

PixelAfrica

One Pixel, One Life.

(Hedera Africa Hackathon)

(Built on Hedera)



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:
 - More than **25%** of PPH deaths occur due to a lack of transfusions.
 - 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:
 - donor centers, couriers, hospitals, NGOs, and the public.
- ❑ We're reimagining blood logistics as a trustless, trackable digital system.

For more info:







GitHub | **Hedera Africa Hackathon**

Sources:

FIGO | <https://www.figo.org/news/pph-leading-unnecessary-deaths>

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:

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

❑ Frontend:

- Pixel Grid Dashboard provides a visual overview.
- QR Codes link each bag to its dedicated timeline.

❑ Flow:

- Register bag → emits "CREATED" event
- Courier updates → emits "IN_TRANSIT" event
- Hospital finalizes → emits "RECEIVED/TRANSFUSED/EXPIRED"
- Public can verify → immutable and transparent

Blockchain Integration

❑ Decentralization & Transparency:

- **Hedera Consensus Service (HCS):** ensures integrity and immutability.
- **Mirror Node:** provides open, auditable records.
- **Wallet IDs:** connect every action to a verified account for accountability.
- **HashConnect:** connects Hedera accounts securely for each user role.

❑ Future Extensions:

- **Hedera Token Service (HTS):** tokenize blood bags.
- **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.

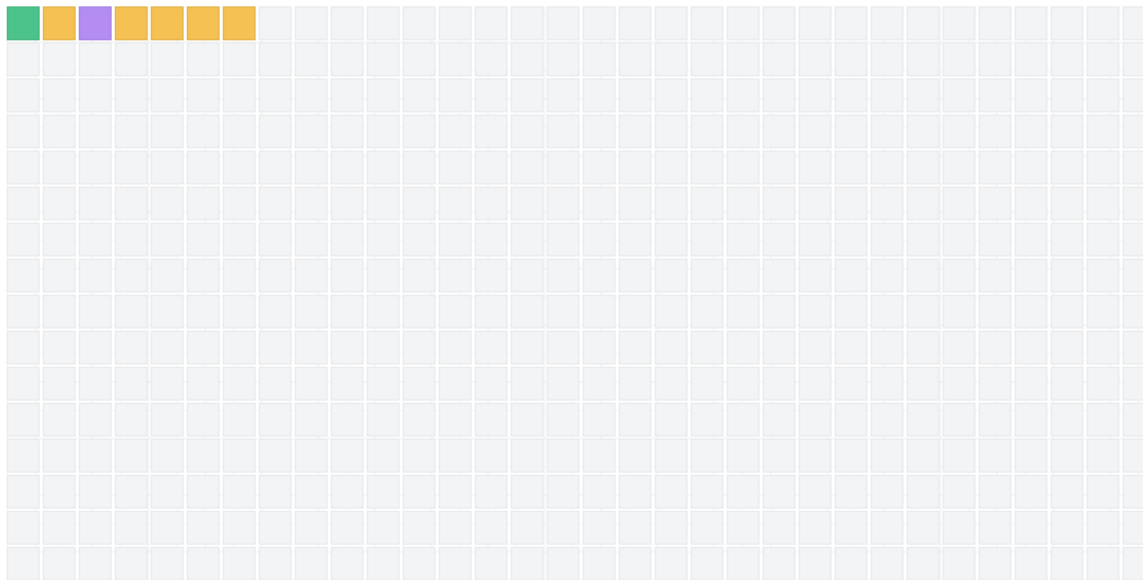
PixelAfrica

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.

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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Important Links

- **Live Demo:** <https://pixel-africa.vercel.app>
- **Demo Video:** <https://youtu.be/7joHzZael3o>
- **Source Code:** <https://github.com/GokhanCey/pixel-africa>
- **Pitch Deck:** <https://github.com/GokhanCey/pixel-africa/PitchDeck.pdf>