

CODEZEN 2026

Project Title : Catalyst

Team Name : catalyst

Team Members : Shubham Mishra (Team Lead, Full-stack Developer)

Harshit Bhardwaj (Frontend Developer - Web & Mobile)

Aditya Srivastava (Backend Developer)

Rudra Kumar (Frontend Developer - UI / UX)

Tracks Chosen : Open Innovation

PROBLEM STATEMENT & TARGET AUDIENCE

Problem We're Solving

- Long billing queues during peak hours in supermarkets
- Slow, counter-based barcode scanning and manual billing
- Customer frustration and poor shopping experience
- Billing staff overloaded during rush hours
- High cost of checkout counters, hardware, and manpower
- Inefficient checkout flow despite existing infrastructure

Target Users

Primary Users (B2C) :

- Shoppers aged **16+** comfortable using smartphones
- Students, working professionals, and daily shoppers
- Users familiar with QR scanning and digital payments
- Customers who prefer fast, self-service shopping

Secondary Users (B2B) :

- Supermarkets and retail owners seeking to reduce checkout congestion and improve customer flow without extra hardware or staff.

OUR UNIQUE SOLUTION

Key Features

- **Mobile Scan & Go Checkout** — self-checkout without queues
- **QR-Based Store Session** — secure store-linked shopping session
- **Smart Scan Overlay** — price and offers shown during scanning
- **Dietary-Aware Insights** — allergen and calorie info on scan screen
- **UPI-First Payments** — fast checkout via any UPI app
- **Behavior-Based Flagging** — unusual scan patterns flagged internally
- **Random Exit Audits** — occasional re-scan to prevent misuse

Why It's Different

- **Existing Scan & Go focuses only on billing** — we assist decisions during scanning
- **Existing systems rely on hardware/surveillance** — we use behavior tracking & audits
- **Existing self-checkout ignores store engagement** — we show in-app store offers
- **Static checkout process** — dynamic QR-based session flow

Novelty Factor :

- Context-aware scan overlay with pre-cart insights
- Behavior-driven theft control with random audits
- In-app store offer visibility during shopping

TECH STACK + ARCHITECTURE

Tech Stack :

Database :

- MySQL — Products, Sessions, Carts, Transactions, Audit Logs

Core Integrations :

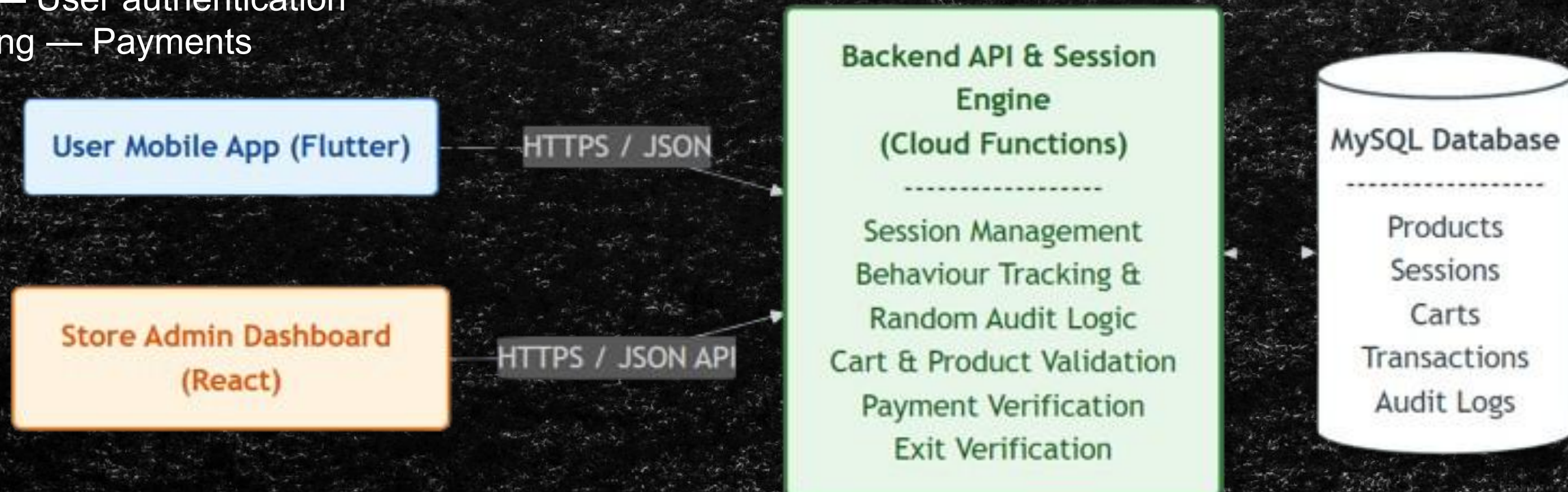
- Google ML Kit — Barcode scanning
- Firebase Auth — User authentication
- UPI Deep Linking — Payments

Frontend:

- Flutter — User Mobile App
- React — Store Admin Dashboard

Backend :

- Google Cloud Functions — API & Session Engine
- REST APIs (HTTPS/JSON)



FEASIBILITY AND SHOWSTOPPERS

Feasibility :

- Pure software solution — no sensors, cameras, or store redesign needed
- Uses existing infrastructure: smartphones, barcodes, QR, UPI
- Modular flow: Session → Scan → Pay → Exit built independently
- Backend-driven logic for session control and behaviour tracking
- MVP demo possible with mock data and controlled exit flow within hackathon time

Showstoppers :

❖ Risks :

- Product mismatch cannot be fully eliminated in self-checkout
- Behavior-based flagging may create occasional false positives
- First-time users may need guidance for Scan & Go flow

❖ Mitigation :

- Combine behavior tracking with random exit audits
- Keep human-in-the-loop for final verification
- Apply lightweight checks only when required to avoid slowing honest users

USP & BUSINESS MODEL

USP

- Scan & Go with real-time product insights, not just billing
- Behavior-driven theft control without surveillance or hardware
- QR-based secure store sessions for controlled checkout flow
- Random exit audits to discourage misuse without affecting all users
- In-app store offer visibility during shopping

Business Model

- **Store Subscription (B2B)** : Retail stores pay a monthly/yearly fee to use the Scan & Go system, admin dashboard, and theft management features.
- **In-App Store Promotion & Offer Visibility** : Subscription enables stores to promote products, offers, and send relevant notifications to users during shopping.
- **Advanced Analytics (Premium Plan)** : Stores can access customer flow insights, scan behavior trends, and product interest analytics, etc.
- **Enterprise Licensing for Retail Chains** : Multi-branch retail chains subscribe to a centralized system for managing all outlets.