PixelAfrica

One Pixel, One Life.
(Hedera Africa Hackathon)
(Built on Hedera)

Pixel
Africa

Our Motivation

Lives in Africa are **at risk every day** due to **critical gaps in healthcare**.

Our solution ensures every blood donation is **safe, traceable, and fast**, going from registration to hospital with **full verification**.

We are not just building blockchain. **We are saving lives**.

Introduction

❏ **PixelAfrica** is a decentralized blood supply chain tracker built on **Hedera Consensus Service (HCS)**, turning Africa's blood logistics into a transparent, immutable pixel grid.

❏ **PixelAfrica** tackles a real African healthcare crisis:
  o More than **25%** of PPH deaths occur due to a lack of transfusions.
  o Blood bags go to waste due to **poor traceability** and **fraud**.

❏ Our platform uses **HCS** to create a **secure timeline** for every blood bag, which is visible to all stakeholders:
  o donor centers, couriers, hospitals, NGOs, and the public.
❏ We're reimagining blood logistics as a trustless, trackable digital system.

Features & Functionality

❑ **Pixel Grid Visualization:**
  - One blood bag = one colored pixel.
  - Status: 🟧 Created, 🟦 In Transit, 🟩 Received, 🟪 Transfused, 🟥 Expired, ⬛ Discarded

❑ **Role-Based Actions:**
  - **Donor Centers:** Register new bags
  - **Couriers:** Update transit info
  - **Hospitals:** Finalize bag status

❑ **Public Verification:**
  - Anyone can view a blood bag's full journey without a login.

❑ **Immutable Event Log:**
  - Every action is recorded on Hedera Consensus Service (HCS), viewable via Mirror Node.

How It Works

❑ **Smart Architecture:**
   o **Hedera Consensus Service (HCS):** Logs every event immutably.
   o **Mirror Node:** Fetches and displays history.
   o **HashConnect + HashPack Wallets:** Enable secure, role-based access.

❑ **Frontend:**
   o Pixel Grid Dashboard provides a visual overview.
   o QR Codes link each bag to its dedicated timeline.

❑ **Flow:**
   o Register bag → emits "CREATED" event
   o Courier updates → emits "IN_TRANSIT" event
   o Hospital finalizes → emits "RECEIVED/TRANSFUSED/EXPIRED"
   o Public can verify → immutable and transparent

Blockchain Integration

❑ **Decentralization & Transparency:**
  o **Hedera Consensus Service (HCS):** ensures integrity and immutability.
  o **Mirror Node:** provides open, auditable records.
  o **Wallet IDs:** connect every action to a verified account for accountability.
  o **HashConnect:** connects Hedera accounts securely for each user role.
❑ **Future Extensions:**
  o **Hedera Token Service (HTS):** tokenize blood bags.
  o **Smart Contracts:** manage roles and permissions automatically.

Challenges and Solutions

❑ **Challenge 1:** Ensuring traceability across multiple stakeholders
Solution: fixed, time-stamped HCS events.

❑ **Challenge 2:** Preventing fraud and data tampering
Solution: Role-based wallet actions and public transparency.

❑ **Challenge 3:** Simplifying supply visibility
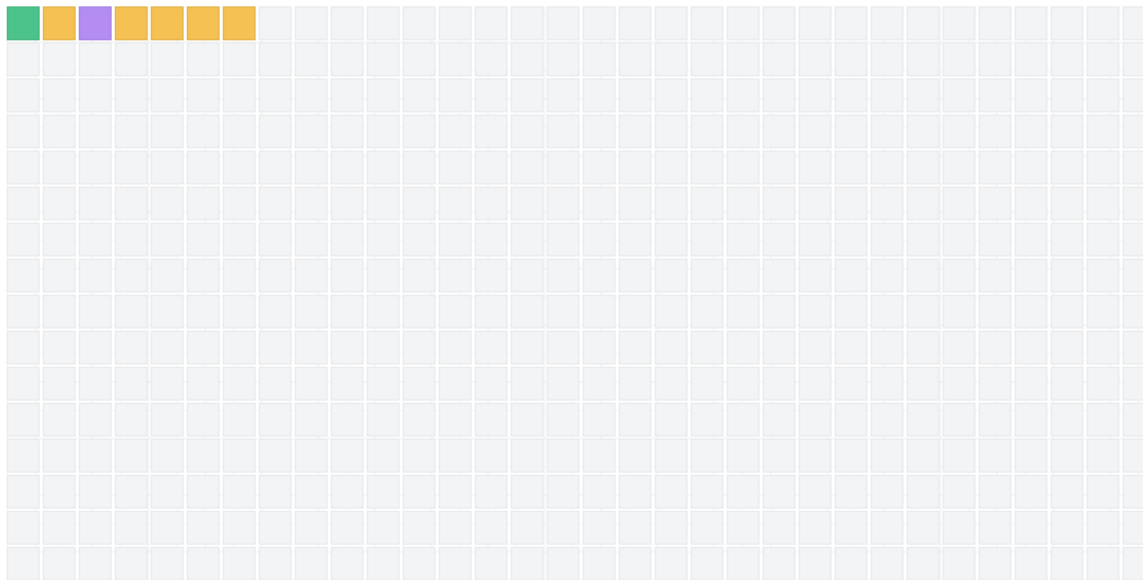**Solution:** Pixel Grid Dashboard as an instant visual overview.

PixelAfrica

PixelAfrica
A clear, honest view of where blood is.

Each square is a bag. The color tells you what's happening now. Click a pixel to see its trail, end to end.

■ CREATED 5 ■ IN_TRANSIT 0 ■ RECEIVED 1 ■ TRANSFUSED 1 ■ EXPIRED 0 ■ DISCARDED 0

• Register a bag with its type, volume, and the courier who carries it.   • Couriers add short location notes while moving the bag.   • Hospitals close out: received, transfused, expired, or discarded.

PIXELAFRICA   REGISTER   TRANSIT   HOSPITAL   VERIFY

Register

Single | Batch

Bag ID (Donation/Unit ID)

Component
Red Cells (RBC)

Preservative / Additive
AS-1

Donation Type
Voluntary

Blood Type
O+

Volume (ml)
450

Collection Site ID (optional)
Site code / center ID

☑ Leukoreduced ☐ Irradiated ☐ CMV-negative

Courier Wallet ID
e.g. 0.0.12345

Hospital Wallet ID
e.g. 0.0.67890

Storage: **1–6 °C (refrigerated)**
Expiry: ~**42 days** from collection

Register Unit

Transit

Transit Updates

Couriers can log transport updates for blood packages. Use quick-select events or add custom notes if needed.

hedera1   **Fetch**

Assigned Courier: `0.0.6879329`

Add Transit Update

Arrived at checkpoint ▼   Successful

Add Update

Timeline

RECEIVED
10/30/2025, 12:14:55 PM — `0.0.6879329`

CREATED
10/30/2025, 11:18:56 AM — `0.0.6879329`

Hospital

Bag hedera1 (RECEIVED)

Blood Type: O+   **Volume:** 450 ml   **Component:** RBC   **Donation Type:** VOLUNTARY

Additive: AS-1   **Collection:** 10/30/2025, 11:18:56 AM   **Expiry:** 12/11/2025   **Attributes:** leukoreduced

```
Successful
```

Update Status

| Mark Received | Mark Tested | Mark Ready | Mark Transfused | Mark Expired | Mark Discarded |

History

RECEIVED — — 10/30/2025, 12:14:55 PM — 0.0.6879329

Verify

Verify Blood Bag

Enter a Bag ID or scan its QR. You'll see the bag's public details and lifecycle history.

| hedera1 | **Search** |

Bag hedera1 RECEIVED

Blood Type: O+   **Volume:** 450 ml

Collection Date: 10/30/2025   **Expiry Date:** 12/11/2025

Timeline

RECEIVED
10/30/2025, 12:14:55 PM

CREATED
10/30/2025, 11:18:56 AM

Roadmap

❑ **HTS Integration:** Tokenize blood bags for enhanced tracking.

❑ **Smart Contracts:** Automated role and permission control.

❑ **UI Upgrade:** Tailwind styling and data filters.

❑ **AI Analytics:** Predict shortages and optimize logistics.

❑ **Scale:** Extend across multiple countries and hospitals.

Hashgraph Developer Course - Certificate

Certificate of Completion
Hashgraph Developer Course

This credential certifies that **Lorenzo Porcelli**
has completed the Hashgraph Developer Course on **7-AUG-2025**

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BUILT ON HEDERA

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Important Links

- **Live Demo:** https://pixel-africa.vercel.app

- **Demo Video:** https://youtu.be/7joHzZael3o

- **X / Twitter:** https://x.com/PixelAfricaX

- **Source Code:** https://github.com/GokhanCey/pixel-africa

- **Pitch Deck:** https://github.com/GokhanCey/pixel-africa/PitchDeck.pdf