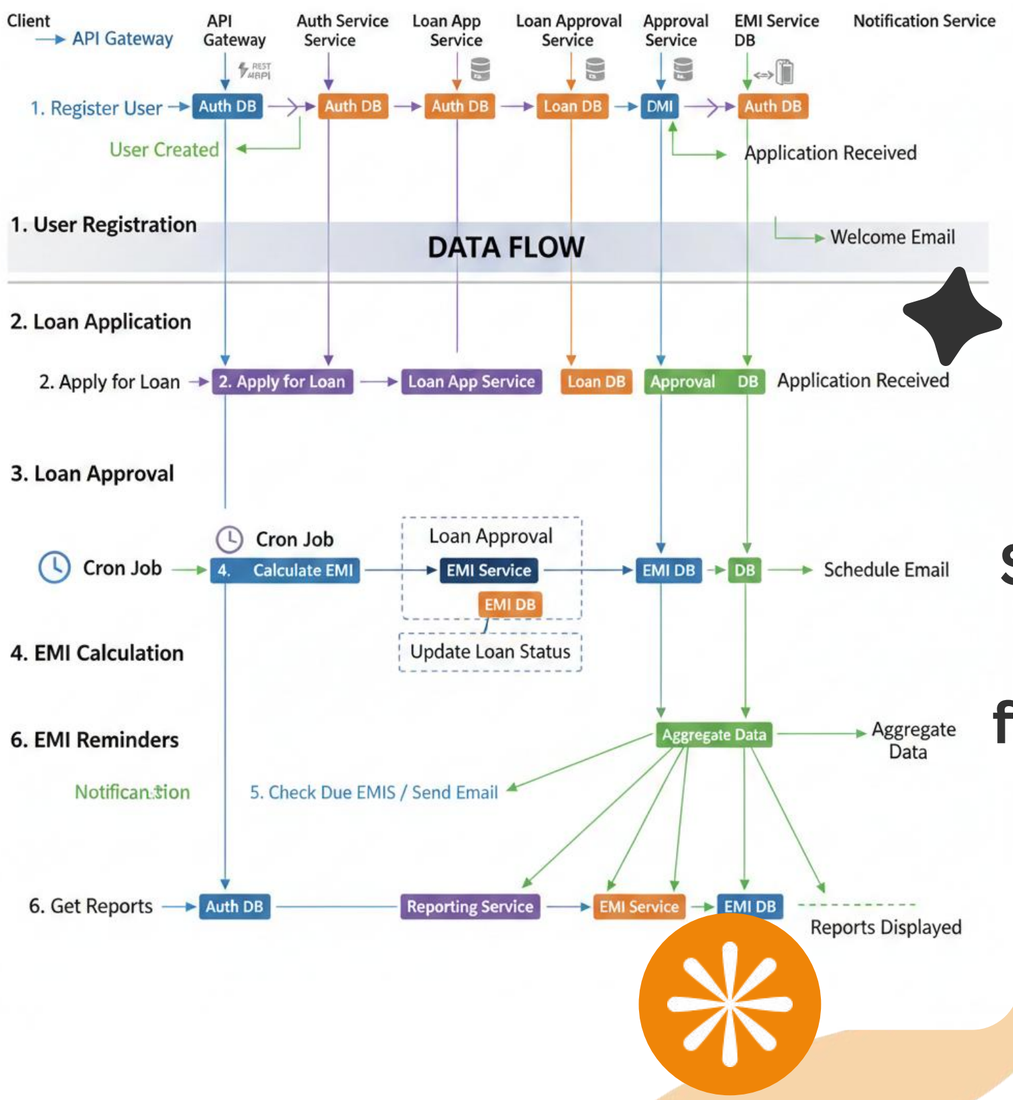
Loan Management System

Riddhima Bhanja
Kalinga Institute of Industrial Technology

March 24, 2036

Problem Statement

Banks and financial institutions manage multiple loan products but rely on manual or semi-automated systems. These systems cause delays, lack transparency, weak tracking of EMIs, limited reporting, and security risks for sensitive financial data. There is a need for a modern, secure, and scalable digital solution to manage the complete loan lifecycle efficiently.

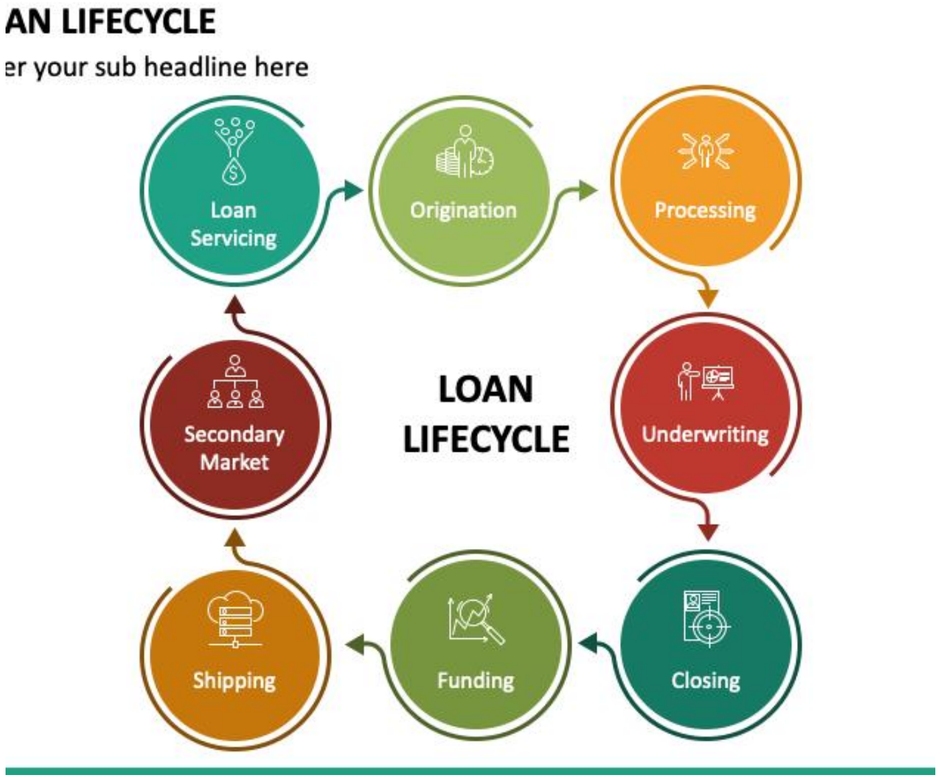


Business Objective

he objective of this project is to design a secure, scalable, and cloud-ready Loan Management System that digitizes the complete loan lifecycle—from application to closure. The system ensures faster processing, transparent approvals, accurate EMI tracking, secure data handling, and real-time reporting through an API-driven architecture

High-level Features

Multi-role system: Admin, Loan Officer, Customer
Online loan application and tracking
Configurable loan types, interest rates, and tenures
Automated EMI calculation and repayment tracking
Secure JWT-based authentication and RBAC
Real-time dashboards and reports

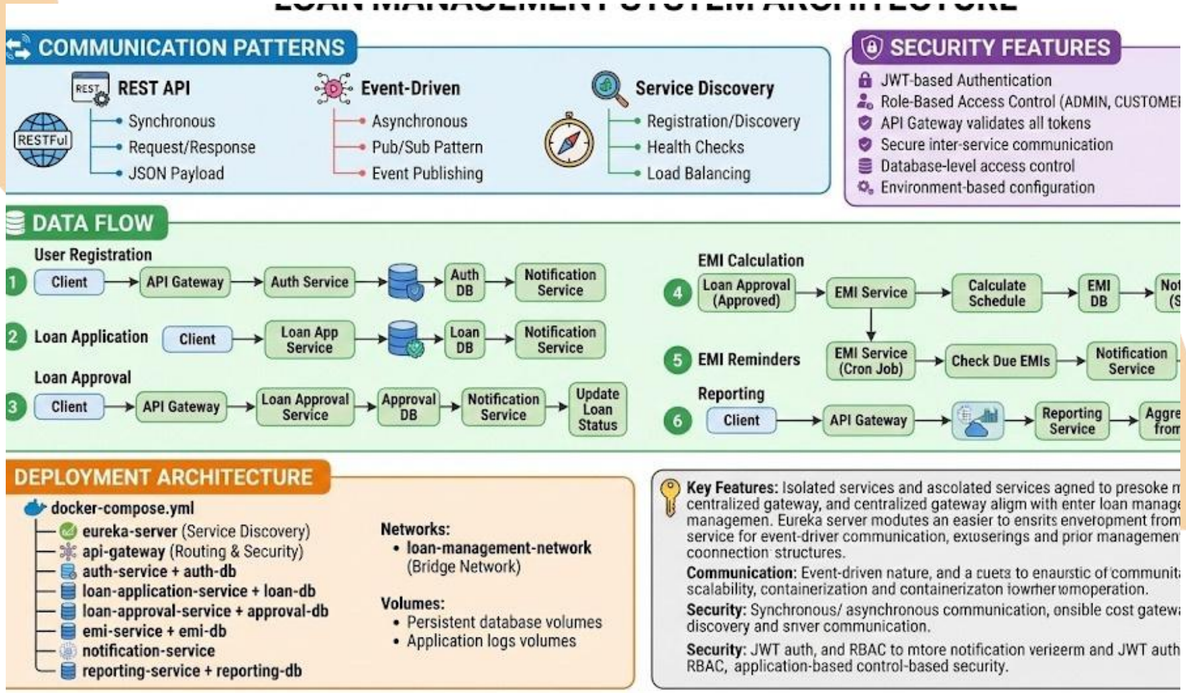


Borcelle

users	roles
Admin	• Manage users, roles, loan types, interest rates
Loan Officer	• Review applications • Approve or reject loans • Generate repayment schedules
Customer	• Apply for loans • Track loan status and EMIs

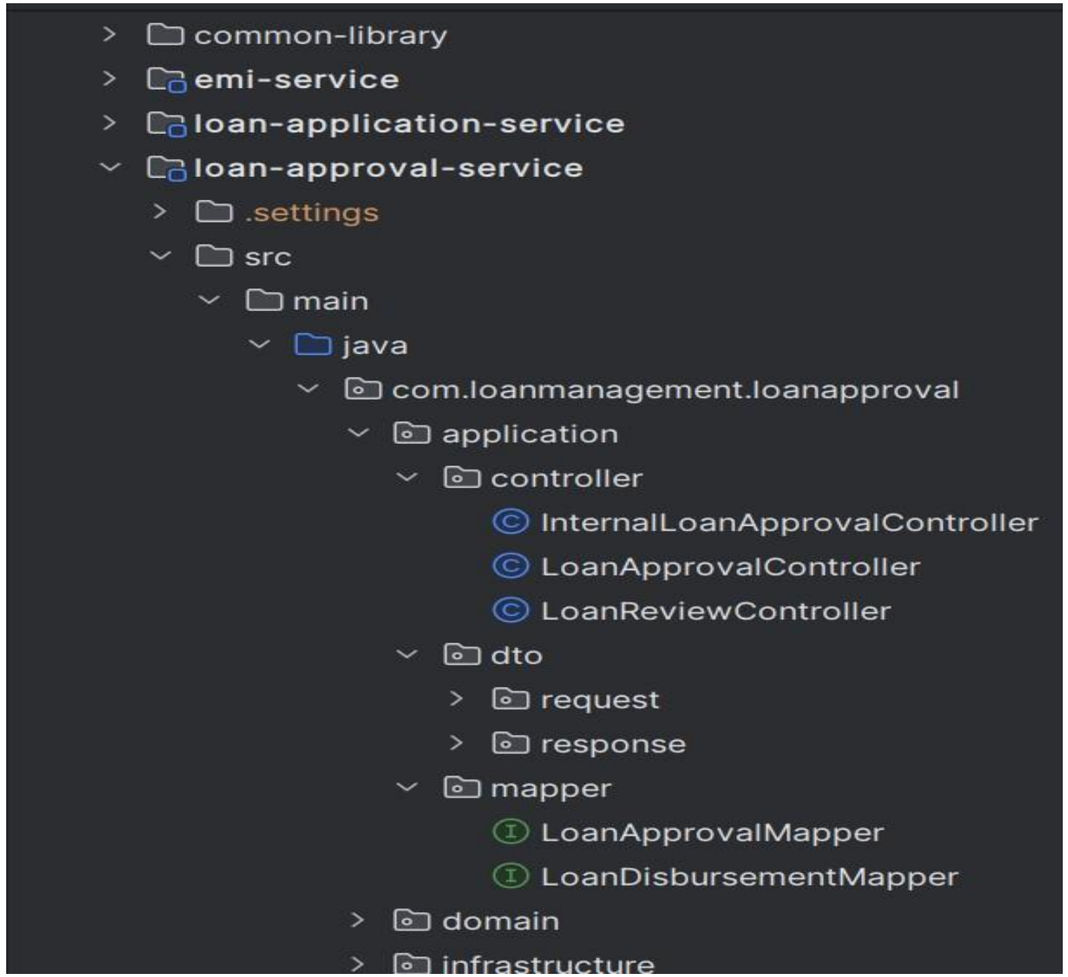
System Architecture

The application follows a layered, modular, full-stack architecture with a secure REST-based backend and a responsive frontend. Business logic is isolated in services, APIs expose data securely, and JWT ensures authentication and authorization.



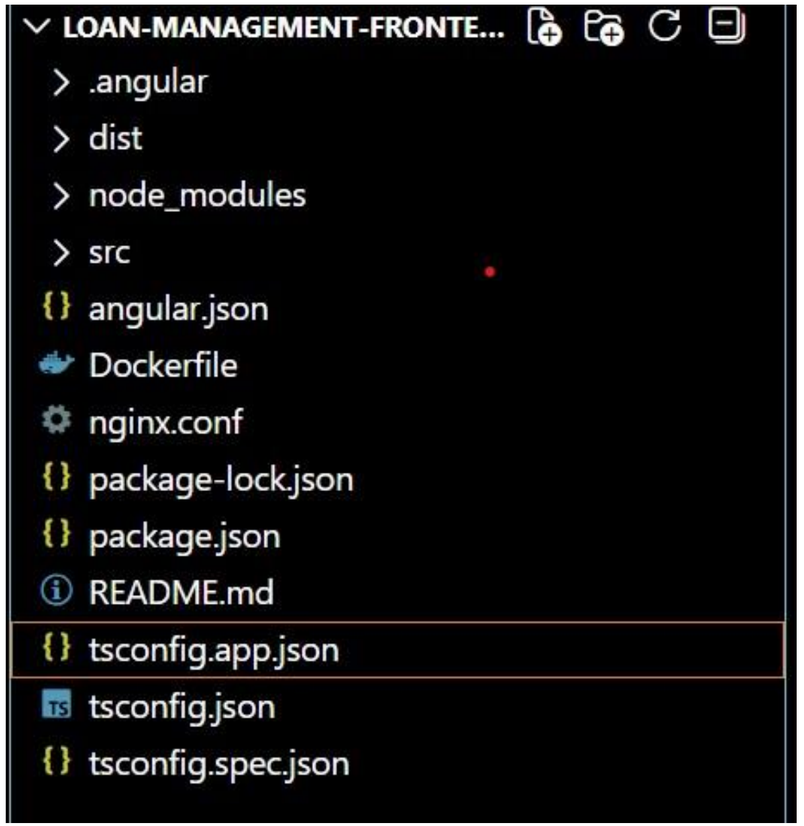
Backend Architecture

- Layered Architecture:
- Controllers
- Services
- Repositories
- DTOs / Entities
- Spring Boot REST APIs
- Centralized exception handling
- JWT-based security
- Database using JPA & Hibernate



Frontend Architecture

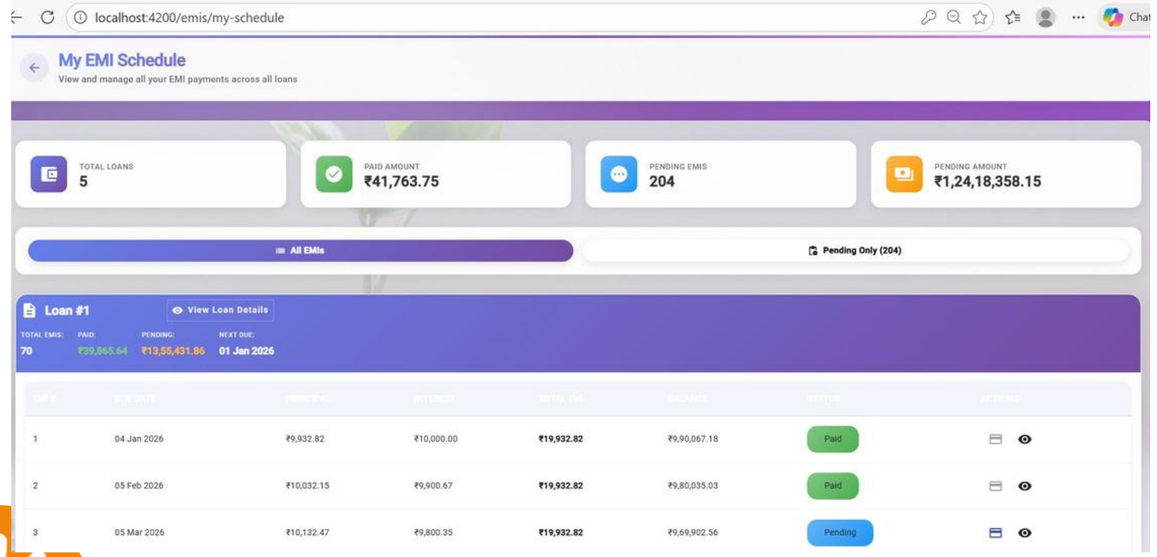
- Modular Angular architecture
- Feature-based modules
- Reactive / Template-Driven forms
- JWT Interceptors & Route Guards
- Responsive UI using Angular Material / Bootstrap



March 24, 2036

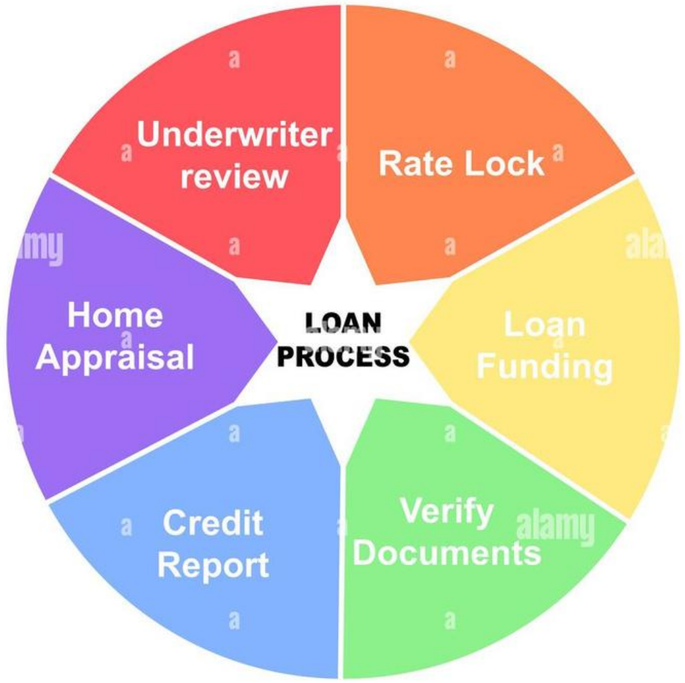
Core Modules

- User & Security Management
- Loan Aplication Management
- Loan Approval & Processing
- EMI & Repayment Tracking
- Reports & Dashboards
- Notifications



Borcelle

Loan Lifecycle Workflow

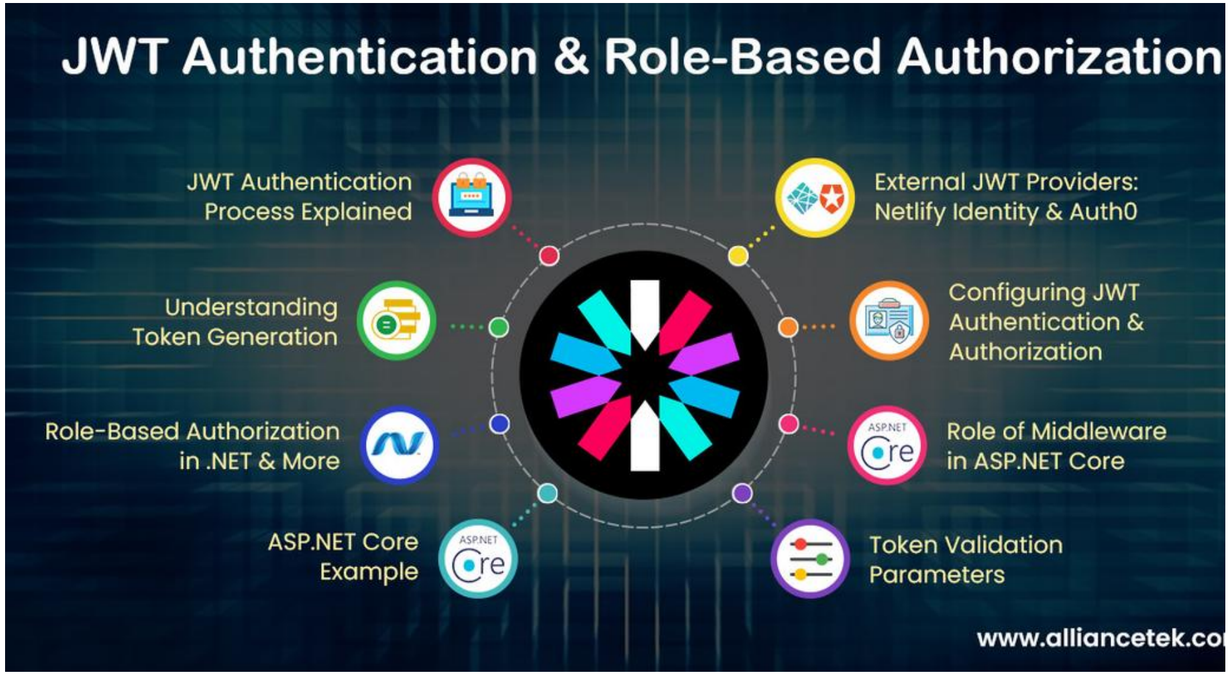


Applied → Under Review → Approved → Rejected → Closed

The system ensures transparent workflow transitions, auditability, and accurate state management at each stage.

Security Implementation

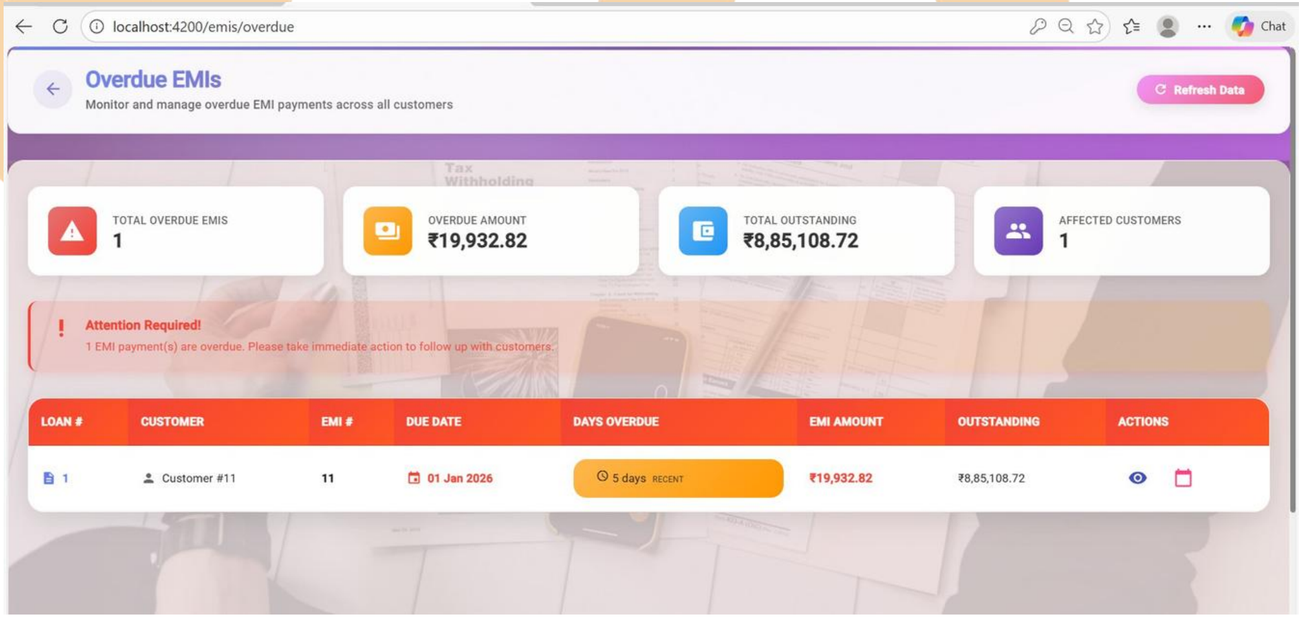
- JWT-based authentication
- Role-Based Access Control (RBAC)
- Password hashing & validation
- Secure REST endpoints
- Authorization at API level



March 24, 2036

Reporting & Dashboards

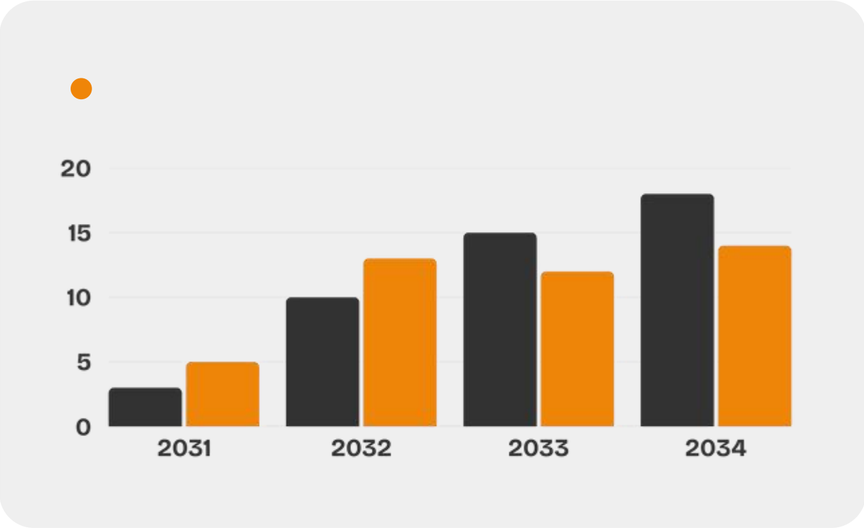
- Loan status reports
- Active vs closed loans
- EMI overdue reports
- Customer-wise loan summaries



March 24, 2036

Testing Strategy

- Unit testing using JUnit 5 & Mockito
- API testing using Postman
- Validation & error handling test cases
- Environment-based configuration



Borcelle

users	roles
backend	• Java 17, Spring Boot, JPA, Hibernate, JWT, MySQL/PostgreSQL
frontend	• Angular, TypeScript, Angular Material
tools	• Postman, Git, GitHub, Maven

March 24, 2036

Conclusion

The Loan Management System successfully demonstrates a real-world, enterprise-grade full-stack application with secure authentication, clean architecture, modular design, and end-to-end loan lifecycle management. The project is scalable, maintainable, and aligned with industry standards.

Thank You

+123-456-7890