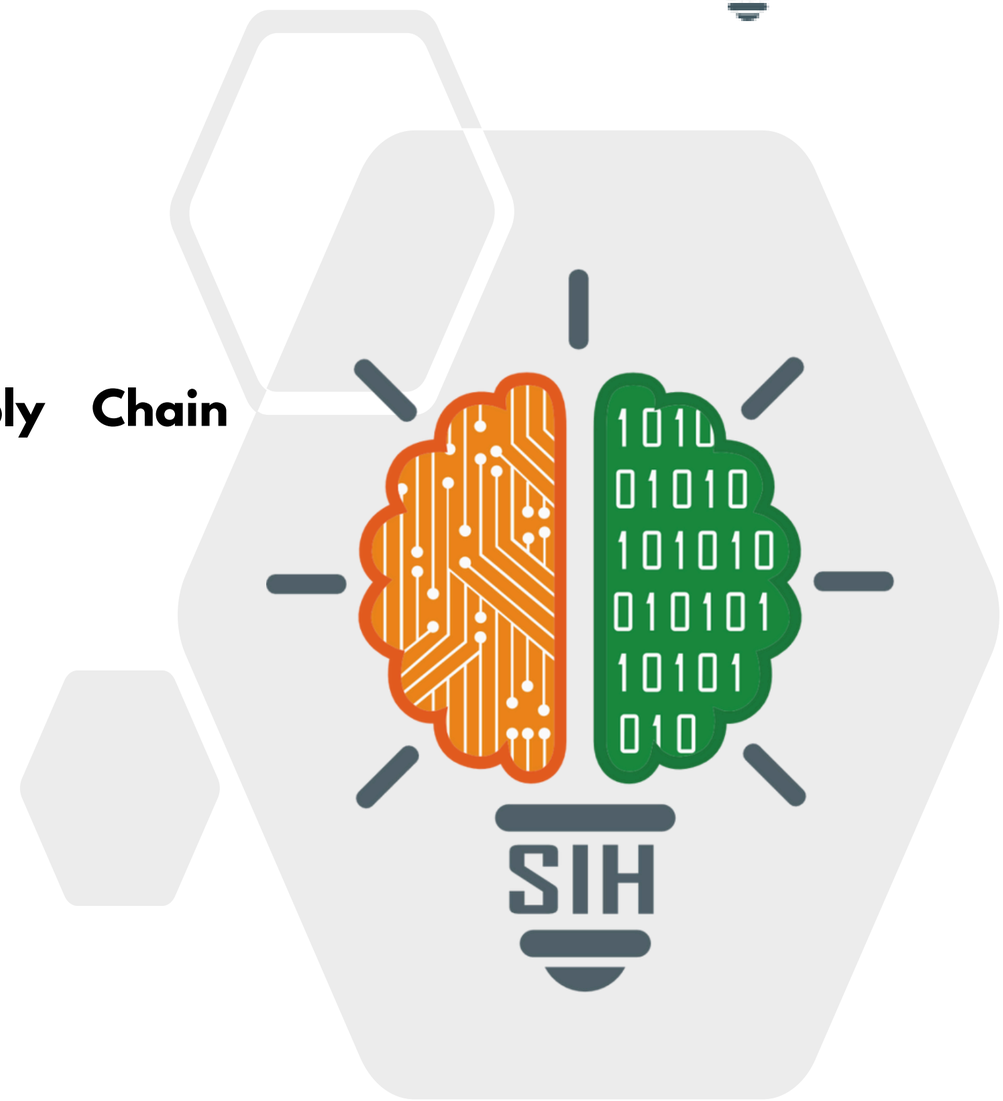
SMART INDIA HACKATHON 2025

SMART INDIA HACKATHON 2025

- **Problem Statement ID** – SIH25045
- **Problem Statement Title** - Blockchain-Based Supply Chain Transparency for Agricultural Produce
- **Theme**- Agriculture, FoodTech & Rural Devlopement
- **PS Category**- Software
- **Team ID**-
- **Team Name -** HASH MAESTROS



HASH MAESTROS

FASALINK: TRANSPARENT FARM-TO-FORK TRACKING

SMART INDIA HACKATHON 2025

- Spike in **exploitation** of the agricultural supply chain **by middlemen**.
- Need to **verify transactions** and ensure transparency in pricing, quality, and origin
- Lack of a **user-friendly** interface for farmers and consumers to **track** produce, lots and transactions

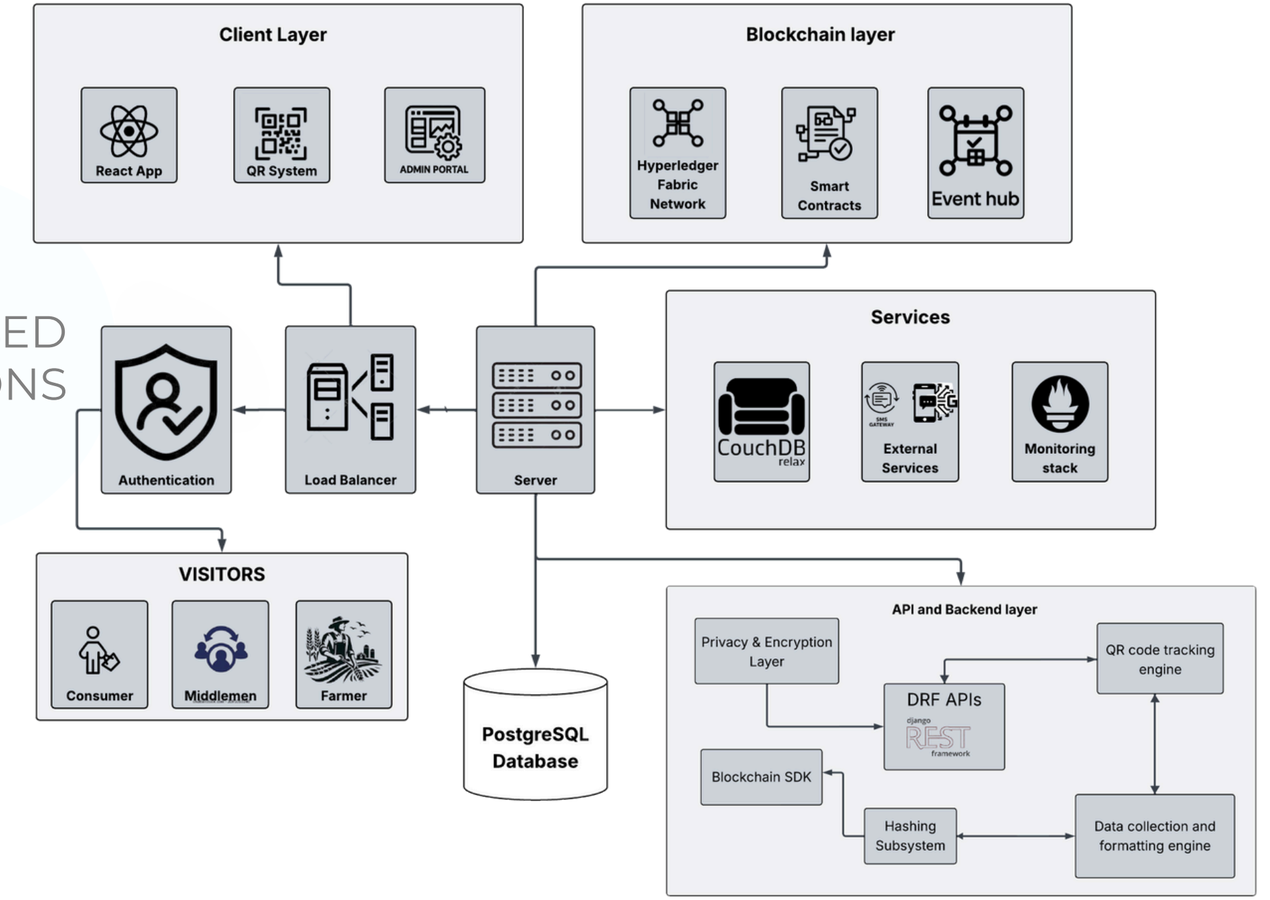
QR code integration - instant product verification and traceability.

Fair and transparent pricing mechanism eliminates middleman exploitation.

Decentralized blockchain platform for total agricultural supply chain transparency.

Multi-stakeholder interface for farmers, distributors and consumers.

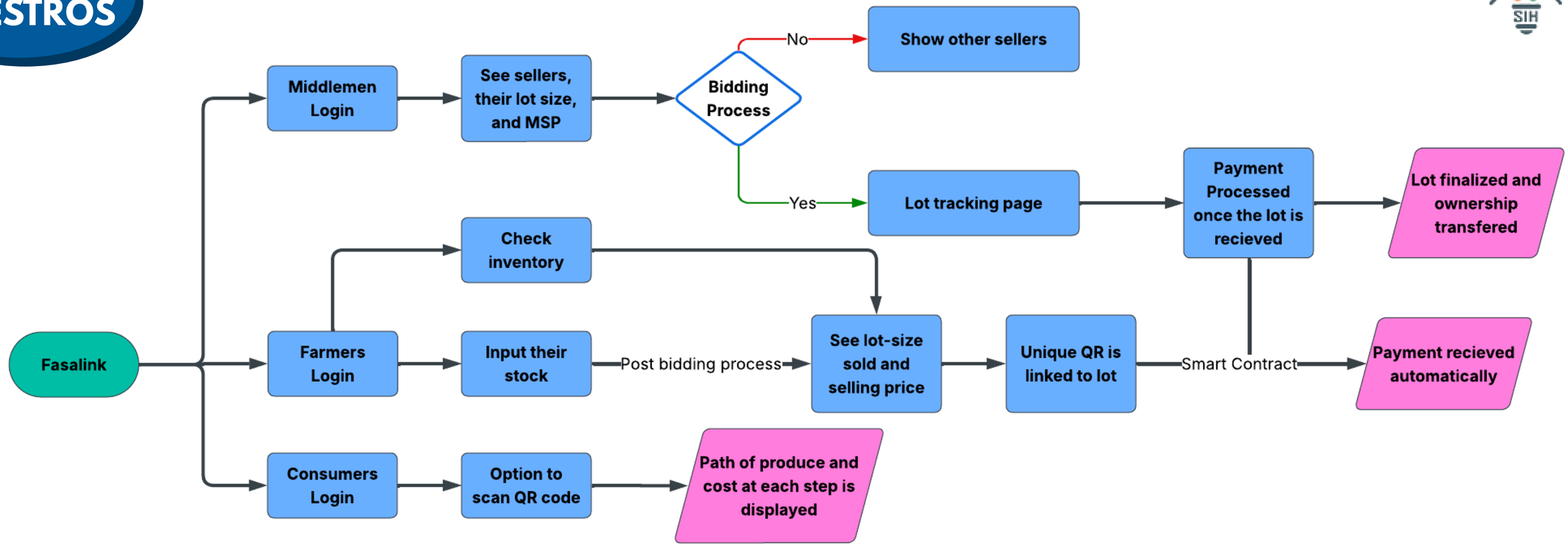
Architecture Diagram



HASH MAESTROS

TECHNICAL APPROACH

SMART INDIA HACKATHON 2025



TECHNOLOGY STACK

Web Development :- React Js, HTML, CSS, Material UI, Django REST framework

APP Development :- React Native, Django rest framework

Blockchain : - Hybrid Hyperledger Fabric Blockchain model

Smart Contracts : - Chaincode(node.js)

Middleware and services : - Restful APIs, QR code Kit, qrcode.js, NGINX

Authentication and Security : - SHA - 256 Hashing, JWT tokens, SSL/TLS encryption

HASH MAESTROS

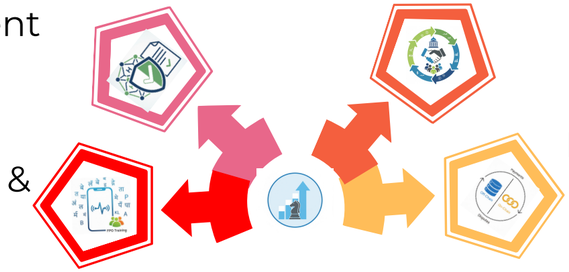
FEASIBILITY AND VIABILITY

SMART INDIA HACKATHON 2025

STRATEGIES FOR OVERCOMING THESE CHALLENGES

Audited Permissioned Fabric & Consent

Offline First Design



Multilingual App & FPO Training

Hybrid Off-Chain DB & On-Chain Contracts

FEASIBILITY

TECHNICAL

Proven blockchain frameworks available Hyperledger

SOCIAL

High smartphone adoption in rural India

REGULATORY

Government support through Digital India initiative

ECONOMIC

Low-cost cloud deployment reducing infrastructure costs

POTENTIAL CHALLENGES AND RISKS

Track Record

Many global blockchain agriculture projects show zero measurable impact

Most of the villages lack internet, unreliable power

Infrastructure & Connectivity Challenge

Digital Literacy & Adoption

Low rural digital literacy

Full blockchain very high cost

Cost Reality

PRIVACY AND SECURITY

Selective Information Sharing & Encryption

Verification and Proof-of-Authenticity

Smart Contract Automation

MSP & APMC Update and Validation

Permissioned Access Control

HASH MAESTROS

IMPACT AND BENEFITS

SMART INDIA HACKATHON 2025

FARMERS

- **Direct Price Access:** Eliminates middlemen exploitation, farmers receive fair market prices.
- **Reduced Financial Losses:** Smart contracts automate payments and reduce fraud
- **Quality Premium Recognition:** Blockchain verification of organic certifications helps farmers command higher prices.
- **Trust Building with Buyers:** Immutable production records build consumer confidence

DISTRIBUTORS

- **Real-Time Inventory Visibility:** Live tracking of stock levels, preventing shortages and overstock.
- **Transparent Pricing Audit:** Ensures price changes logged on-chain, deterring unfair markups and building trust.
- **Supplier Performance Insights:** Aggregates transactional data for performance analytics, improving partner selection and negotiating leverage.
- **Enhanced Traceability Reporting:** Supplies clear origin and transit records, simplifying compliance and recall management.

CONSUMERS

- **Fair Pricing Assurance:** Access transparent pricing history and guaranteeing equitable consumer rates.
- **Fraud Prevention:** Eliminate counterfeit goods through immutable transaction records, ensuring genuine agricultural .
- **Enhanced Trust:** Engage confidently with agricultural brands backed by verifiable blockchain records, fostering loyal consumer relationships.
- **Real-Time Traceability:** Instantly verify produce's farm origin via QR code, ensuring authentic supply-chain visibility.

HASH MAESTROS

RESEARCH AND REFERENCES

SMART INDIA HACKATHON 2025

BLOCKCHAIN

- https://www.denso.com/global/en/driven-base/tech-design/blockchain_2/
- https://hyperledger-fabric.readthedocs.io/en/release-2.5/deployment_guide_overview.html
- https://hyperledger-fabric.readthedocs.io/en/release-2.5/ops_guide.html

SMART CONTRACTS

- https://www.sciencedirect.com/science/article/pii/S092658052200293X
- https://hyperledger-fabric.readthedocs.io/en/release-1.3/chaincode.html
- https://hyperledger-fabric.readthedocs.io/en/release-2.2/developapps/smartcontract.html
- https://www.mdpi.com/2079-9292/12/6/1340

QR Code Integration

- https://qrcodekit.com/news/qr-codes-and-blockchain-technology/
- https://www.sciencedirect.com/science/article/pii/S2352146523004519

SUPPLY CHAIN

- https://annas-archive.org/md5/cbf2c614ca2427a4a36a65a2abfa266f

DATA

- https://enam.gov.in/web/stakeholders-Involved/Apmcs
- https://enam.gov.in/web/dashboard/trade-data
- https://desagri.gov.in/wp-content/uploads/2025/08/MSP-Statement_English.pdf
- https://www.ideasforindia.in/topics/agriculture/middleman-margins-and-market-structure-in-west-bengal-potato-supply-chains.html

HASH

- https://www.ssldragon.com/blog/sha-256-algorithm/
- https://www.ssl2buy.com/wiki/sha-256-algorithm