Problem Statement:
5. Loan Management System

LoanSphere

Next-Gen Loan Management System

Secure, Scalable, and Smart Financial Processing

Presented By: Sharanya Velagandula

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Business Context

Banks, NBFCs, and financial institutions manage multiple loan products such as Personal Loans, Home Loans, Vehicle Loans, and Education Loans.

Common Challenges

Manual Processing: Manual or semi-automated loan processing.

Tracking Issues: Difficulty tracking loan status and approvals.

Limited Visibility: Limited visibility into EMI schedules and repayments.

Poor Audit: Poor audit and reporting mechanisms.

Security Risks: Security risks around customer financial data.

The Goal

"To build a Loan Management System that digitizes the complete loan lifecycle - from application to closure."

Project Overview

What it Does

The Loan Management System (LMS) is a robust enterprise-grade web application designed to streamline the entire loan lifecycle. It transforms traditional, paper-heavy lending processes into a seamless digital experience - from initial application to final closure.

High-Level Tech Stack

Frontend: Angular with Angular Material

Backend: ASP.NET Core Web API (.NET 9)

Database: SQL Server with Entity Framework Core

Security: JWT Authentication & Role-Based Access Control

The Solution: LoanSphere

A strictly digital, secure, and role-based lending platform.

Core Pillars

End-to-End Digitization:

Applied -> Under Review ->
Active(Approved)/Rejected -> Closed

Role-Based Access:

Dedicated portals for Admin, Officers, and
Customers.

Smart Intelligence

Real-Time:

Instant notifications and dynamic dashboards.

Secure:

JWT Auth, RBAC, Bcrypt Passsword Hashing.

Detailed Tech Stack & Implementation

FRONT END

Angular (v20+) + Material Design

Reactive Forms (Validation)

Snackbars & Data Pipes

Pagination, Search & Filter

TypeScript Models & Interfaces

BACK END

ASP.NET Core Web API (.NET 9)

EF Core ORM (Code-First)

JWT Auth & Custom Role Logic

LINQ & DTOs (No Entity Exposure)

Repository Pattern / Layered Arch.

Global Exception Middleware

DATABASE & TOOLS

SQL Server Database

Swagger (OpenAPI) & Postman

Git Version Control

Database Seeder (DbInitializer)

Key Features (The "Wow" Factor)

Workflow Engine ⚙️
Enforces strict status transitions (Applied -> Under Review -> Approved(Active)/Rejected - > Closed).

Maker-Checker Principle 🛡️
2-level approval process: Verifier (Officer 1) cannot be Approver (Officer 2).

Smart EMI Engine 💸
Auto-calculates amortization schedules and handles foreclosures.

Financial Tools 🧮
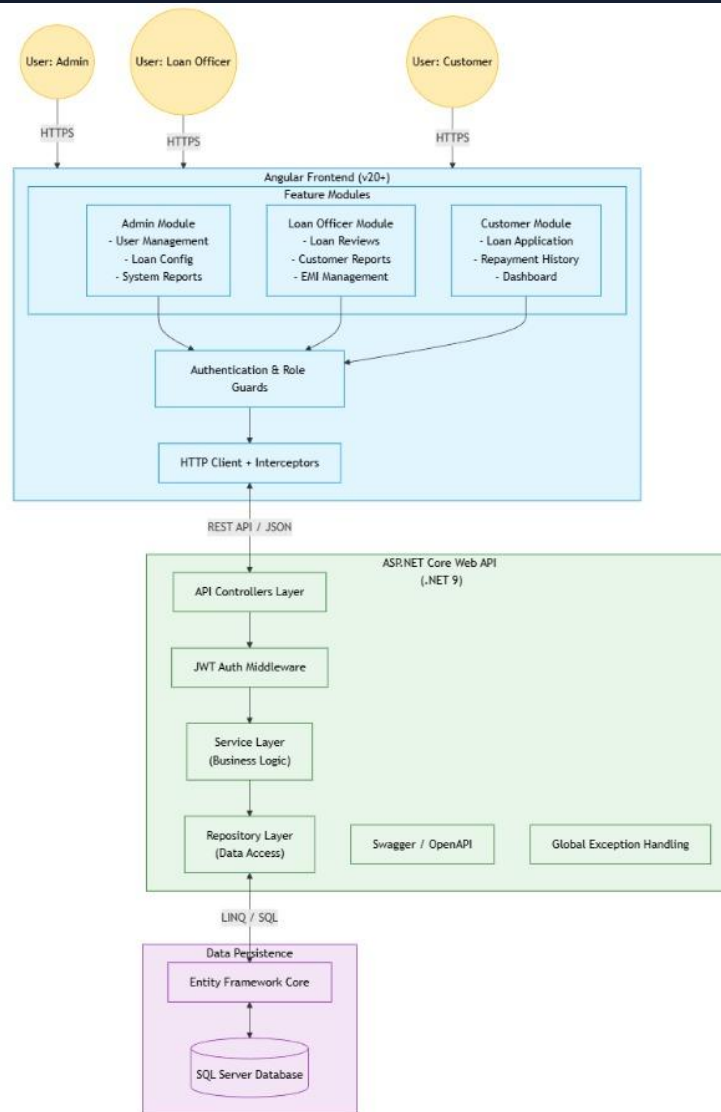Integrated EMI and Foreclosure Calculators for transparency.

Moratorium Support 🎓
Education Loan: Repayment holiday during course + 6-12 months buffer.

Live Notifications 🔔
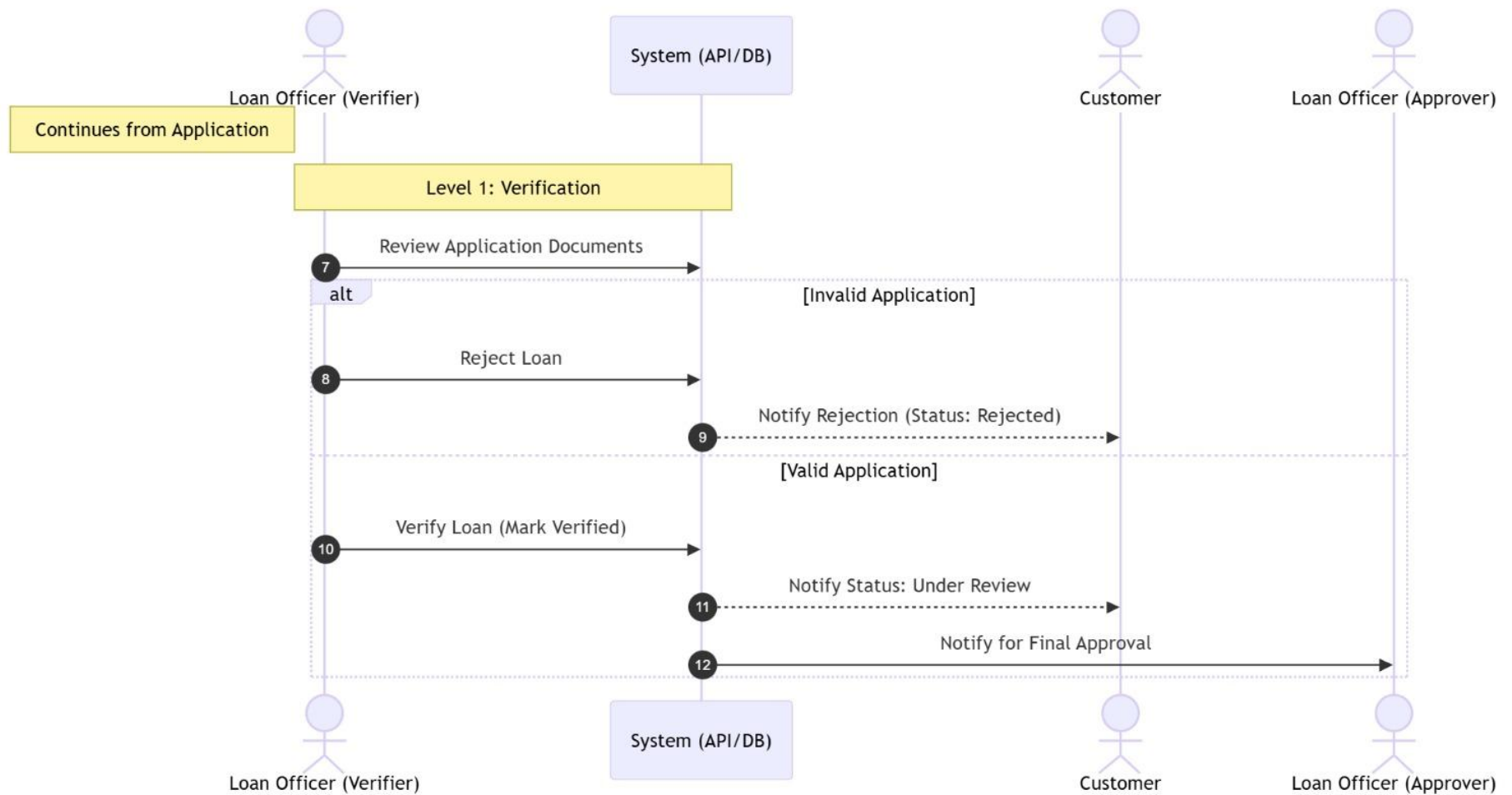Instant alerts for status changes, EMI payments, and doc uploads.

System Architecture

ER Diagram
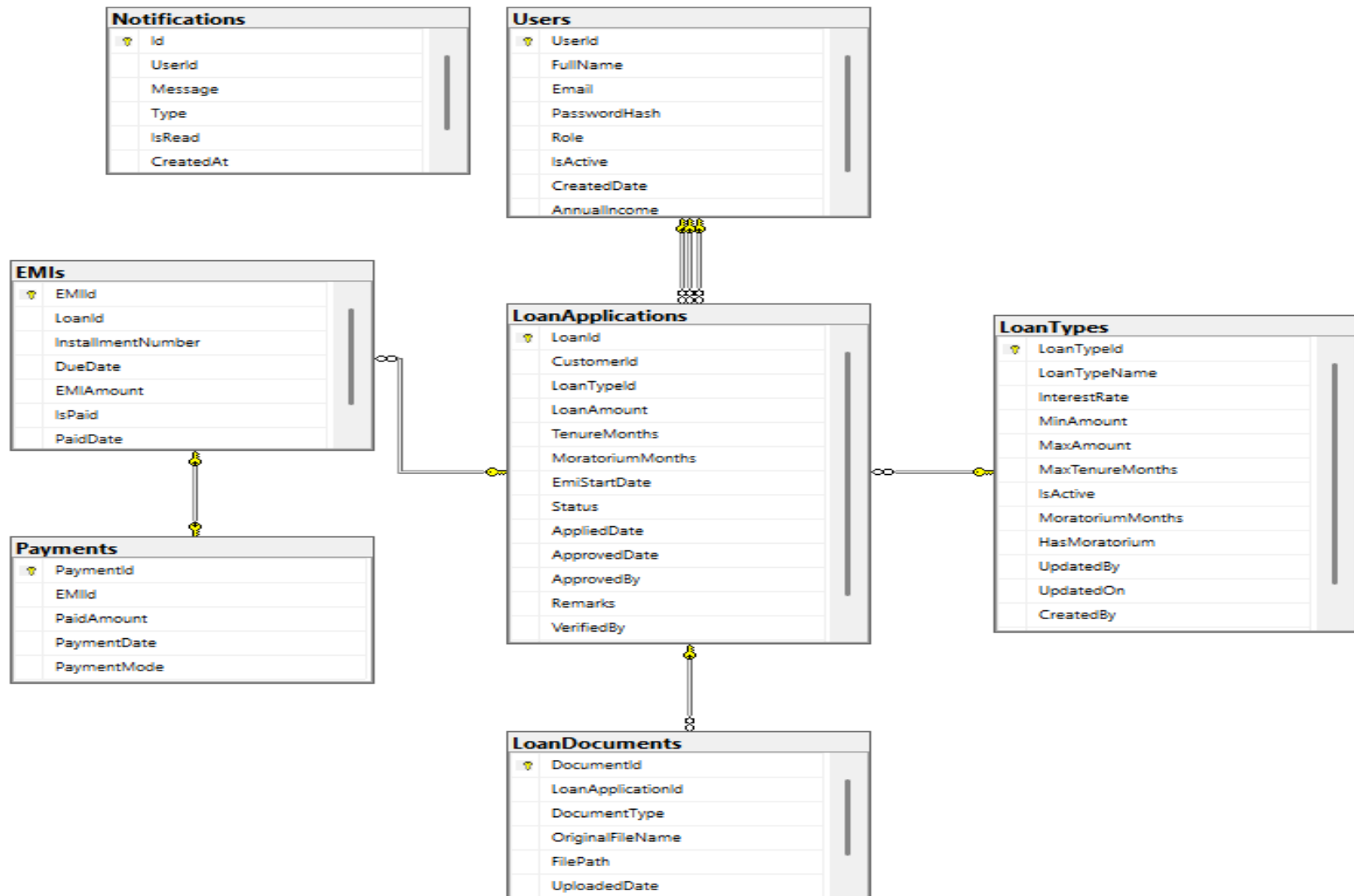
Work Flow
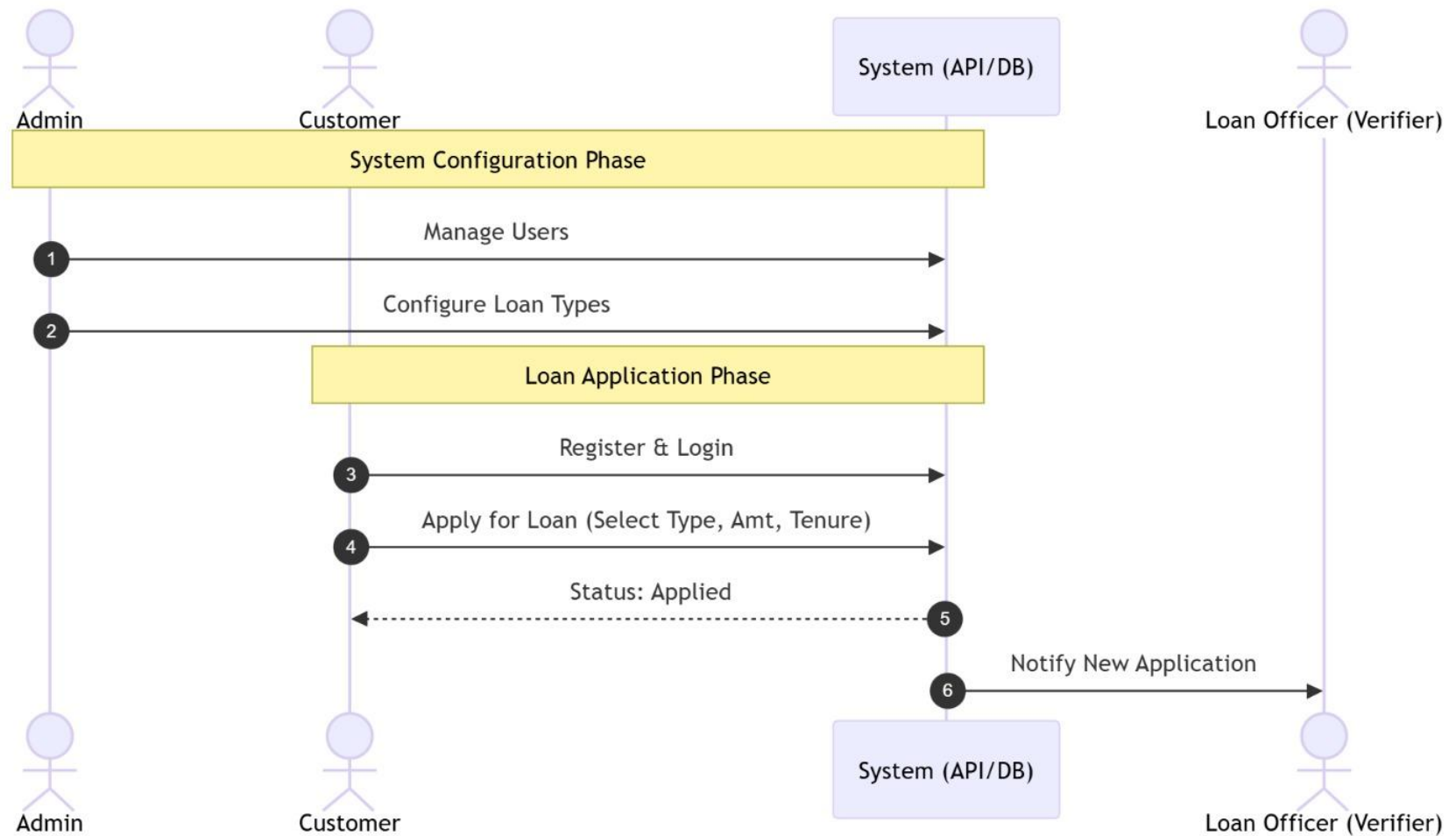
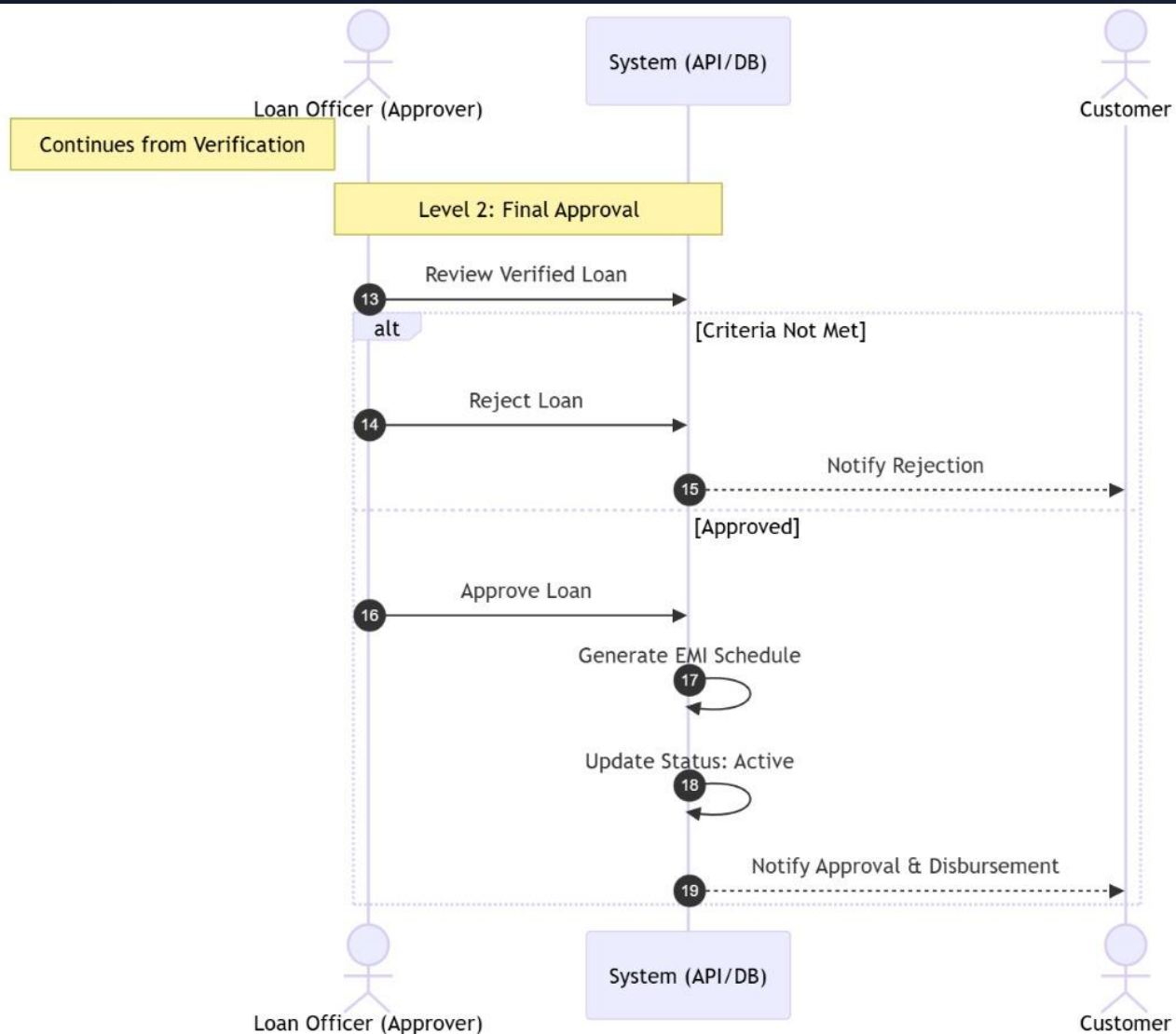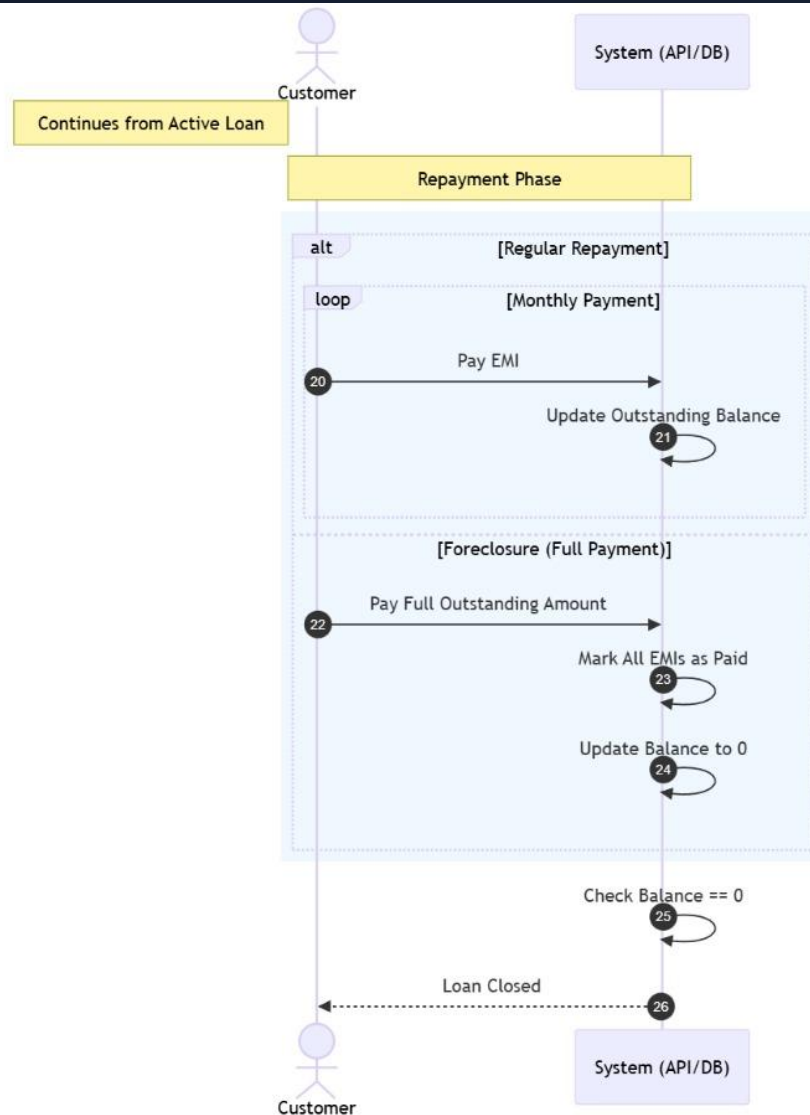# Work Flow

Work Flow

Work Flow

Testing

UI Screens

Home Page

UI Screens

Register as Customer

1 Personal Details —— 2 Financial Details

Full Name*

Email*

Password*

Confirm Password*

Next

Already have an account? Login

Register as Customer

✎ Personal Details —— 2 Financial Details
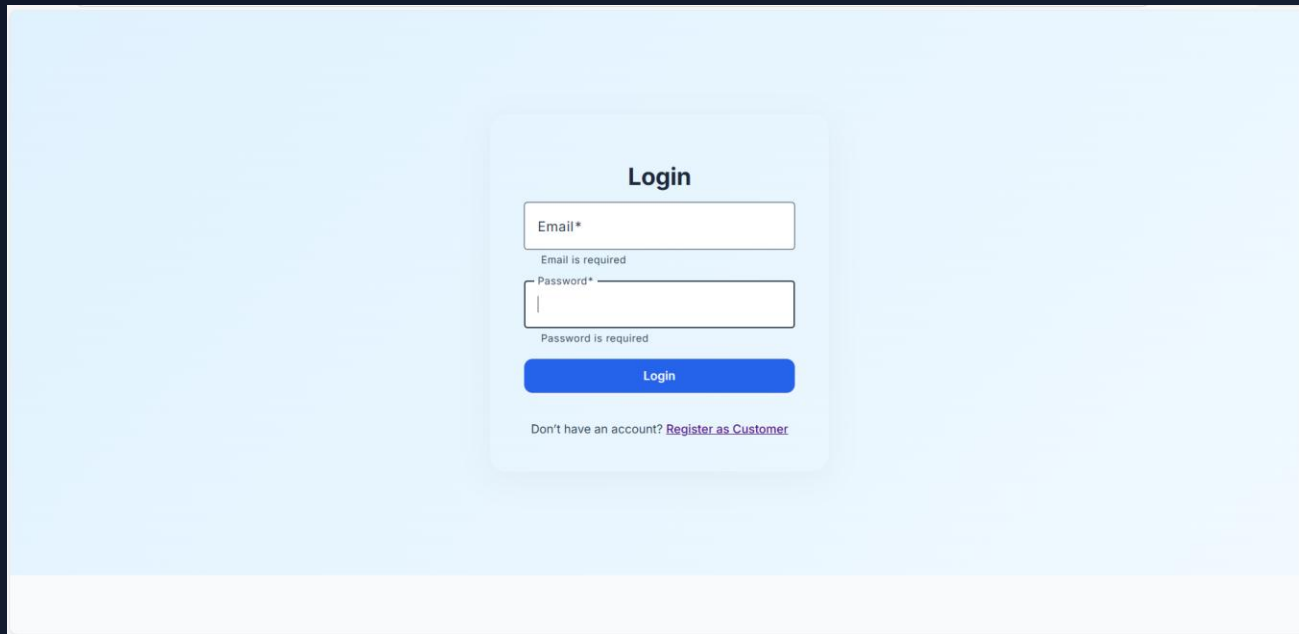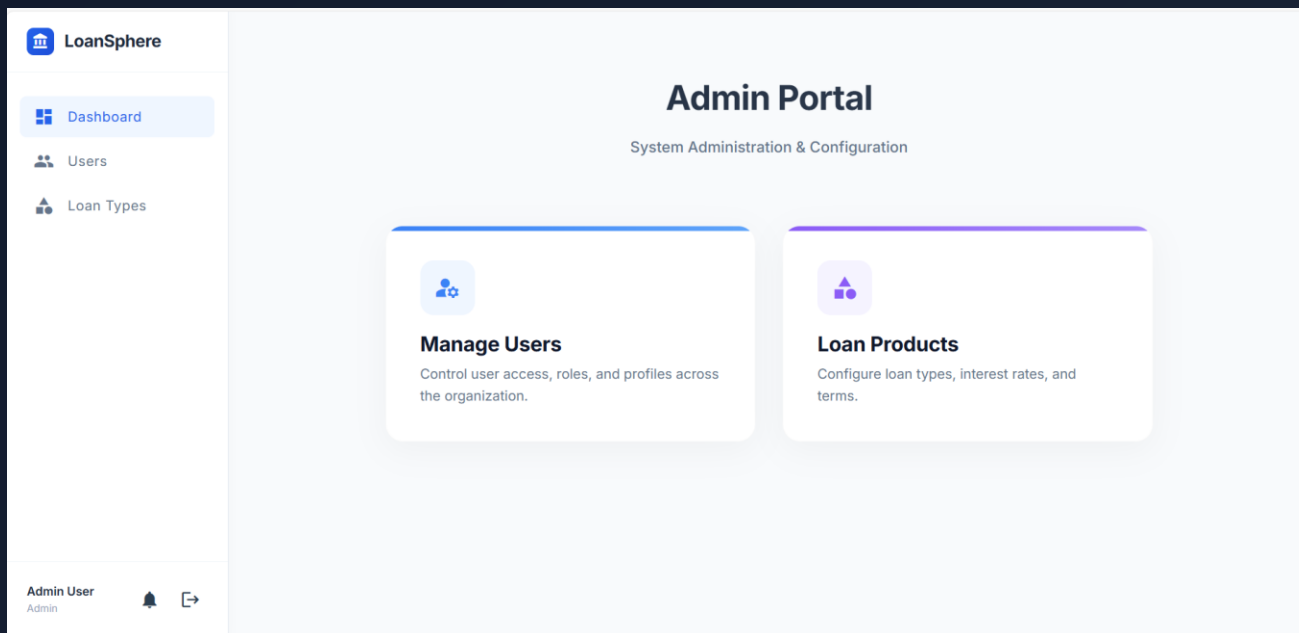
Annual Income (₹)*

Back   Complete Registration

Already have an account? Login

Customer
Registration Page

UI Screens

Login Page

Admin Dashboard

UI Screens

User Management

Loan Types Management

UI Screens

Create User

Full Name*

Ex. John Doe

Email Address*

Role* ▼

Cancel   **Create User**

Create Loan Type

Loan Type Name*

Ex. Personal Loan

Interest Rate (%)*

0

Max Tenure (Months)*

0

Min Amount*

0

Max Amount*

0

⊖ Has Moratorium ✓ Active

Cancel   **Create**

Edit Loan Type

Loan Type Name*

Business Loan

Interest Rate (%)*

8

Max Tenure (Months)*

60

Min Amount*

40000

Max Amount*

800000

⊖ Has Moratorium ✓ Active

Created: 03 Jan 2026

Updated: 04 Jan 2026

Cancel   **Update**

User & Loan Types Management
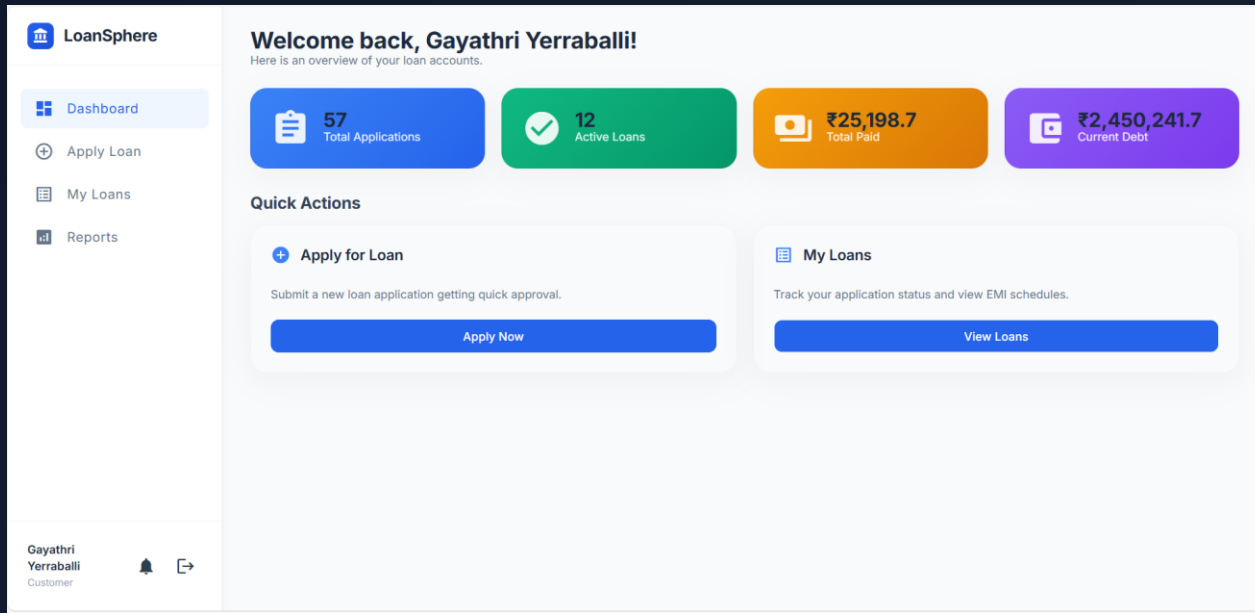
UI Screens

Customer Dashboard
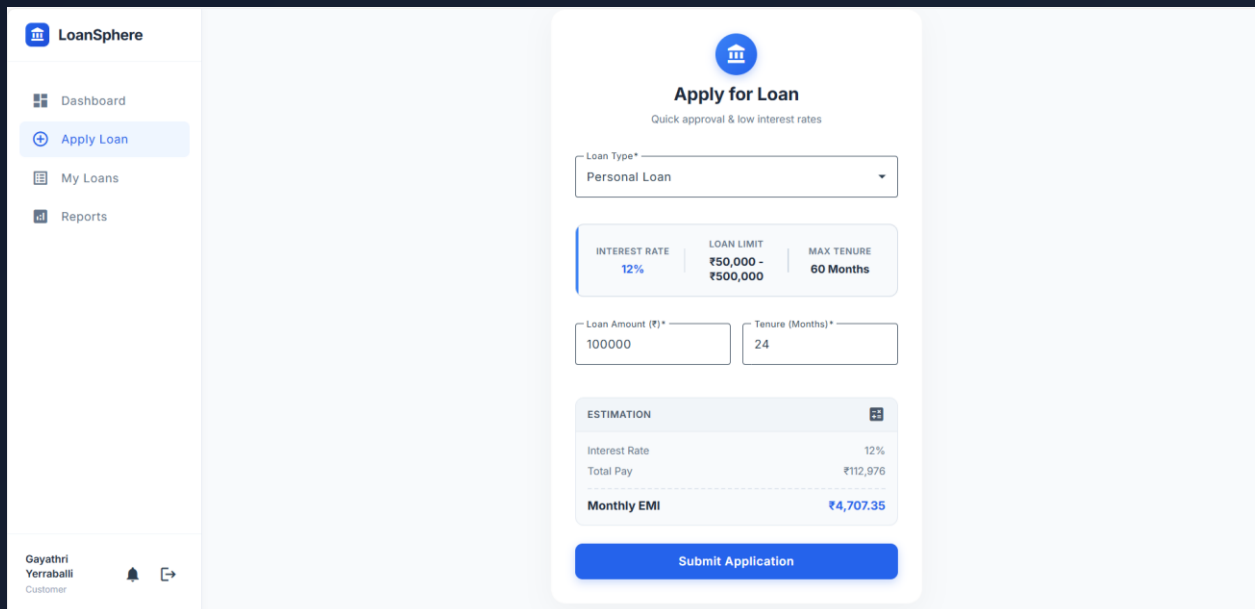
Apply for Loan

UI Screens
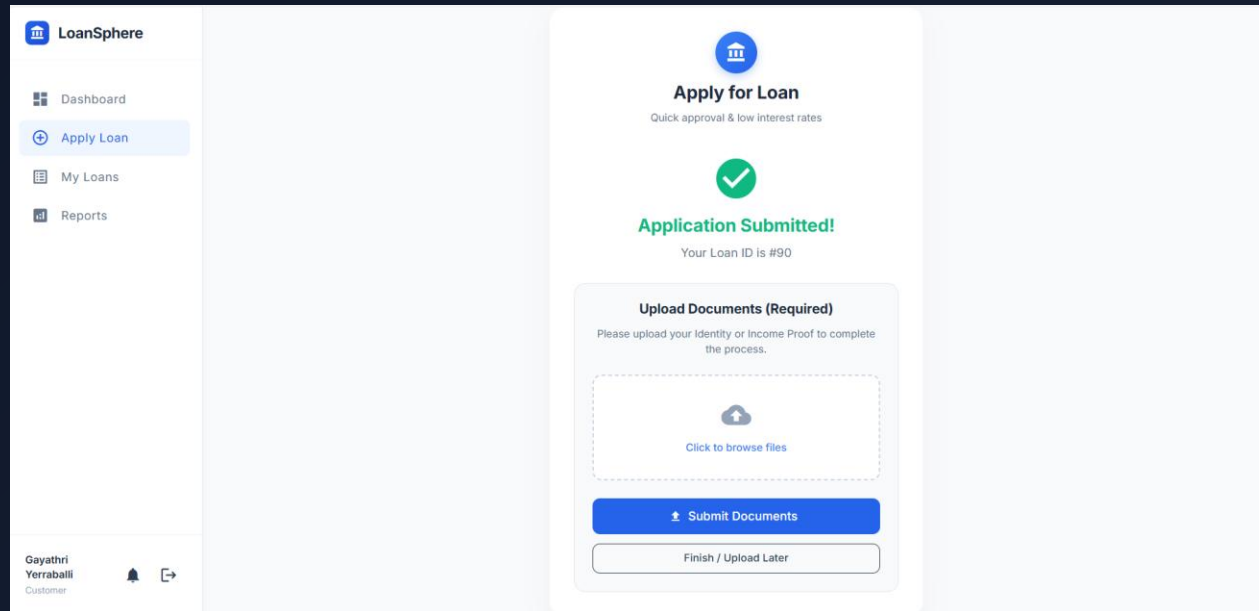
Proof Document Submission
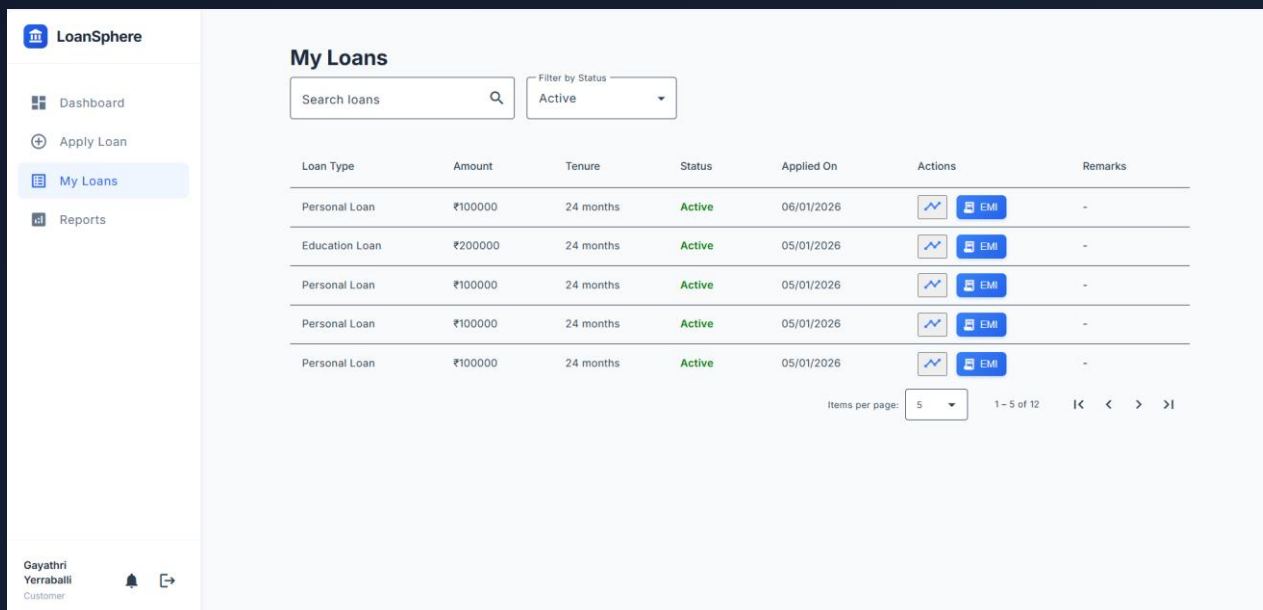
My Loans

UI Screens

Loan Status

#81

Applied
Jan 6, 2026

Under Review
Jan 6, 2026

Active
Jan 6, 2026

Closed
Pending

Close

Pay EMI

EMI AMOUNT DUE
₹4,707.00

Payment Method
UPI / GPay / PhonePe

Amount to Pay
₹ 4707

Cancel   **Pay ₹4,707.00**

Close Loan

OUTSTANDING AMOUNT
₹88,767.00

Payment Method
UPI / GPay / PhonePe

Amount to Pay
₹ 88767

Cancel   **Pay ₹88,767.00**

LoanSphere

- Dashboard
- Apply Loan
- My Loans
- Reports

EMI Schedule
View upcoming payments and track your loan progress

Pay Full Outstanding

EMI Schedule   Payment History

Search schedule...

#	Due Date	Amount	Status	Action
1	06 Feb 2026	₹4,707	UNPAID	Pay Now
2	06 Mar 2026	₹4,707	UNPAID	Pay Now
3	06 Apr 2026	₹4,707	UNPAID	Pay Now
4	06 May 2026	₹4,707	UNPAID	Pay Now
5	06 Jun 2026	₹4,707	UNPAID	Pay Now

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Gayathri
Yerraballi
Customer

Loan Status,
EMI Schedule,
Pay EMI,
Pay Outstanding

UI Screens
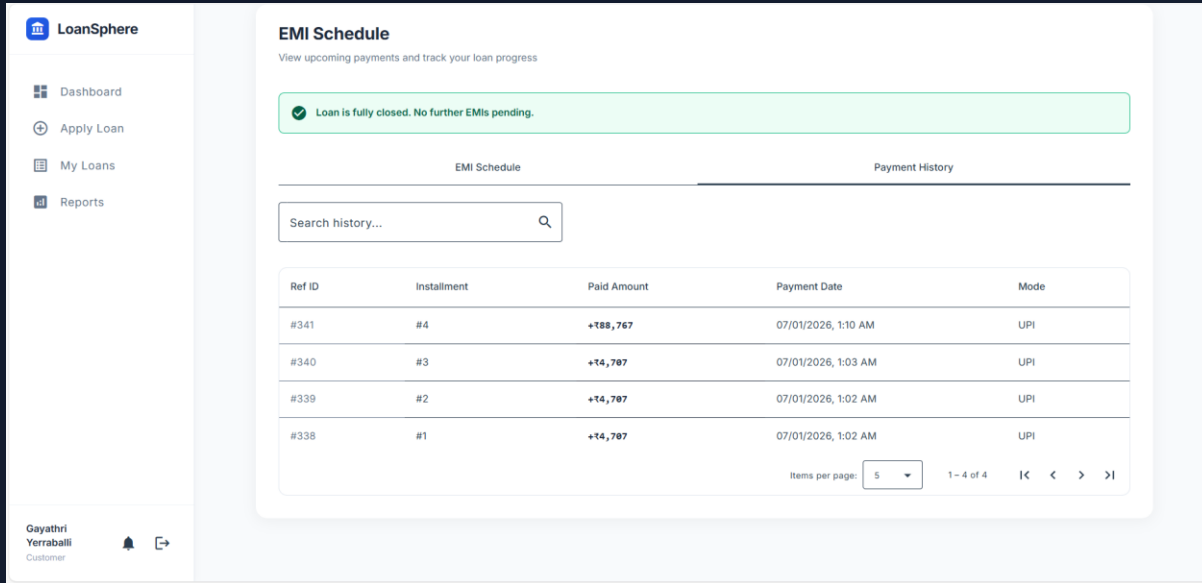
Payment History
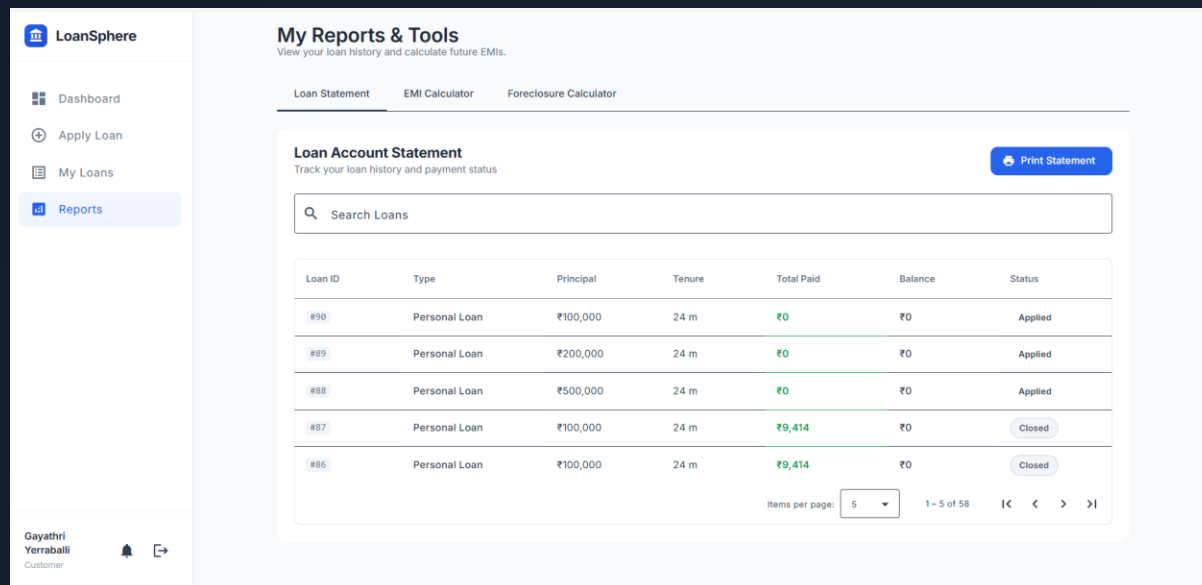
Print Statement

UI Screens
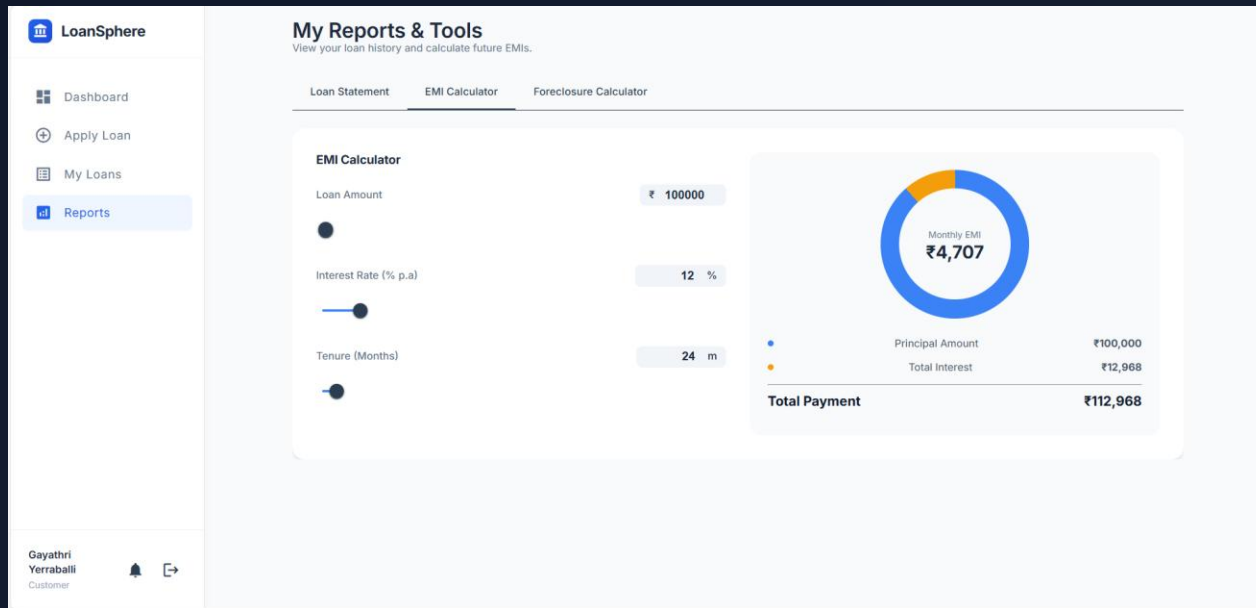
EMI Calculator
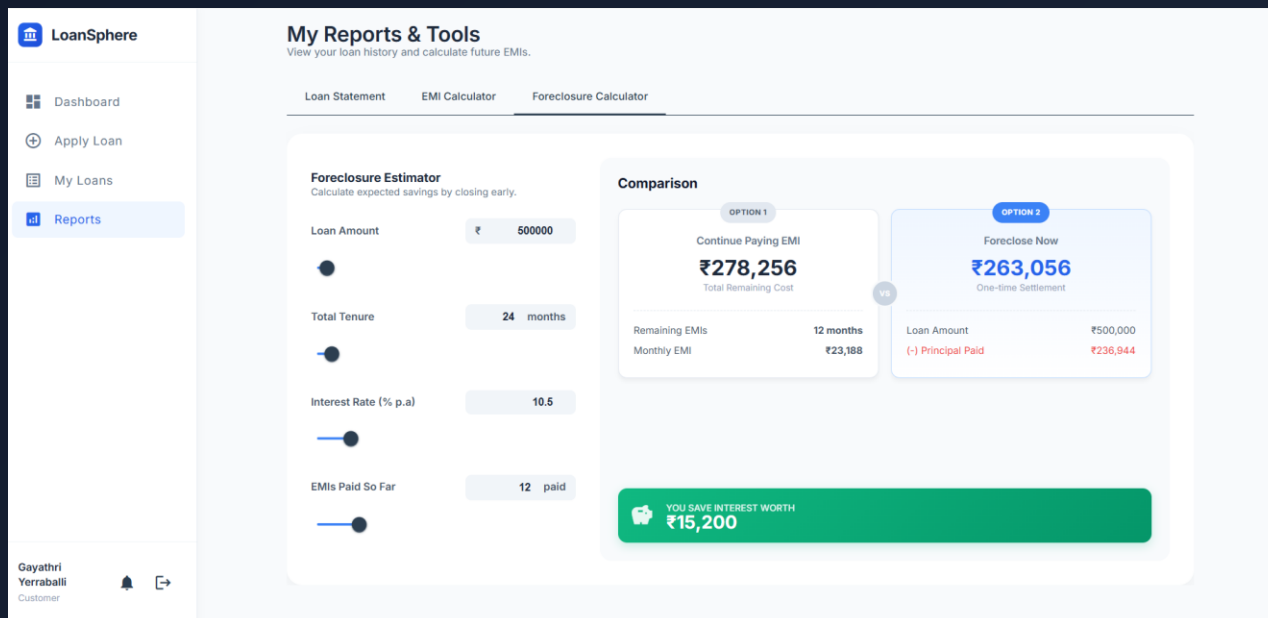
Foreclosure Calculator

UI Screens
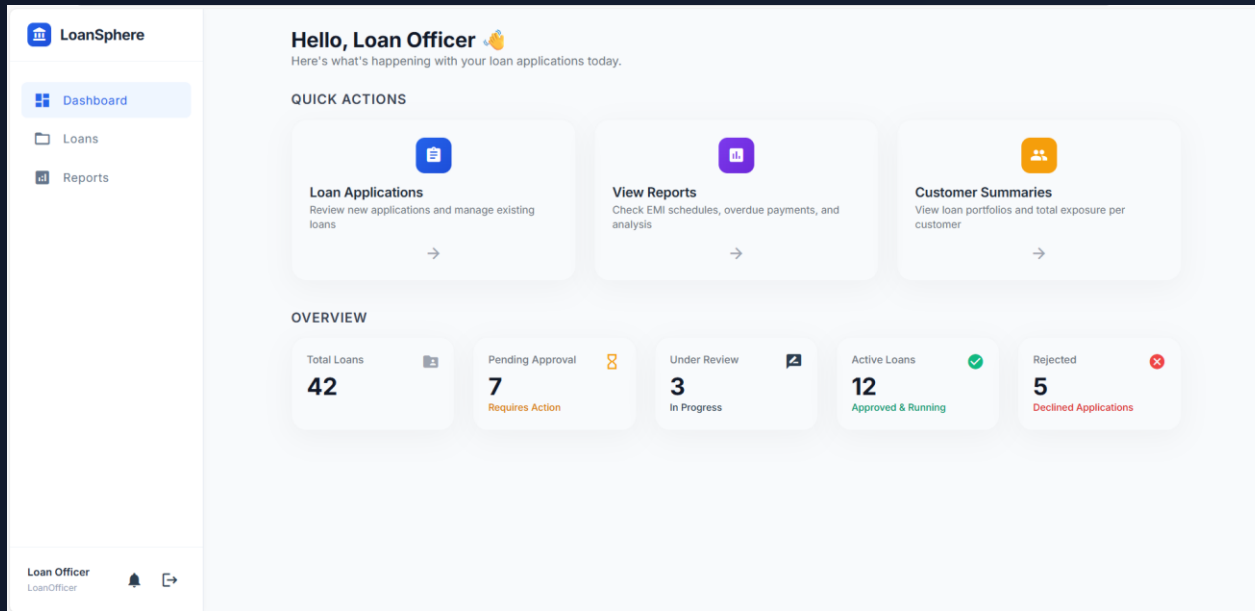
Loan Officer
Dashboard
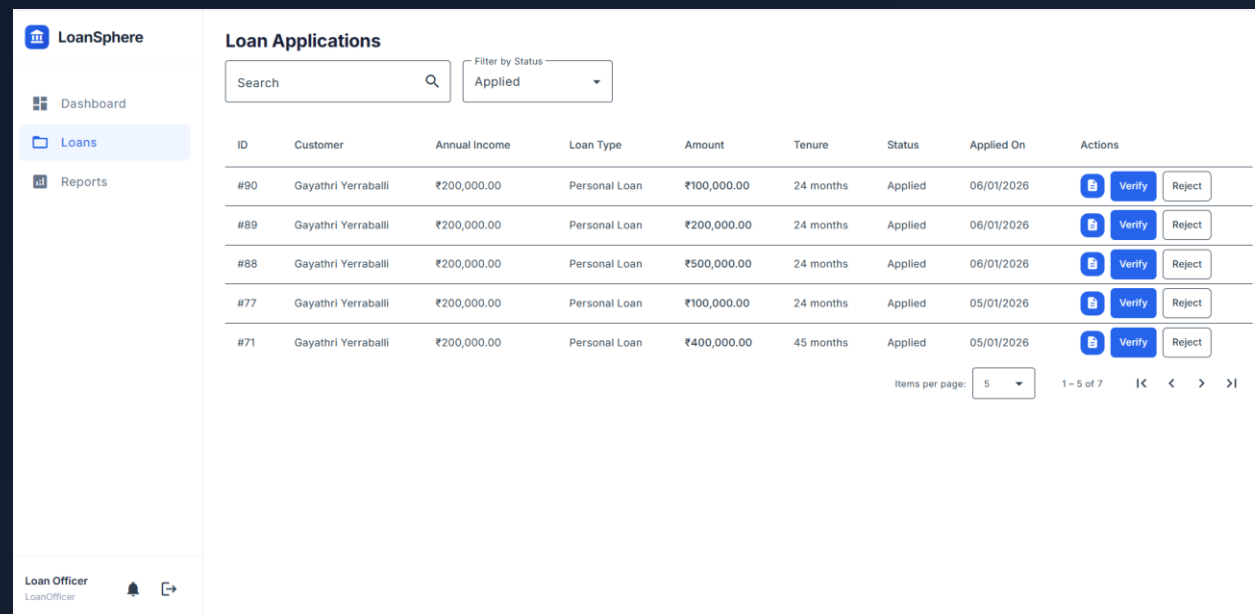
Loan
Applications

UI Screens

Loan Documents

bag.jpg
IdentityProof Jan 5, 2026

Close

Loan Officer Reports

Loans by Status | EMI Overdue | Monthly EMI | Outstanding Amount | Active vs Closed | Customer Summaries

Loans by Status
Overview of loan application statuses and distribution.

Distribution Overview

TOTAL
90

- ● Active/Approved   27
- ● Applied/Pending   7
- ● Under Review   3
- ● Rejected   20
- ● Closed   33

Detailed Breakdown

Status	Count
Active	27
Applied	7
Closed	33
Rejected	20
Under Review	3

Outstanding Amounts
Check pending dues for specific loan accounts.

Find Loan Details

Loan ID
27

Enter the unique loan identifier

🔍 Check Status

TOTAL OUTSTANDING DUE
₹239,142.96
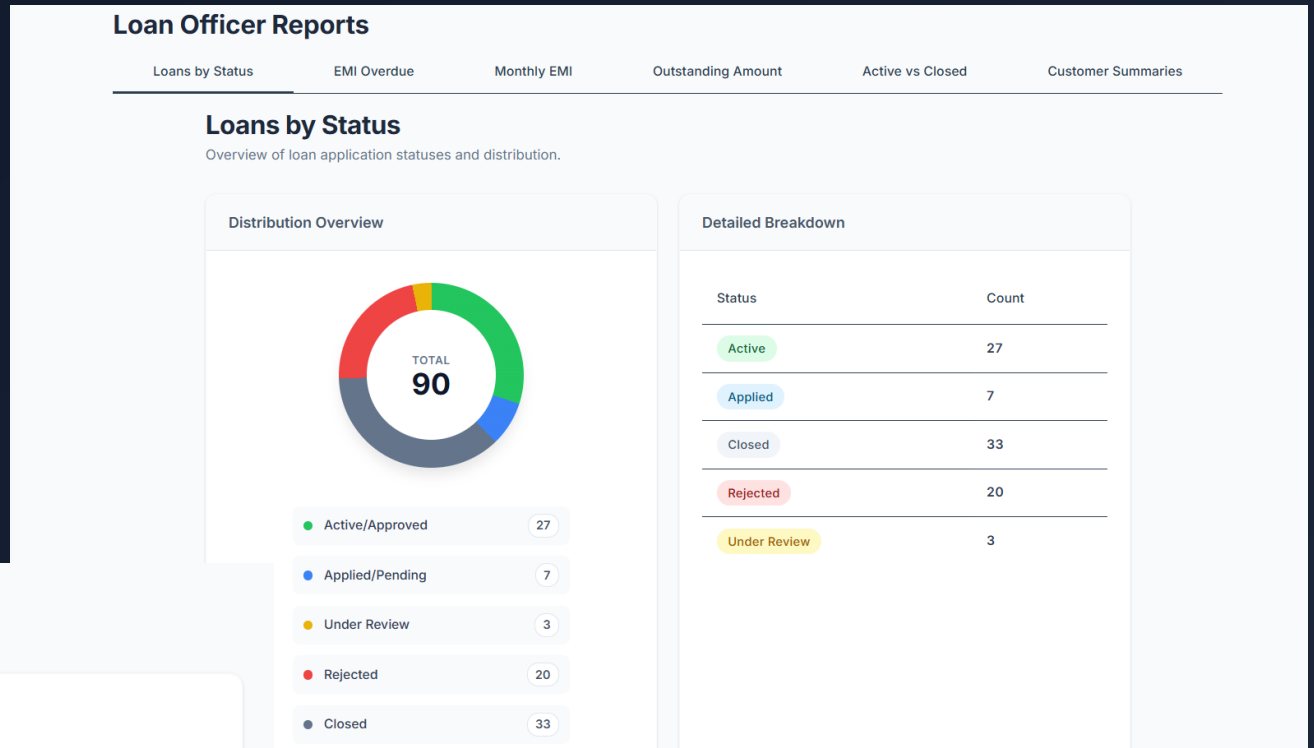
Loan Documents & Officer Reports

UI Screens

Overdue Installments
Monitor accounts with missed payments

Search Overdue Accounts 🔍

LOAN REFERENCE	OUTSTANDING DUE	MISSED EMIs
#31	₹3,484.00	1
#46	₹4,707.35	1
#53	₹4,707.00	1
#57	₹23,537.00	1
#60	₹4,707.00	1

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Active vs Closed Loans

Active Loans
27
Currently ongoing

Closed Loans
33
Fully repaid

Ratio Analysis
Active (45%)   Closed (55%)

You have **27** active loans compared to **33** closed ones.

Monthly EMI Collections
Track EMI payments and pending dues for a specific month.

Month: January   Year: 2026   📊 View Report

🟢 Paid: ₹124,958.00 (66%)   🟠 Pending: ₹64,400.35

Details
🔍 Search Report

| Loan ID	Customer	Due Date	EMI Amount	Status
#4	Customer Two	01 Jan 2026	₹12,756.37	Paid
#30	Gayathri Yerraballi	03 Jan 2026	₹3,484.00	Paid
#31	Pallavi Velagandula	04 Jan 2026	₹3,484.00	Pending
#32	Gayathri Yerraballi	04 Jan 2026	₹3,484.00	Paid
#33	Gayathri Yerraballi	04 Jan 2026	₹3,484.00	Paid

Items per page: 5 ▾   1 – 5 of 33 |< ‹ › >|

Customer Loan Summaries
Overview of customer portfolios and risk exposure.

Search 🔍

ID	Customer	Email	Total Applications	Active	Total Borrowed	Outstanding Debt
#3	Customer One	customer1@lms.com	3	1	₹900,000.00	₹200,000.00
#4	Customer Two	customer2@lms.com	1	0	₹500,000.00	₹0.00
#5	Sharanya Velagandula	sharanyavelagandula@gmail.com	10	4	₹2,150,000.00	₹800,000.00
#11	Abhinaya Motapothula	abhinayamotapothula@gmail.com	9	6	₹2,220,000.00	₹1,320,000.00
#21	Customer10	customer10@lms.com	4	3	₹402,000.00	₹352,000.00

Items per page: 5 ▾   1 – 5 of 9 |< ‹ › >|

Reports

Swagger UI

Auth

POST /api/auth/register

POST /api/auth/login

Documents

POST /api/Documents/upload

GET /api/Documents/{loanId}

GET /api/Documents/download/{id}

Emi

GET /api/emis/loan/{loanId}

PUT /api/emis/{emiId}/pay

PUT /api/emis/loan/{loanId}/pay-full

GET /api/emis/loan/{loanId}/foreclosure

GET /api/emis/loan/{loanId}/payments

LoanApplications

POST /api/loans/apply

GET /api/loans/my

GET /api/loans

GET /api/loans/{loanId}

GET /api/loans/officer/my-dashboard

PUT /api/loans/{loanId}/decision

LoanTypes

GET /api/loan-types

POST /api/loan-types

GET /api/loan-types/all

PUT /api/loan-types/{id}

Notification

GET /api/Notification

PUT /api/Notification/{id}/read

PUT /api/Notification/read-all

Reports

GET /api/reports/loans-by-status

GET /api/reports/outstanding/{loanId}

GET /api/reports/monthly-emi

GET /api/reports/emi-overdue

GET /api/reports/customer-summary

Users

GET /api/users

POST /api/users

PUT /api/users/{id}/status

Results & Achievements

Project Highlights

Real-World Rules: Implemented real-world logic vs basic CRUD.

Security: JWT, RBAC, and strict validations (Bcrypts).

Data Integrity: Robust backend validations ensure consistency.

Dashboards: Tailored views for Admin, Officer, and Customer.

Technical Wins & Outcomes

Streamlined Workflow: "Maker-Checker" separation of duties.

User Experience: Responsive, modern UI across devices.

Performance: Optimized LINQ and indexing.

Reliability: 100% data integrity with error handling.

Conclusion

LoanSphere is a secure foundation for real-world fintech.

Impact:

Reduces processing time by 70%, increases transparency by 100%.

Thank You

Live Demo

Showcasing LoanSphere in Action