



FinFlow: Expense Tracker Software Requirements Specification

Version 1.0

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1. Introduction

Managing personal and group finances efficiently is a challenge faced by individuals in today's fast-paced world. **FinFlow: Expense Tracker** aims to bridge this gap by providing an intuitive, feature-rich platform for tracking expenses, monitoring budgets, and analyzing spending patterns. Designed with simplicity and collaboration in mind, FinFlow empowers users to manage their finances effectively, whether individually or as part of a group. Its robust architecture ensures scalability, security, and ease of use, making it a comprehensive solution for modern financial management needs. From real-time expense logging to insightful analytics and seamless group expense handling, FinFlow is built to transform the way users interact with their financial data.

1.1 Purpose

The purpose of this Software Requirements Specification (SRS) document is to define the functional, non-functional, and system requirements for **FinFlow**, a web-based Expense Tracker application. The document acts as a roadmap for developers, testers, and stakeholders, ensuring alignment and clarity throughout the project lifecycle.

1.2 Scope

FinFlow is a platform designed to assist users in managing their financial activities. It is particularly focused on individual and group expense tracking, offering features such as real-time analytics, budget management, and shared expense splitting. Its scope includes:

- Simplifying expense logging with categorized inputs.
- Providing an intuitive dashboard for expense analytics and insights.
- Automating the calculation of shared expenses in group settings.

1.3 Definitions, Acronyms and Abbreviations

1. **CRUD**: Create, Read, Update, Delete operations.
2. **UI/UX**: User Interface/User Experience.
3. **REST API**: Representational State Transfer Application Programming Interface.

1.4 References

1. IEEE SRS Standards: <https://standards.ieee.org/830>
2. Angular Official Documentation

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3. Spring Boot Reference Guide: <https://spring.io/projects/spring-boot>
4. MySQL Documentation: <https://dev.mysql.com/doc/>

1.5 Technologies to be used

Frontend

- **Angular:** Dynamic web framework for building the user interface.
- **Bootstrap:** Framework for responsive and mobile-first design.

Backend

- **Spring Boot:** For scalable, secure RESTful APIs.
- **Hibernate:** ORM tool for seamless database interactions.

Database

- **MySQL:** Relational database management system.
- **H2:** In-memory database for development and testing.

Tools

- **Postman:** For API testing.
- **IntelliJ IDEA:** Integrated development environment.
- **Git:** Version control system.

Deployment

- **Docker:** For containerization.
- **AWS EC2:** Cloud hosting for scalability.

1.6 Overview

This document provides a detailed guide for the development of **FinFlow**. It includes technical specifications, architecture, and methodologies to ensure successful project completion.

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2.Literature survey

2.1 Review of Related Work

1. Mint

Mint is one of the most popular personal finance apps, providing features like budgeting tools, bill reminders, and spending categorization.

- **Strengths:**

1. Offers detailed budgeting tools with automated category suggestions.
2. Integrates with bank accounts for real-time transaction tracking.

- **Limitations:**

1. Focuses solely on individual finance management, lacking group expense tracking features.
2. Analytics and insights are limited to static graphs, with no dynamic interaction or predictive suggestions.

2. Expense Manager

Expense Manager is a lightweight mobile app designed for tracking personal expenses quickly and efficiently.

- **Strengths:**

1. Simple interface for logging expenses manually.
2. Provides basic reporting features for reviewing past spending.

- **Limitations:**

1. Does not include budgeting tools, group tracking, or detailed analytics.
2. Lacks features for exporting data or generating reports in user-friendly formats.

3. PocketGuard

PocketGuard is a budgeting app designed to help users identify “what’s left” after accounting for bills and expenses.

- **Strengths:**

1. Highlights savings opportunities and provides a simplified view of finances.
2. Tracks recurring subscriptions automatically.

- **Limitations:**

1. Limited customizability for expense categories and subcategories.
2. Lacks support for group expenses and collaboration among users.

4. Splitwise

Splitwise is a group-oriented expense tracking app that simplifies splitting bills and shared

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expenses.

- **Strengths:**
 1. Streamlines expense sharing among group members with automatic calculations.
 2. Tracks outstanding balances and payment history.
- **Limitations:**
 1. Focuses solely on group expense management, with no tools for personal budgeting or detailed analytics.

2.2 Knowledge Gaps

Despite the availability of these solutions, certain gaps persist, which FinFlow aims to address:

1. **Integrated Personal and Group Finance Management:**

Existing tools either cater to individual users or focus on group expense tracking. Very few platforms provide an integrated solution for managing both personal and collaborative financial goals.
2. **Advanced Analytics and Predictive Insights:**

While most tools offer basic visualizations, they lack actionable insights or recommendations based on user spending behaviour. Predictive budgeting, which could help users anticipate and prepare for future expenses, is also missing.
3. **Customizable Financial Tracking:**

Limited flexibility in defining categories, subcategories, or recurring expenses reduces the relevance of these tools for users with unique financial needs.
4. **Cross-Platform Accessibility:**

Many solutions are restricted to mobile platforms, limiting accessibility for users who prefer web-based interfaces or require synchronization across multiple devices.

2.3 Comparative Analysis

Feature	Mint	Expense Manager	PocketGuard	Splitwise	FinFlow (Proposed)
Personal Expense Logging	✓	✓	✓	✗	✓
Group Expense Management	✗	✗	✗	✓	✓
Budget Setting	✓	✗	✓	✗	✓
Dynamic Analytics	✗	✗	✗	✗	✓
Data Export Options	✓	✗	✗	✗	✓
Predictive Insights	✗	✗	✓	✗	✓

2.4 Summary

The existing solutions in the expense tracking and budgeting domain offer a range of features but often fail to provide a comprehensive, user-centric experience. While tools like Mint excel in individual financial tracking and Splitwise focuses on group expense

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management, none address both needs effectively. Similarly, the lack of advanced analytics, customizable tracking, and data export options reduces their utility for diverse user requirements.

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3. Specific Requirements

3.1 Functional Requirements

1. User Authentication

Login and Registration:

1. Enable users to create accounts using email or integrate third-party OAuth providers (e.g., Google, Facebook).

Password Management:

1. Implement strong password encryption (e.g., BCrypt).
2. Allow users to reset passwords via OTP/email verification.

2. Expense Logging

Create Expense:

Users can log expenses by entering the amount, category (Food, Transport, etc.), description, and date.

Edit/Delete Expenses:

Users can update or remove existing expense records.

Recurring Expenses:

Set recurring expenses (e.g., monthly subscriptions) with automated logging.

3. Group Expense Splitting

Group Creation:

Allow users to create groups, assign roles (Admin/Member), and invite others via email links.

Shared Expense Management:

Record expenses under groups and calculate shares dynamically.

Payment Tracking:

Track outstanding payments among group members.

4. Budget Monitoring

Set Budgets:

Define monthly/annual budgets by category or overall.

Budget Alerts:

Notify users when spending nears or exceeds 80% and 100% of the budget.

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5. Analytics Dashboard

Spending Trends:

Interactive charts to view expenses by time period, category, and group.

Comparison Reports:

Compare expenses across months/years.

Savings Suggestions:

AI-generated insights to optimize spending habits.

6. Data Export

Export reports in CSV and PDF formats for personal or professional use.

3.2 Non-Functional Requirements

- **Performance:**

Ensure response time under 2 seconds for key operations like expense logging and analytics display.

- **Scalability:**

Support 50,000 concurrent users and process up to 1 million expense records seamlessly.

- **Reliability:**

Guarantee 99.9% uptime using robust cloud architecture.

- **Security:**

Use HTTPS for data transmission and AES-256 for database encryption.

- **Maintainability:**

Design modular architecture for easy updates and debugging.

3.3 Hardware Requirements

- **Minimum:** 8GB RAM, Dual-Core Processor, 500GB HDD.

- **Recommended:** 16GB RAM, Quad-Core Processor, SSD Storage.

3.4 Software Requirements

- **Operating System:** Windows 10/11, macOS, or Linux.

- **Browser Compatibility:** Chrome (v100+), Firefox (v90+), Edge (v85+).

- **Languages/Frameworks:** Java 11+, TypeScript, MySQL, Hibernate

3.5 Agile Methodology

Steps in Agile Development

1. Backlog Creation

- a) All requirements (e.g., login, analytics, group handling) are broken down into

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user stories.

- b) Prioritized backlog includes tasks like "As a user, I want to add an expense so I can track spending."

2. **Sprint Planning**

Bi-weekly sprints focus on implementing specific features (e.g., sprint 1: login system; sprint 2: expense logging).

3. **Daily Standups**

15-minute meetings to discuss progress, blockers, and upcoming tasks.

4. **Continuous Integration and Testing**

- a) Developers integrate code into a shared repository daily.
- b) Automated unit and regression tests ensure system reliability.

5. **Sprint Review and Retrospective**

- a) Present completed work to stakeholders for feedback.
- b) Discuss improvements for the next sprint.

6. **Incremental Deployment**

Features are deployed incrementally, ensuring early user feedback and quick bug resolution.

3.6 Business Process Model

1. **Processes**

2. **Onboarding:**

Registration, tutorial, and account setup.

3. **Expense Logging:**

Enter, categorize, and manage expenses.

4. **Group Management:**

Collaborate on shared expenses with real-time updates.

5. **Analytics and Reporting:**

Visualize trends, export data, and receive recommendations.

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4. System Architecture

4.1 Client-Server Architecture

1. Frontend (Client)

Angular provides dynamic views for features like dashboards and group handling.

2. Backend (Server)

Spring Boot handles API requests, authentication, and business logic.

3. Database

MySQL stores structured data for users, expenses, and budgets.

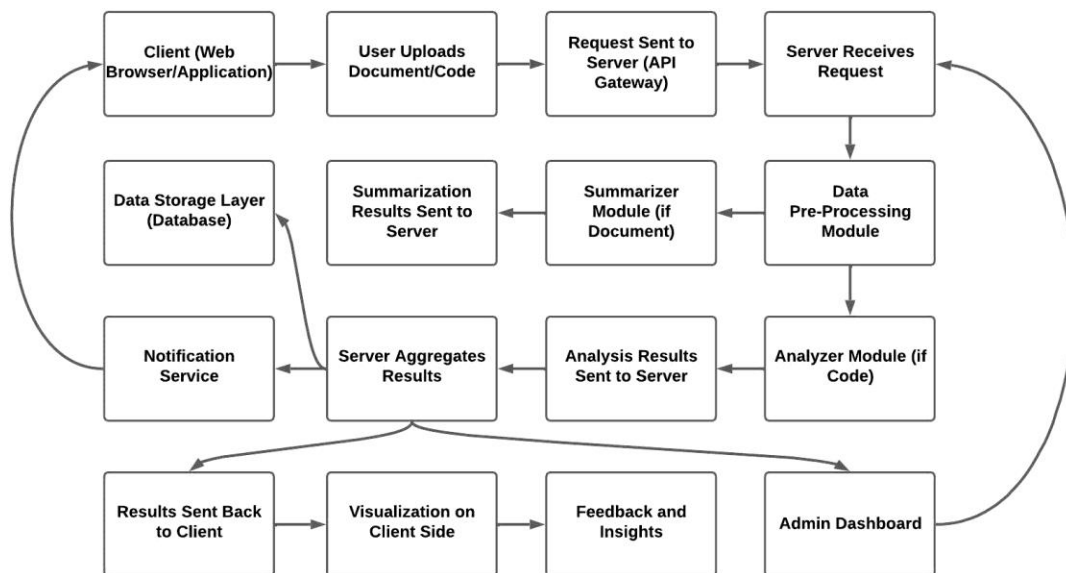


Figure 4.1 *Client-Server Architecture 1*

4.2 Communication Interfaces

- **REST APIs:** Enable client-server interaction using HTTP.
- **JSON Format:** Used for lightweight, human-readable data exchange.
- **HTTPS Protocol:** Ensures data security during communication.

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5. Overall Description

5.1 Product Features

Key Features of FinFlow

1. Expense Management
 - a) Add, edit, and delete expenses categorized by predefined labels (e.g., Food, Transport) or user-defined categories.
 - b) Support for recurring expenses, with automatic logging at set intervals.
2. Group Expense Handling
 - a) Create and manage groups for shared financial activities.
 - b) Automatically calculate each member's share for group expenses and notify members of balances.
3. Budget Monitoring
 - a) Allow users to define budgets for individual categories or overall expenses.
 - b) Trigger alerts when spending nears or exceeds the budget limit.
4. Analytics and Reporting
 - a) Visualize spending trends with interactive dashboards, including pie charts, bar graphs, and heatmaps.
 - b) Export reports in PDF or CSV format for detailed analysis.
5. User Customization

Enable users to customize expense categories and notification preferences.

5.2 Data Flow Diagram (DFD)

Level 0 DFD (Context Diagram)

- Shows the system at a high level, with users interacting with FinFlow via a web interface.
- User actions (e.g., log expense, view analytics) are processed by the backend, which interacts with the database to retrieve or update information.

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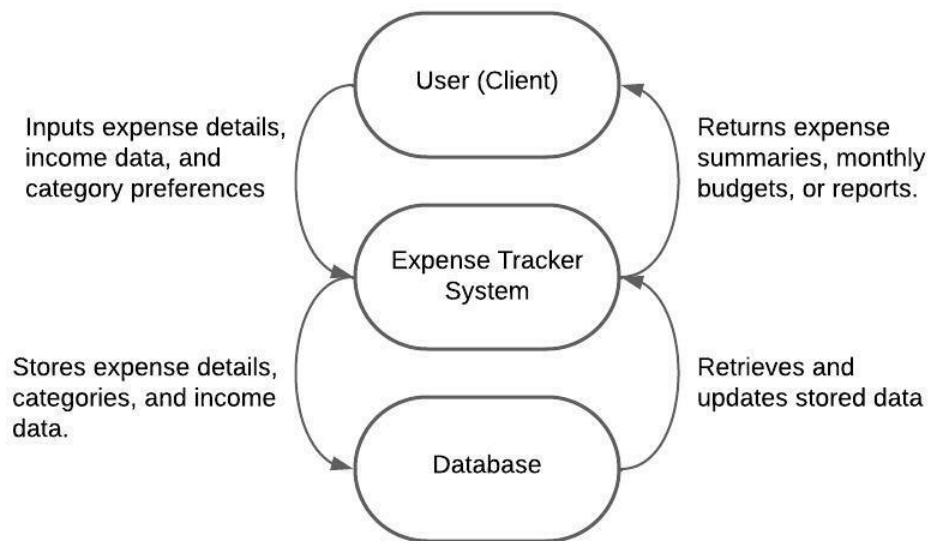


Figure 5.2.1 Data Flow Diagram (Level 0)

Level 1 DFD

1. Expense Logging

- Input: Amount, category, date, description.
- Process: Validate input and store expense details in the database.
- Output: Display updated expense list and analytics.

2. Group Management

- Input: Group name, members, shared expenses.
- Process: Calculate individual shares and track payments.
- Output: Notify members of balances and updates.

3. Analytics Dashboard

- Input: User's expense history and budget data.
- Process: Aggregate data to generate trends and comparisons.
- Output: Display interactive graphs and insights.

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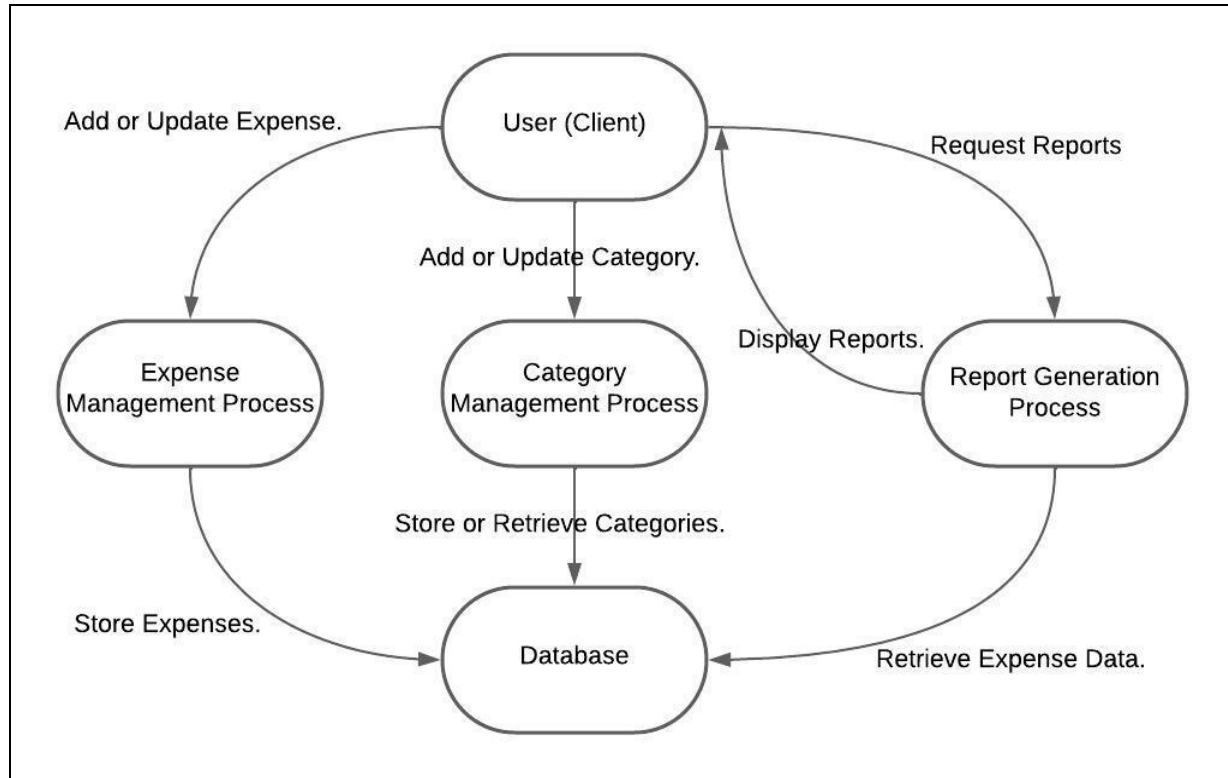


Figure 5.2.2 Data Flow Diagram (Level 1)

DFD Level 2 – Expense Tracker

Processes:

1. **User Authentication:** Validates user login.
2. **Expense Management:** Adds and stores expenses.
3. **Expense Update/Deletion:** Updates or deletes expenses.
4. **Generate Report:** Creates expense reports.
5. **Category Management:** Manages expense categories.

Data Stores:

1. **User Data:** Stores user information.
2. **Expense Data:** Stores expenses.
3. **Category Data:** Stores categories.
4. **Report Data:** Stores reports.

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5.3 E-R Diagram

Entities and Relationships

1. User

1. Attributes: UserID, Name, Email, Password.

2. Relationships:

- A user can log multiple expenses.

2. Expense

1. Attributes: ExpenseID, Amount, Category, Date, Description.

2. Relationships:

- An expense belongs to a user or a group.

3. Group

1. Attributes: GroupID, GroupName, AdminID.

2. Relationships:

- A group has multiple members and shared expenses.

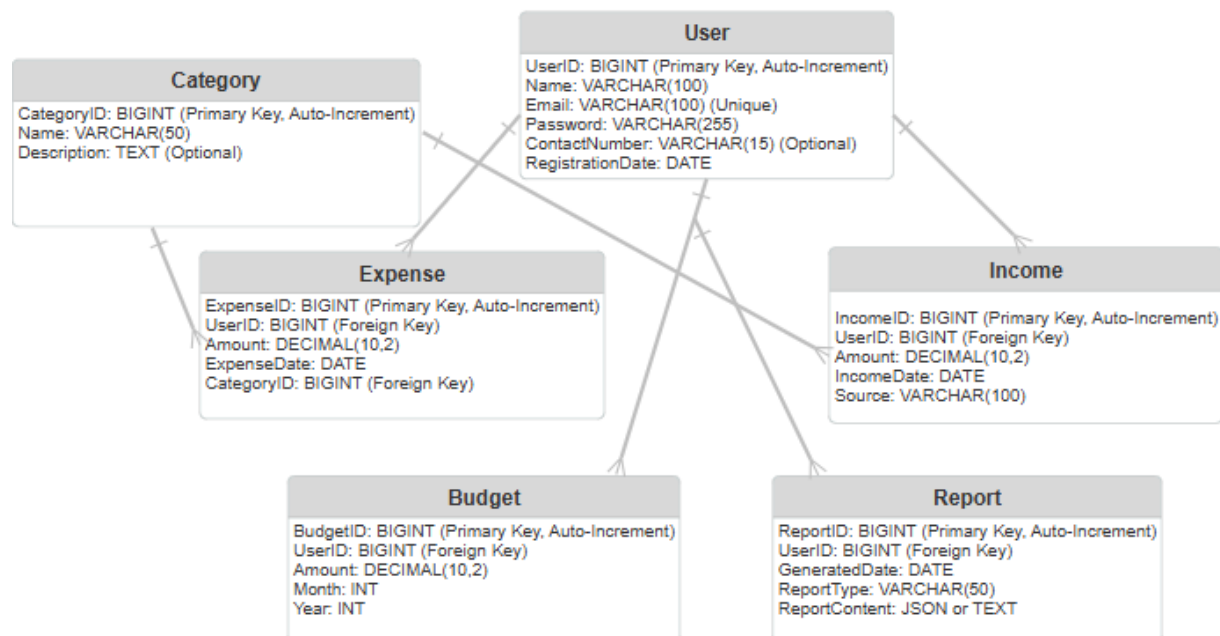


Figure 5.3 ER DIAGRAM

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5.4 Class Diagram

Key Classes

5.4.1 User

1. Attributes: UserID, Name, Email, Password.
2. Methods: register(), login(), updateProfile().

5.4.2 Expense

1. Attributes: ExpenseID, Amount, Category, Date.
2. Methods: addExpense(), editExpense(), deleteExpense().

5.4.3 Group

1. Attributes: GroupID, GroupName, Members.
2. Methods: createGroup(), addMember(), splitExpense().

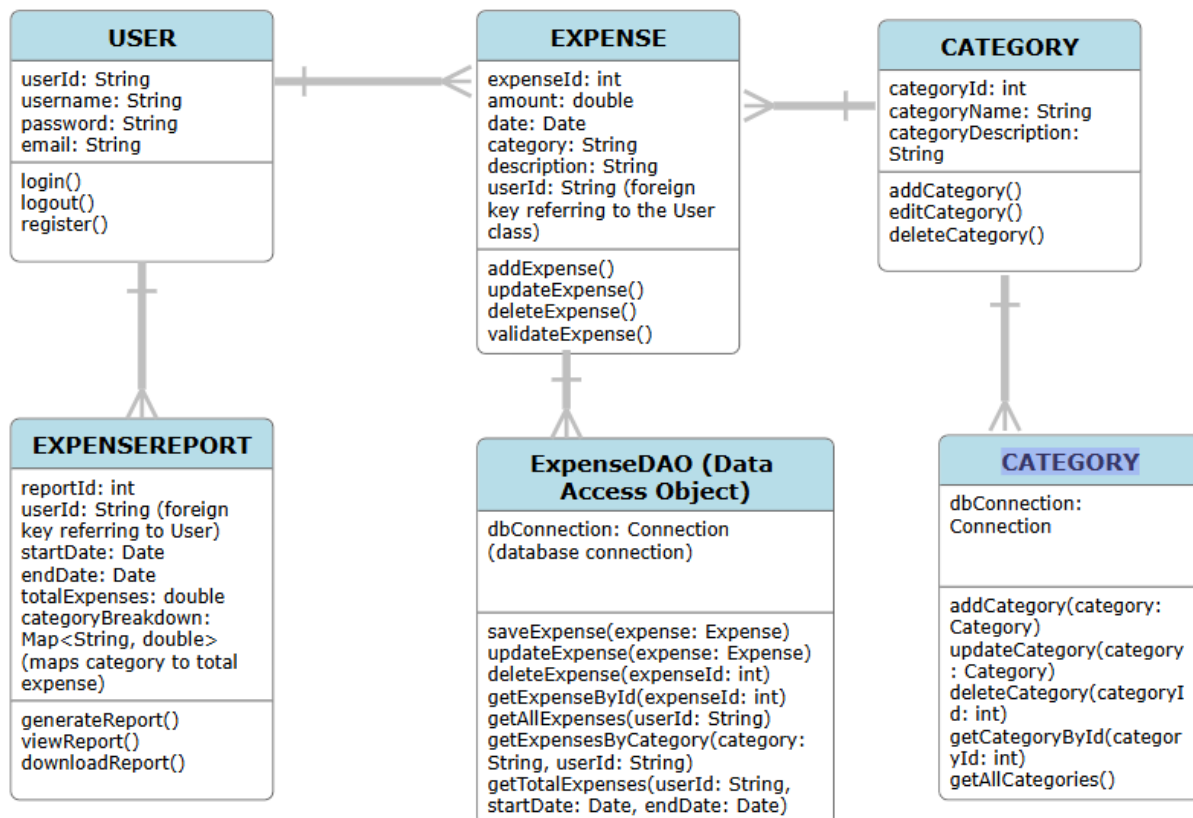


Figure 5.4 Class Diagram 1

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5.5 Use-Case Model

Actors

1. End User
 - Logs expenses, manages groups, sets budgets, and views analytics.
2. Administrator
 - Oversees system operations and resolves user issues.

Use Cases

1. Log Expense
 - User enters expense details, and the system updates the database.
2. Create Group
 - User creates a group, adds members, and assigns roles.
3. View Analytics
 - User views interactive dashboards showing spending patterns.

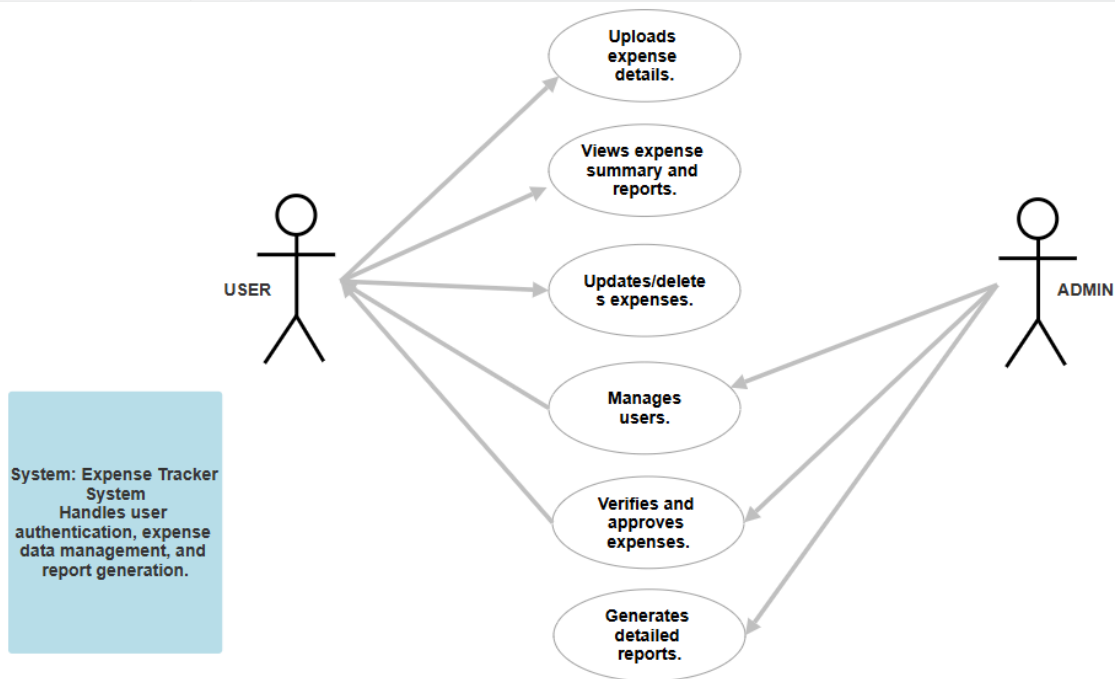


Figure 5.5 USE CASE DIAGRAM

5.6 Behavioural Diagrams

5.6.1 Sequence Diagram

1. Log Expense

- User sends a request to add an expense.
- The backend processes the request and updates the database.
- The system returns the updated expense list and analytics.

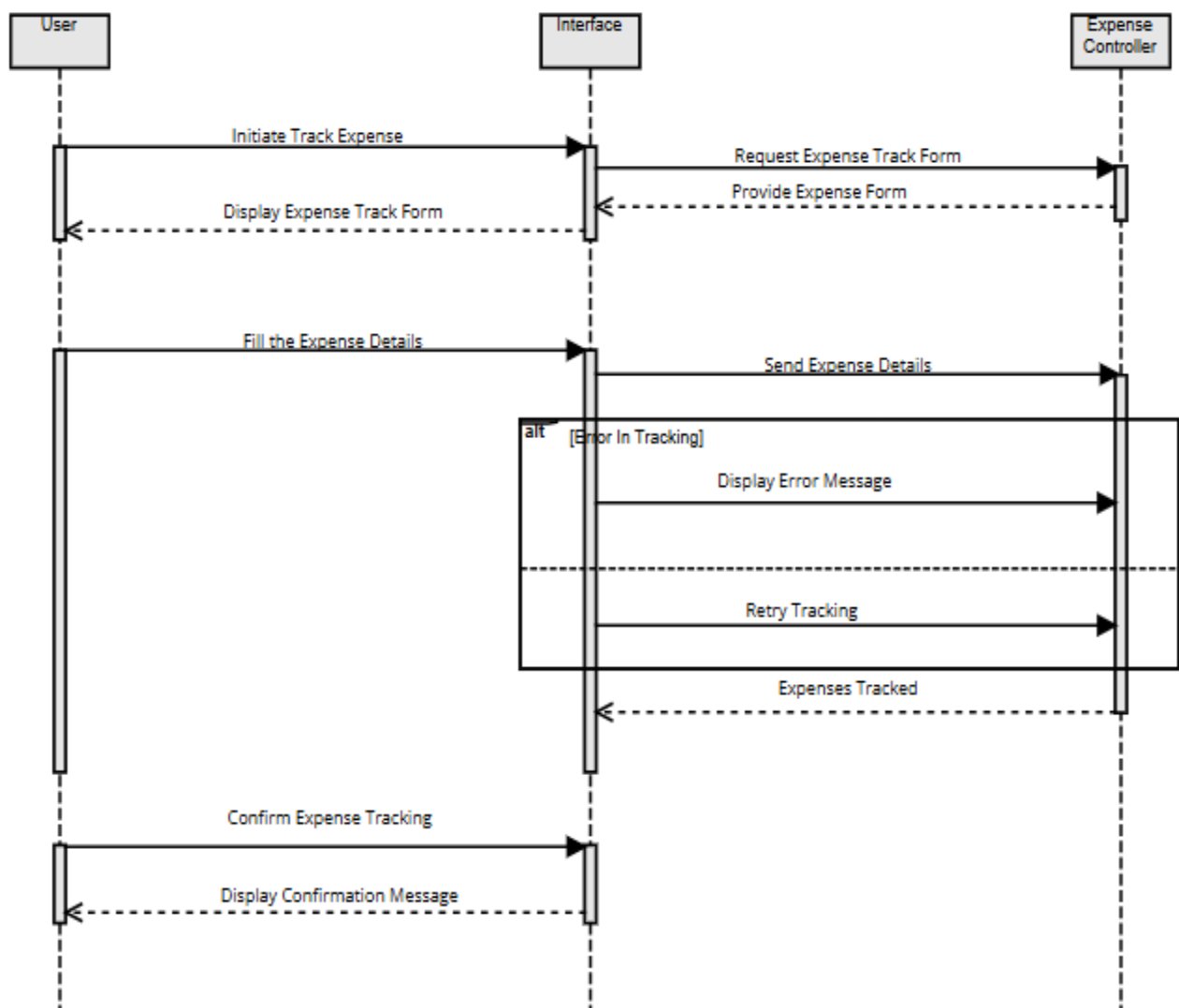


Figure 5.6.1 *Sequence Diagram*

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5.6.2 Activity Diagram

1. Group Expense Splitting

- Admin creates a group and invites members.
- Members log shared expenses.
- The system calculates each member's share and tracks payments.

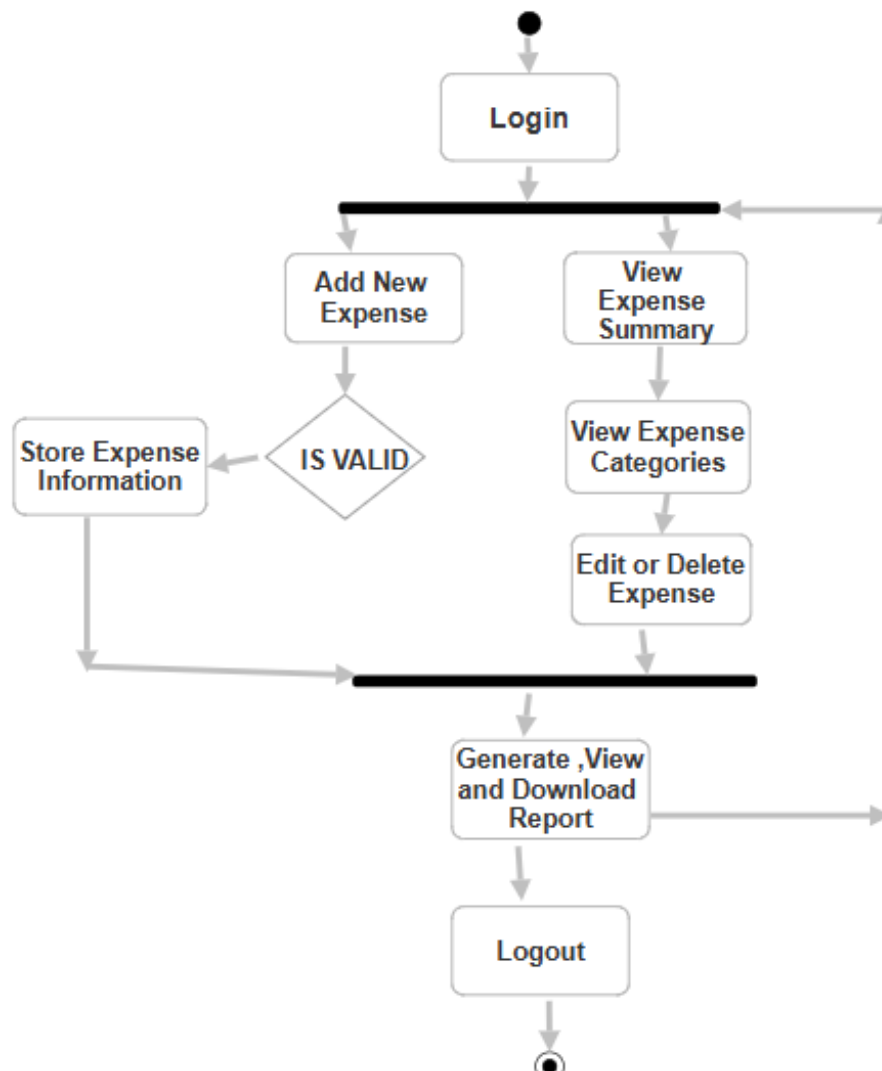


Figure 5.6.2 Activity Diagram

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5.6.3 Communication Diagram

A Communication Diagram represents the interaction between objects and their relationships. It focuses on how the objects collaborate to achieve a particular use case or scenario.

- Use Case: Log Expense

Objects Involved:

- User
- Expense Management System
- Database

- Flow of Communication:

1. User sends a "log expense" request to the Expense Management System with the details of the expense (amount, category, date, description).
2. Expense Management System processes the request and sends a request to Database to store the expense details.
3. Database confirms the successful storage of expense details.
4. Expense Management System updates the user with the status of the expense logging (success/failure).

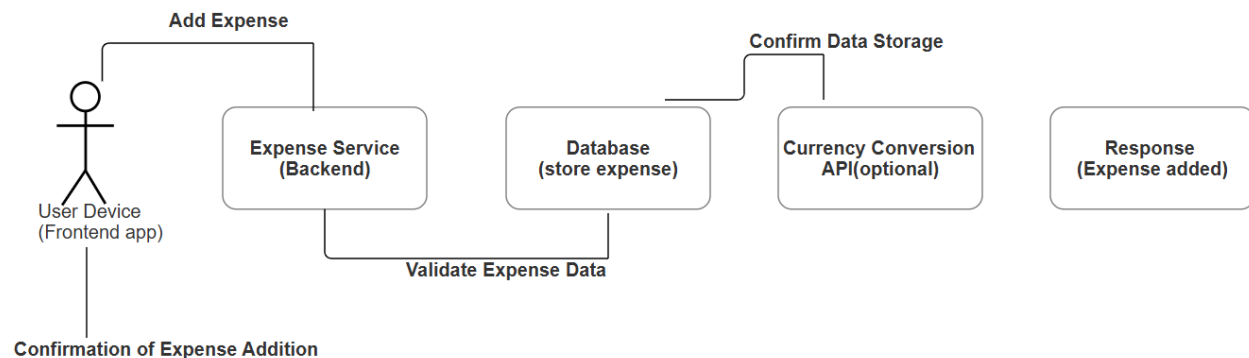


Figure 5.6.3 *Communication Diagram*

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5.7 Structure Diagram

5.7.1 Component Diagram

A Component Diagram shows the high-level components of the system and how they interact with each other. For the Expense Tracker system, the components could include the following:

- Key Components:
 1. User Interface (UI)
 - Handles user interactions.
 - Allows users to log expenses, view analytics, manage groups, etc.
 2. Expense Management Component
 - Manages the core logic for adding, editing, deleting, and viewing expenses.
 3. Authentication Service
 - Handles user registration, login, and authentication.
 - Integrates with OAuth providers (e.g., Google, Facebook) for login.
 4. Analytics Engine
 - Processes the expense data to generate spending reports, trends, and dashboards.
 - Visualizes data as charts and graphs.
 5. Database
 - Stores data such as user information, expense records, group data, etc.
 6. Notification Service
 - Sends email or SMS notifications for various actions (e.g., expense log success, budget exceeded).
- Interactions:
 - User Interface interacts with the Expense Management Component to perform operations like logging an expense or viewing analytics.
 - The Expense Management Component communicates with the Database to store/retrieve expense records.
 - Authentication Service handles user login and authentication.
 - Analytics Engine pulls data from the Database to generate visual reports.
 - Notification Service is triggered by the Expense Management Component or Analytics Engine to send notifications to the user.

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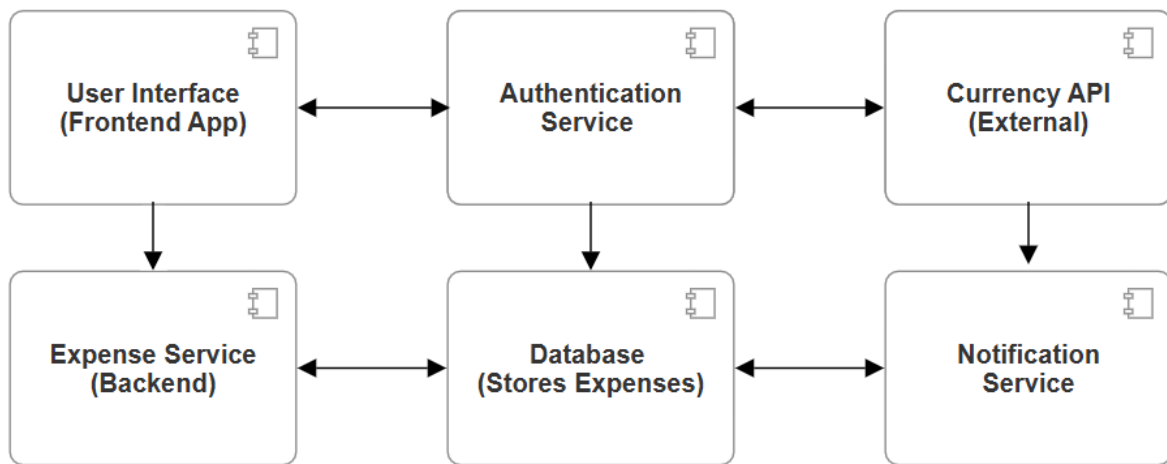


Figure 5.7.1 *Component Diagram*

5.7.2 Deployment Diagram

A Deployment Diagram shows the physical deployment of software components on hardware components (e.g., servers, cloud platforms) and how they interact.

- Key Components:

1. Web Server

- Hosts the Expense Tracker Web Application (UI).
- Responsible for serving the front-end application to users.

2. Application Server

- Hosts the Expense Management Component and other backend services (e.g., authentication, analytics).

3. Database Server

- Stores all data related to users, expenses, categories, etc.
- Database management system like MySQL or PostgreSQL.

4. Cloud Services (Optional)

- Hosting and backup services such as AWS EC2 for running the backend application and S3 for storing static files (e.g., expense reports).

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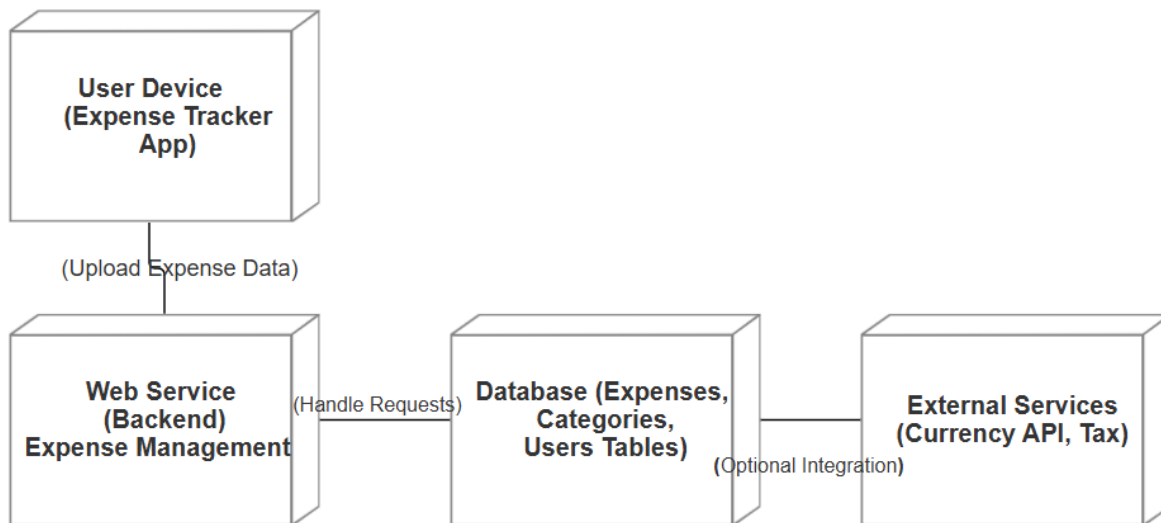


Figure 5.7.2 *Deployment Diagram 1*

5.8 Assumptions and Dependencies

Assumptions

1. **User Competency:** Users have basic knowledge of navigating web applications and entering data accurately.
2. **Internet Connectivity:** The application assumes users have a stable internet connection for real-time interactions.
3. **Data Formats:** All uploaded data (e.g., expense records) adheres to predefined formats for seamless processing.

Dependencies

1. **Third-Party Services:**
 - OAuth providers for authentication (e.g., Google, Facebook).
 - Email services for notifications (e.g., Twilio).
2. **Hosting Infrastructure:**
 - Cloud services like AWS EC2 and S3 for deployment and backup.
3. **Browser Compatibility:** The application is optimized for modern browsers like Chrome, Firefox, and Edge.

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6.Supporting Information

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7. Conclusion and Future Scope

7.1 Conclusion

The **FinFlow: Expense Tracker** application integrates advanced web technologies to provide a comprehensive platform for managing both personal and group finances. With features like real-time expense tracking, budget monitoring, and group expense splitting, the system simplifies financial management for users. The application leverages a scalable and secure architecture built on Angular, Spring Boot, and MySQL, ensuring reliability and performance. By automating manual tasks such as expense calculations and report generation, **FinFlow** enhances user productivity and promotes better financial decision-making.

7.2 Future Scope

1. Multilingual Support

Expanding the platform to support multiple languages will make it accessible to a global user base, ensuring inclusivity.

2. AI-Powered Insights

Implementing predictive analytics and personalized savings recommendations to enhance financial planning capabilities.

3. Mobile App Integration

Developing native mobile applications for Android and iOS to enable users to track expenses and manage budgets on the go.

4. Third-Party Payment Integration

Adding integration with payment gateways (e.g., PayPal, Stripe) for real-time payments and tracking.

5. Voice Commands for Expense Logging

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Allowing users to log expenses using voice input for faster and more intuitive data entry.

6. **Cryptocurrency Expense Tracking**

Adding functionality to track expenses in cryptocurrencies, catering to modern financial trends.

7. **Gamification**

Introducing rewards or achievement badges for meeting savings goals to encourage consistent financial management.

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8. Concerns / Queries / Doubts if any:

1. **Third-Party Integration**

Should the system integrate directly with banks to fetch transaction data for enhanced automation?

2. **AI Features**

Is there a need for AI-driven spending habit analysis and predictive budgeting?

3. **Offline Functionality**

Should the application support offline expense tracking with data synchronization upon reconnecting to the internet?

4. **Data Storage and Retention**

What should be the policy for storing and deleting user data to align with privacy regulations like GDPR?

5. **Scalability**

What additional architectural enhancements are required to handle user growth beyond the initial scale?