RAJALAKSHMI ENGINEERING COLLEGE

# TiForge 2026

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## PROBLEM STATEMENT TITLE

- Theme – Tech for Government
- Problem Statement Title - TrustChain: A Blockchain Framework for Transparent NGO Fund Management
- Team Name- Error 404
- Team Leader Name(With Contact Number) - Rakshitha S (6374943517)

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# Idea / Solution Overview

- Trust Chain is a **blockchain-powered fund management system** that ensures **transparent, tamper-proof, and accountable** usage of NGO funds.
- Donations are routed through **smart contract–based escrow**, released only after **verified milestones and proofs**, eliminating fund misuse.

# How the Solution Works (end-to-end flow)

- Donors/Government deposit funds into a **smart contract escrow** instead of directly to NGOs.
- NGOs create **projects and milestones**, each linked with budget, vendor, and conditions.
- Vendors are **KYC-verified** and submit invoices and work proofs stored on **IPFS**.
- Smart contracts automatically **validate approvals and proofs** and release payments.
- All transactions and approvals are **immutably recorded on blockchain**.

# How It Addresses the Problem

- Prevents fund misappropriation through **locked escrow funds**.
- Eliminates  vendors using **blockchain-based identity verification**.
- Ensures real-time transparency for **donors, auditors, and citizens**.
- Reduces manual audits and corruption via **automatic, rule-based execution**.

# Innovation & Uniqueness

- Uses **milestone-based smart contract payments** instead of manual fund release.
- Combines **blockchain + IPFS** for integrity and scalable document storage.
- Provides **public auditability without exposing sensitive data**.
- Introduces **trust-by-design**, not trust-by-assumption.

# Impact

- Builds donor confidence
- Strengthens NGO accountability
- Enables corruption-resistant fund governance

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# ARCHITECTURE DIAGRAM

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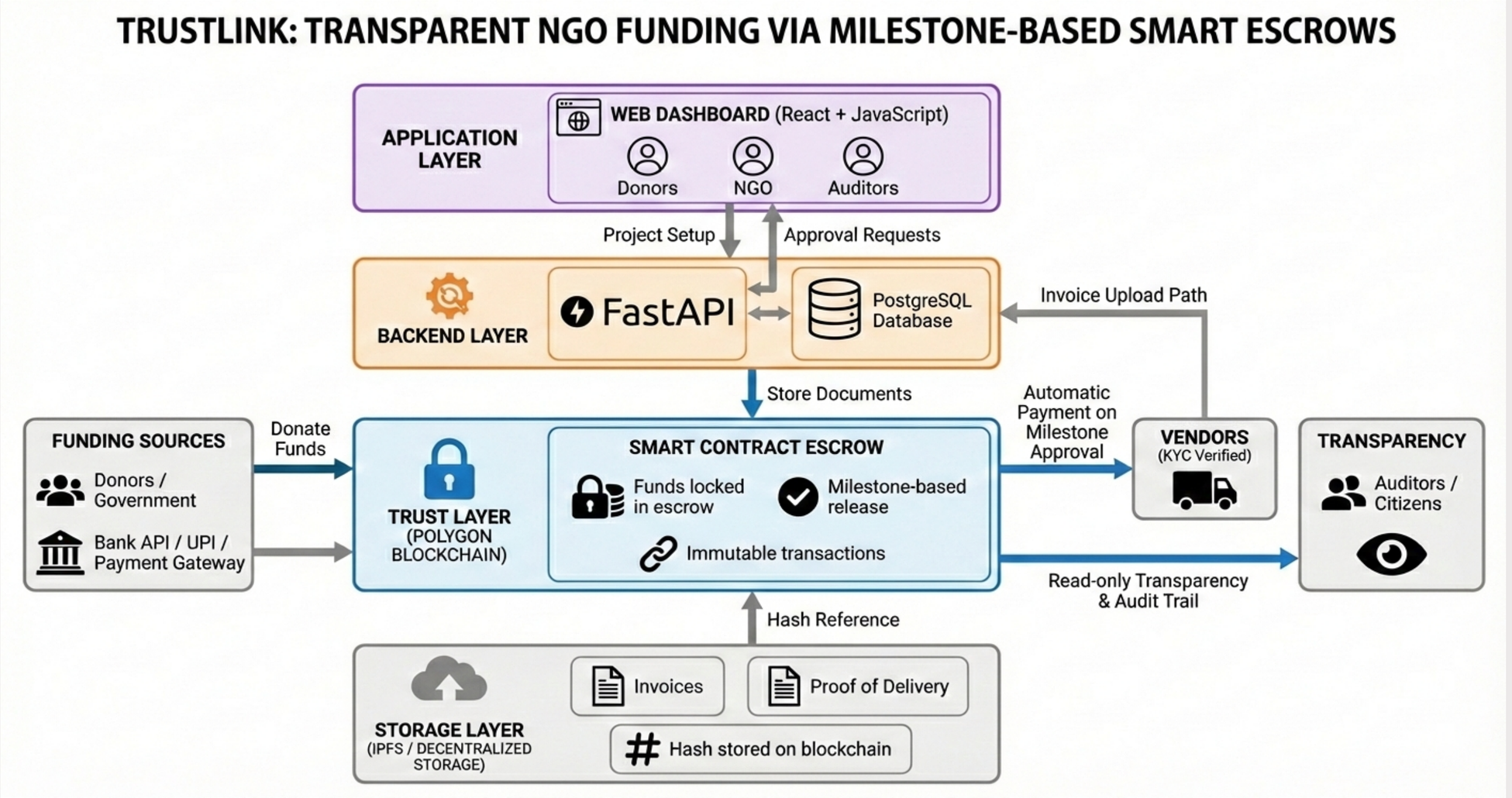


## Technology Stack:

**Block Chain Layer** (Polygon)
**Smart Contracts** (Solidity)
**Authentication** (JWT+ Decentralized ID)
**Frontend** (React.js)
**Backend** (Fast Api)
**Database** (PostgreSQL)
**Payment Integrations** (Stripe)

polygon SOLIDITY stripe IPFS

IPFS-Document Storage

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# Feasibility Analysis of Trust Chain

**Technical Feasibility**

- Blockchain platforms (Polygon) support immutable and transparent transaction records.
- Smart contracts automate fund allocation, tracking, and verification.
- Off-chain storage (IPFS) reduces cost while maintaining data integrity.

**Economic Feasibility**

- Reduces auditing and administrative overhead for NGOs.
- Increases donor trust, potentially improving funding inflow.
- Low-cost deployment using permissioned or Layer-2 blockchains.

**Social & Organizational Feasibility**

- Aligns with global demand for transparency and accountability.
- Encourages ethical fund usage and public trust.
- Suitable for government-regulated and private NGOs.

# Potential Challenges and Risks

- **High transaction costs** on public blockchains.
- **Scalability limitations** during high transaction volumes.
- **Regulatory and legal uncertainty** across regions.
- **Data privacy risks** for donors and beneficiaries.
- **Lack of technical expertise** within NGOs.
- **Resistance to adoption** due to transparency concerns.
- **Smart contract vulnerabilities** leading to fund loss.

# Strategies to Overcome Challenges

- Use **permissioned or hybrid blockchains** to reduce cost and improve performance.
- Implement **privacy-preserving techniques** (off-chain data, hashing, access control).
- Ensure **regulatory compliance** through KYC, audit logs, and legal review.
- Conduct **smart contract audits and testing** before deployment.
- Provide **training and simple dashboards** for NGO staff and donors.
- Follow a **phased implementation approach** starting with pilot projects.

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# Potential Impact & Benefits

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## Social Impact

- Ensures NGO and government funds reach **real beneficiaries**
- Reduces corruption, fake vendors and fund misuse
- Builds public trust in welfare, relief, and CSR programs

## Economic Impact

- Prevents **30-40% fund leakage** caused by fraud and inefficiency
- Speeds up vendor payments through automated smart contracts
- Reduces audit costs and manual verification efforts

## Operational Impact

- Automates fund release through milestone-based smart contracts
- Reduces manual paperwork, approvals, and audit delays
- Improves coordination between NGOs, vendors, and auditors

## Governance & Transparency Impact

- Enables **end-to-end fund traceability** (Donor → NGO → Vendor)
- Provides real-time, tamper-proof audit trails
- Improves accountability across NGOs, vendors and auditors

## Stakeholder Impact

- **Donors/Government:** Verifiable fund utilization
- **NGOs:** Higher credibility and faster operations
- **Vendors:** Timely, fair, milestone-based payments
- **Citizens:** Visibility into how public funds are used

## Long-Term Impact

- Scalable across disaster relief, healthcare, education, and CSR
- Strengthens ESG and digital governance initiatives
- Creates a trusted national framework for NGO fund management

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# RESEARCH AND REFERENCES

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