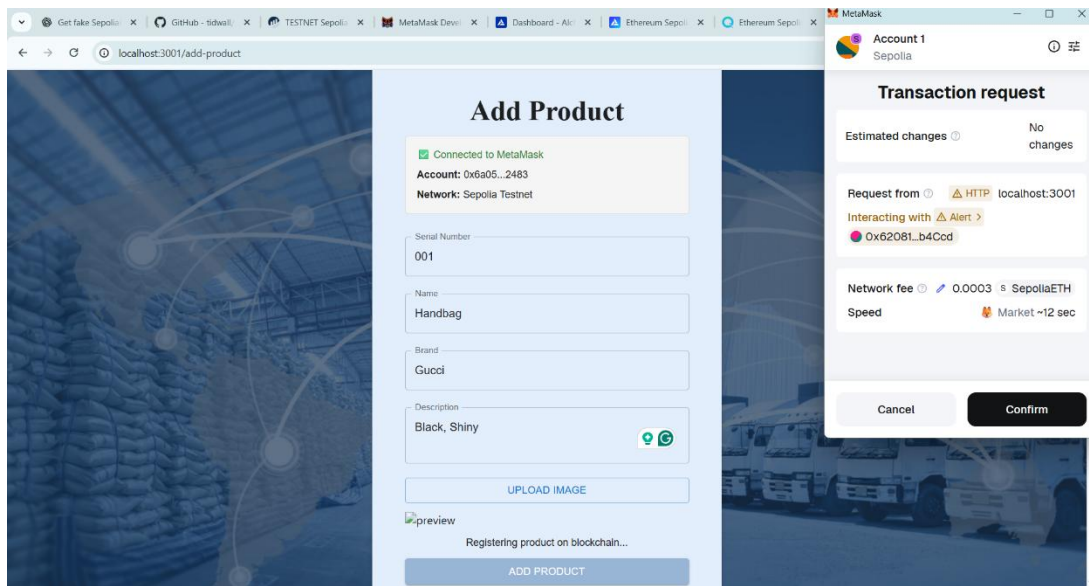
Description

UPLOAD IMAGE

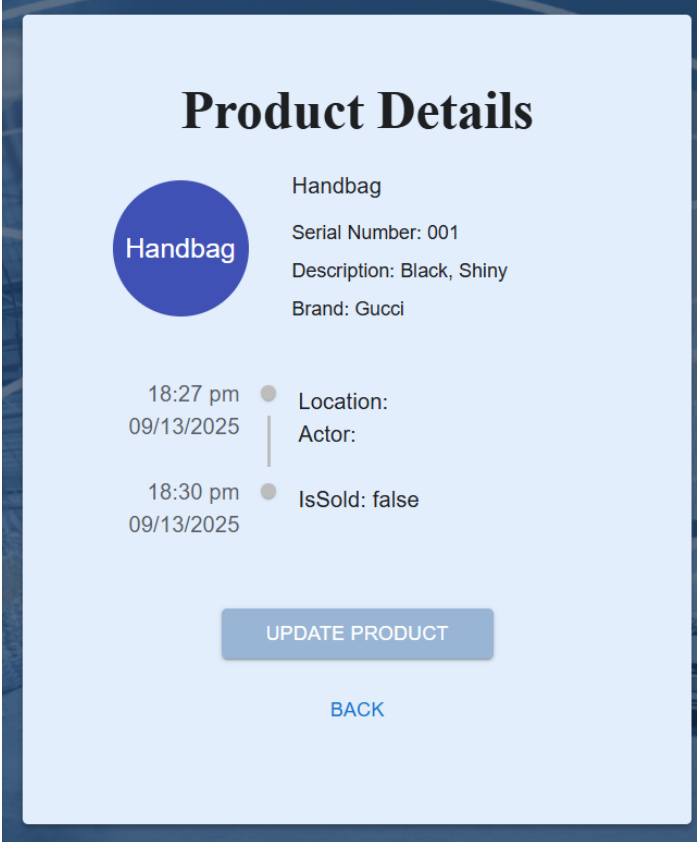
ADD PRODUCT

BACK

### 1.3.2 Registering Product on Blockchain by Manufacturer



### 1.4.1 Supplier can get Product Details



**Product Details**

**Handbag**

Handbag

Serial Number: 001

Description: Black, Shiny

Brand: Gucci

18:27 pm 09/13/2025

Location:

Actor:

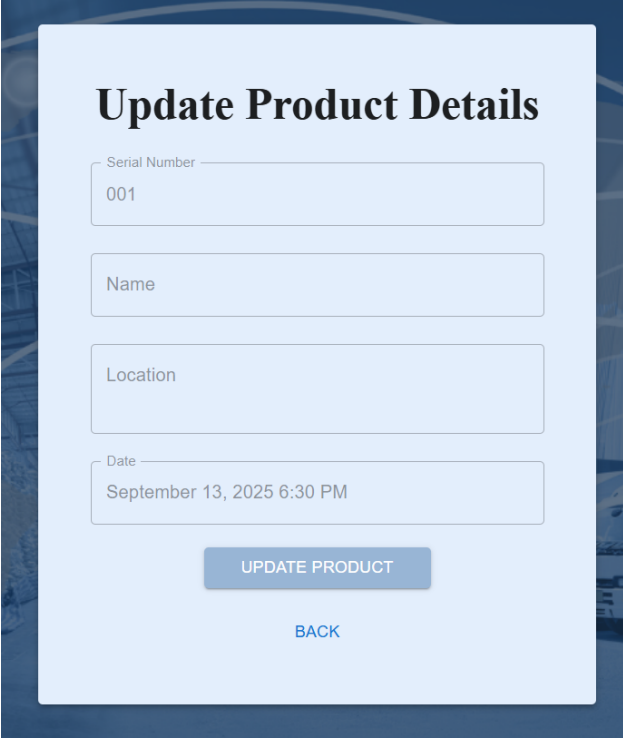
18:30 pm 09/13/2025

IsSold: false

UPDATE PRODUCT

BACK

### 1.4.2 Supplier can Update the Product Details



**Update Product Details**

Serial Number

001

Name

Location

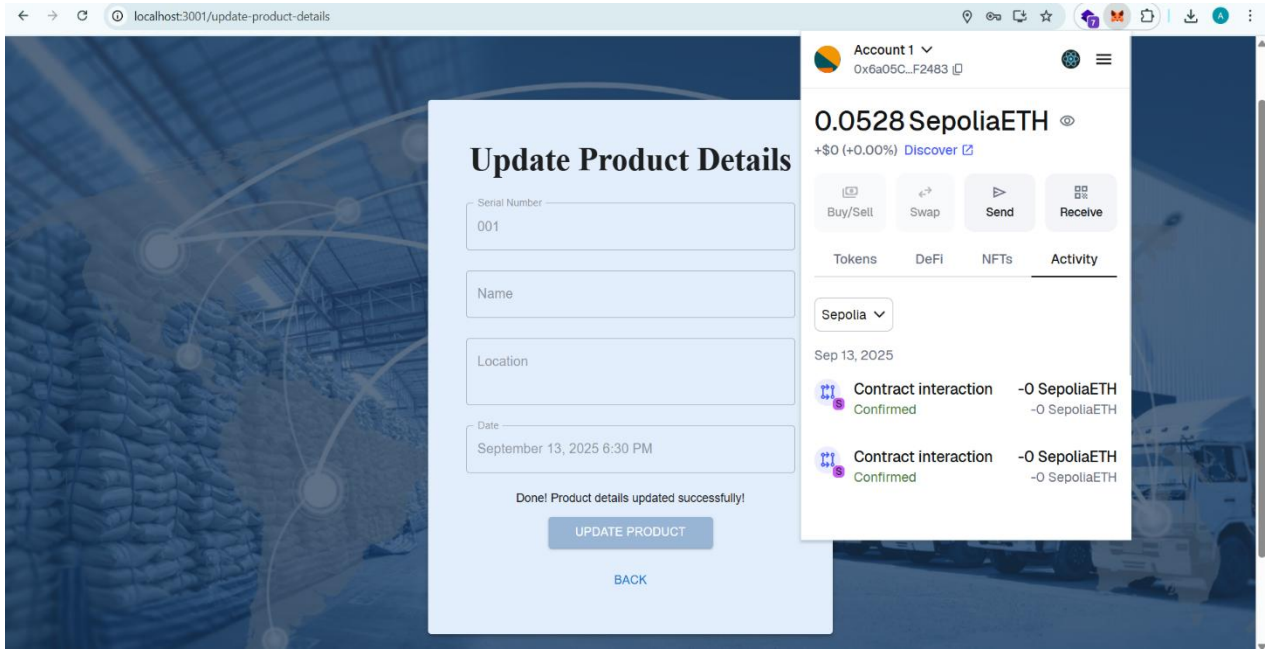
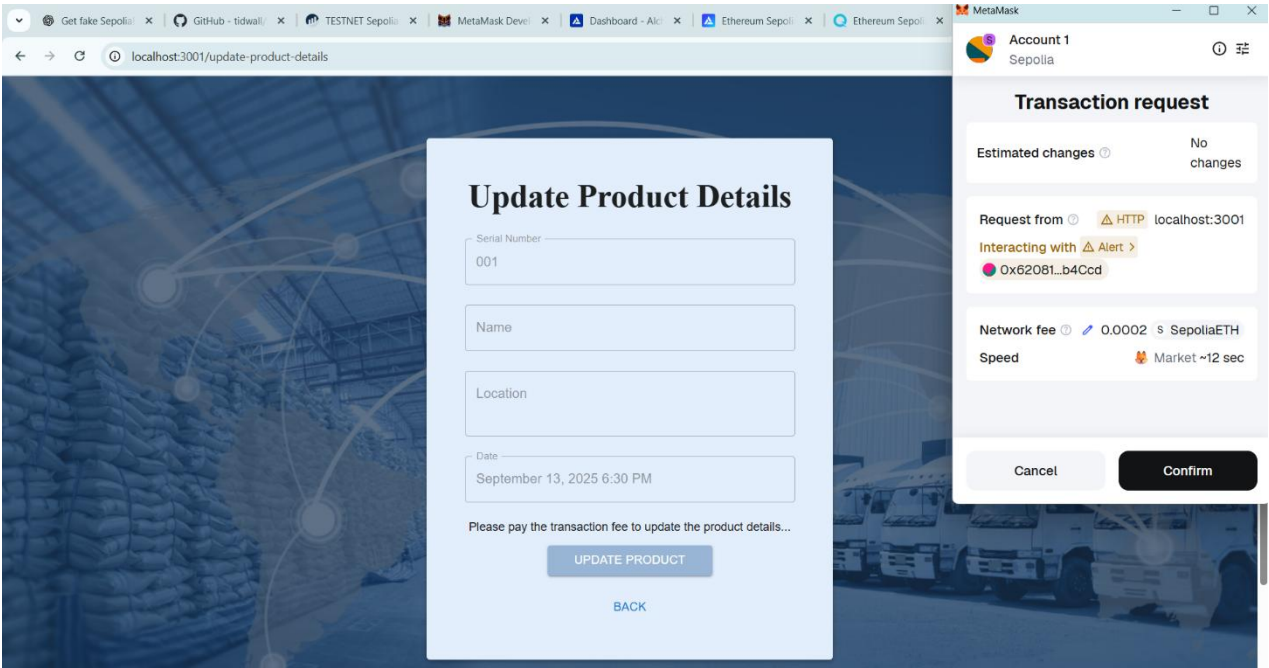
Date

September 13, 2025 6:30 PM

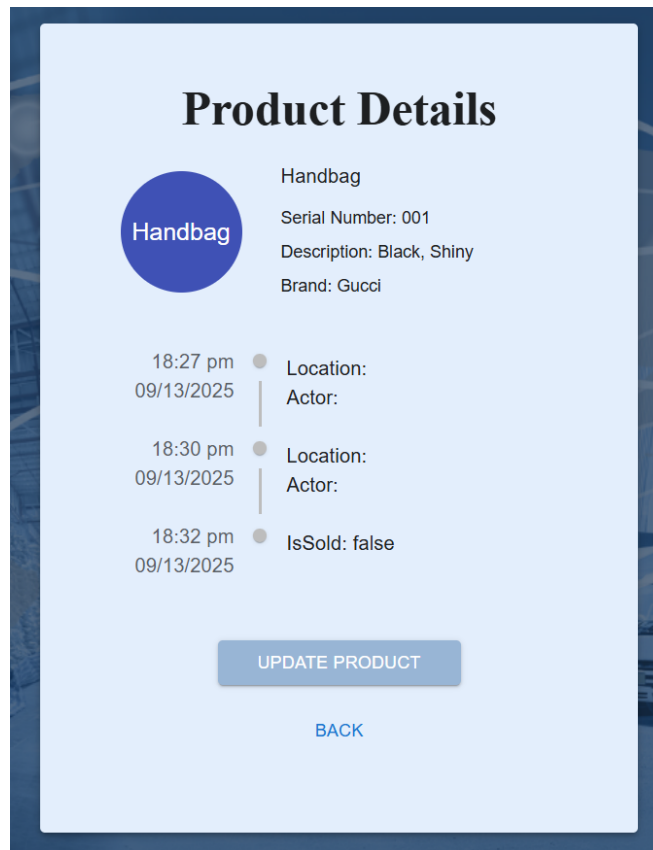
UPDATE PRODUCT

BACK

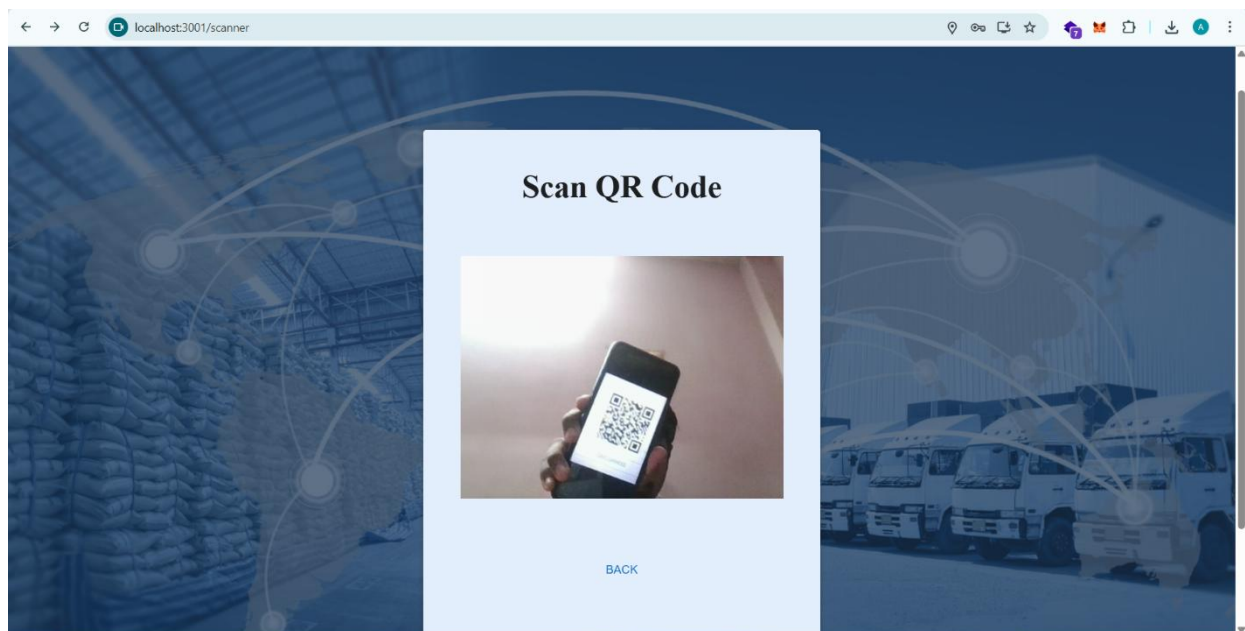




## 1.5 Supplier can see the Updated Product Details



## 1.6 Retailer needs to Scan QR Code To get the updated Product Details



## 1.6.1 Retailer can update the sells details of product

### Update Product Details

Serial Number

001

Name

Location

Date

September 13, 2025 6:33 PM

Is Sold?

false

×

▼

UPDATE PRODUCT

BACK

### Product Details

Handbag

Handbag

Serial Number: 001

Description: Black, Shiny

Brand: Gucci

18:27 pm  
09/13/2025

●

Location:  
Actor:

18:30 pm  
09/13/2025

●

Location:  
Actor:

18:33 pm  
09/13/2025

●

Location:  
Actor:

18:35 pm  
09/13/2025

●

IsSold: true

UPDATE PRODUCT

BACK

1.6.2 Transactions Details

Gas < 0.1 Gwei

Blockchain Tokens DApps Charts & stats API Other

Blockscout Defi

Logout

Launch your own fully functioning blockchain explorer in minutes. [Deploy now](#)

Search by address / txn hash / block / token...

Ads: Bitget – Speed meets crypto - Exclusive prizes in every lap. [Race Now](#)

Address details EOA+code

0x6a05C72f4978004ca4B3f87a1c09AF29c0bf2483

1 Explorer

Details Code Transactions 15 Token transfers Tokens Internal txns Coin balance history Widgets 10

Filter

Download CSV

Txn hash	Type	Method	Block	From/To	Value ETH	Fee ETH
scanning new transactions...						
0xe5af6904ca...a2e3 12m ago	Contract creation Success		9207154	0x6a...2483 0x5C...Ee49	0	0.00210887
0x283290bce7...bcf5 14m ago	Contract creation Success		9207141	0x6a...2483 0xA1...079F	0	0.0021089
0x6ab9727318...51d1 17m ago	Contract call Success		9207129	0x6E...C033 0x6a...2483	0.05	0.00000003
0x7663d23f2e...49ce 19m ago	Transaction Success		9207120	0x6a...2483 0x6a...2483	0	0.00005527
0x32a8ebcef5...448a	Contract creation		9207106	0x6a...2483	0	0.00210878

Txn hash	Type	Method	Block	From/To	Value ETH	Fee ETH
0x7663d23f2e...49ce 19m ago	Transaction Success		9207120	0x6a...2483 0x6a...2483	0	0.00005527
0x32a8ebcef5...448a 23m ago	Contract creation Success		9207106	0x6a...2483 0x50...eCa9	0	0.00210878
0x4b1dac9bdd...2da7 44m ago	Contract call Success	addProductHistory	9207007	0x6a...2483 0x62...4Ccd	0	0.00020238
0xe353a54c29...8041 48m ago	Contract call Success	addProductHistory	9206985	0x6a...2483 0x62...4Ccd	0	0.00017251
0x064bdf2847...8202 50m ago	Contract call Success	registerProduct	9206974	0x6a...2483 0x62...4Ccd	0	0.00037357
0x1546679837...e88c 1d ago	Contract call Success	addProductHistory	9197313	0x6a...2483 0x62...4Ccd	0	0.00014384
0xb55dbbb6cc...5f9f 1d ago	Contract call Success	addProductHistory	9197305	0x6a...2483 0x62...4Ccd	0	0.00011397
0x95f3dcd479...7c45 1d ago	Contract call Success	registerProduct	9197295	0x6a...2483 0x62...4Ccd	0	0.00013277
0x06911a2106...e385 2d ago	Contract call Success	addProductHistory	9195303	0x6a...2483 0x62...4Ccd	0	0.00011595
0x183cc7adbd...49b9	Contract call	addProductHistory	9195289	0x6a...2483	0	0.00012674

**Conclusion:**

A QR → blockchain provenance system provides a practical, auditable, and decentralized approach to detect and prevent fake products. By combining off-chain media storage, on-chain anchoring, role-based updates, and wallet-signed transactions, the system creates a verifiable chain of custody from manufacture to sale. For production readiness, address gas-cost strategies, privacy safeguards, and user-friendly wallet flows so that verification becomes frictionless and widely adoptable.

Additionally, this blockchain-powered product verification system fosters trust and transparency across the entire supply chain. Consumers gain confidence by verifying product authenticity themselves, while businesses can protect their brand value and reduce losses due to counterfeiting. Regulatory authorities can also leverage the immutable audit trail for compliance and investigation purposes. By integrating QR-based verification with blockchain, the solution not only combats counterfeit goods but also enhances accountability, efficiency, and collaboration among all stakeholders.