DESIGN THINKING LAB

PHASE 1 EVALUATION

GRANTHA : BOOK RESOURCE AGGREGATOR AND RENTAL SYSTEM

By

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ABSTRACT :

Grantha - The Book Resource Aggregator and Rental System is a web-based application designed to simplify book discovery and rental processes for users. The platform caters to both suppliers (who wish to rent out or sell their books) and users (who are looking to rent, or explore book-related resources). The system acts as a book aggregator, retrieving PDF availability , related YouTube videos and other resources to provide a comprehensive access to book seekers.

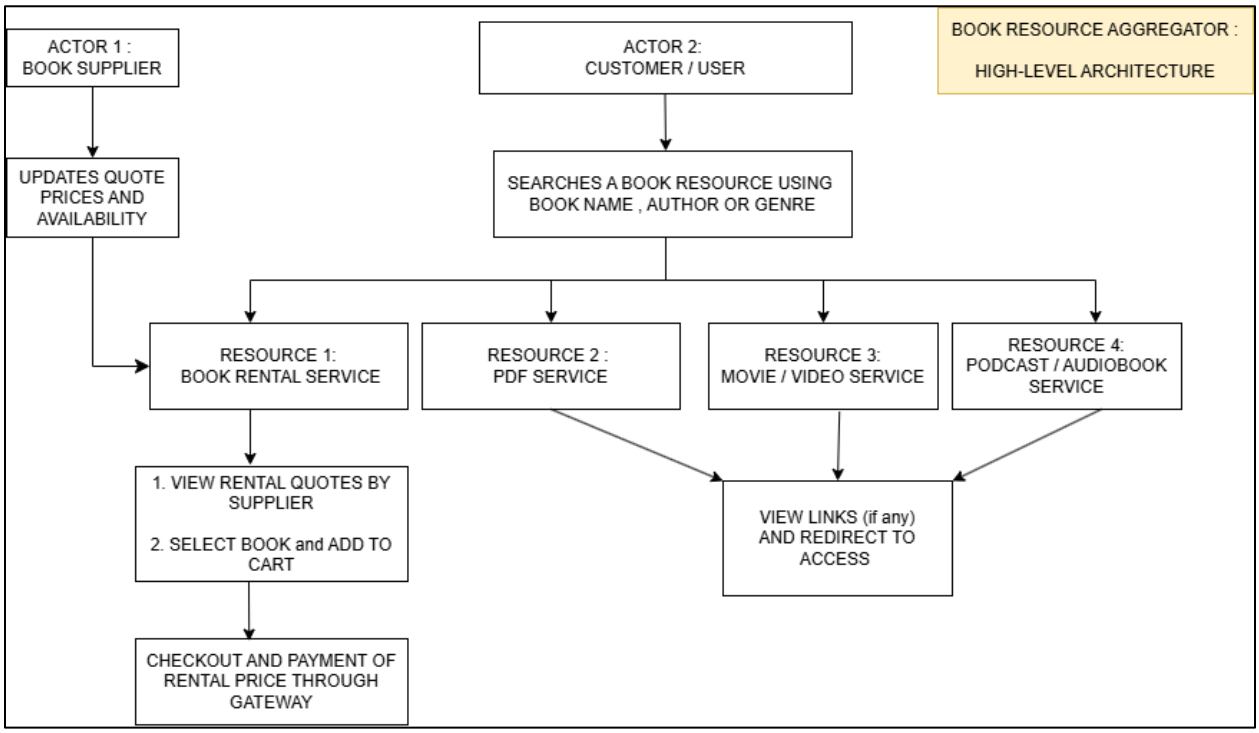
Suppliers can register and list their books for rent , providing users with the option to search for books based on title, author, or genre. Once a book is found, users can either rent it for a specified period through a streamlined shopping cart and checkout process, which includes secure payment integration.

Additionally, the system functions as a book aggregator, offering users enriched search results. When a user searches for a book, the platform not only displays available rental or purchase options but also checks for PDF availability and redirects to access links , fetches related YouTube videos to provide further resources such as reviews, audiobooks, or summaries.

Built using Spring Boot for the backend, ReactJS for the frontend, and PostgreSQL for the database, the system ensures a seamless user experience with secure authentication and third-party integrations like Google Books API , Open Library and YouTube API.

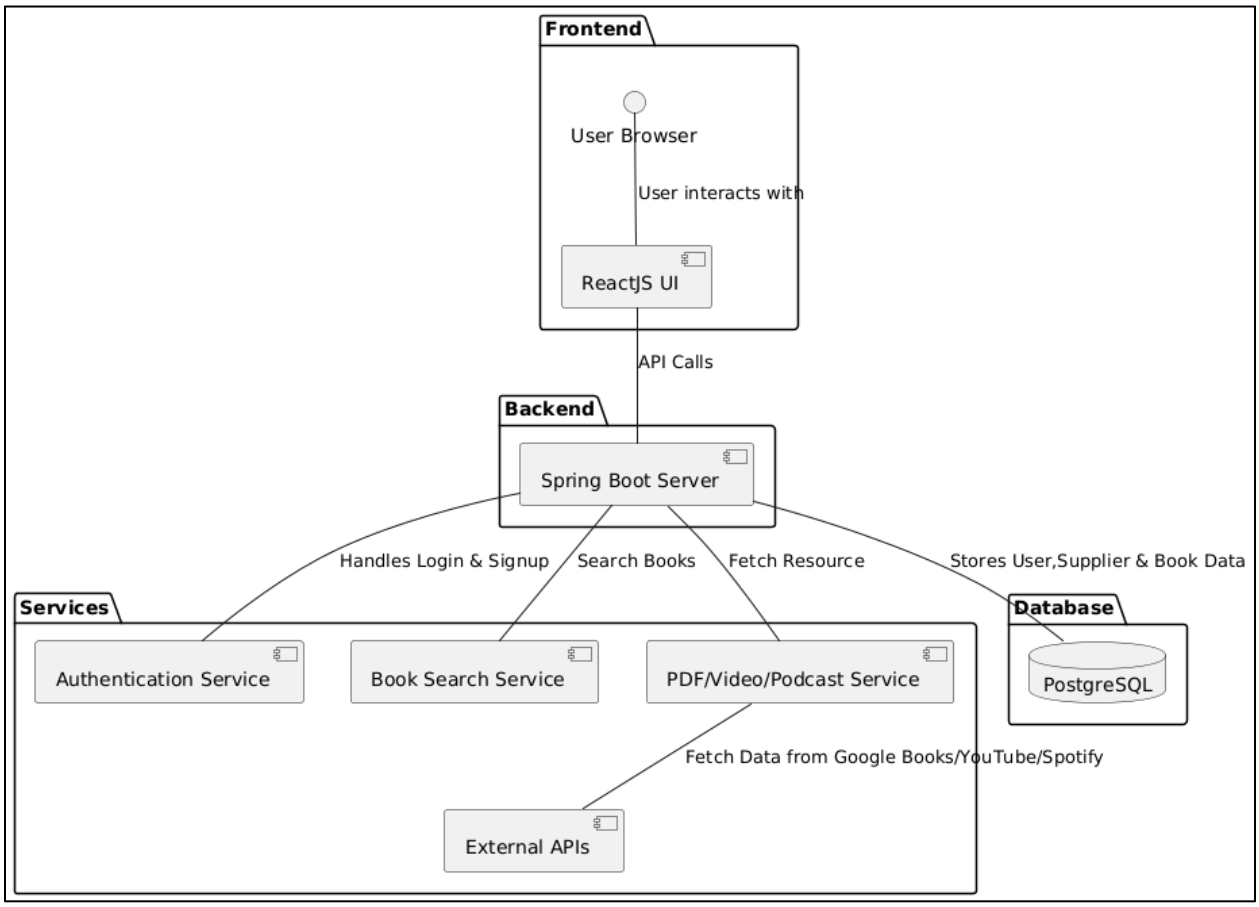
This platform enhances the accessibility of books by combining traditional rental features with additional learning resources.

ARCHITECTURE DIAGRAM :



DESIGN DIAGRAM :

UML COMPONENT DIAGRAM



Key Components:

1. Frontend (ReactJS):

The frontend handles user interactions with the platform. It allows users to search for books, browse available rentals, and interact with additional resources.

2. Backend (Spring Boot):

Handles business logic like user authentication, book listing management, rental transactions, and user management. It communicates with the database to retrieve and store information.

3. Authentication & Authorization:

Spring Security is used to handle user authentication and authorization for secure login, registration, and access control.

4. PostgreSQL Database:

Stores the core information such as user , supplier and book data.

5. External APIs (Google Books API, Open Library API , YouTube API, Spotify API):

The system integrates with Google Books API/Open Library API, to provide PDFs of the books and with YouTube, Spotify API to fetch related videos , reviews, summaries and audiobooks respectively.

6. Aggregator Service:

This service aggregates all resources like renting options, available PDFs and YouTube videos to provide extra value for users when they search for books.

7. Third-Party Integration:

Payment Gateway (Stripe/PayPal) for processing transactions securely

Data Flow Overview :

1. User Searches for Books

- The user enters a book title / author / genre in the search bar
- The frontend (React.js) sends a request/ makes an API call to the Spring Boot Server with the search query.
- The backend (Spring Boot) processes the request and:
    - Fetches PDF links
    - Fetches any related Youtube video links
    - Fetches rental availability (checks if any suppliers have listed the book for rent).
- The backend aggregates this data and sends a response to the frontend.
- The frontend displays:
    - Book details (title, author, description, cover image, price).
    - Rent options (if available from suppliers).
    - Any available PDFs.
    - Related YouTube videos.
    - Related Audiobook / Podcast

2) User Adds Book to Cart & Proceeds to Checkout

- The user selects a book and chooses to rent
- The user clicks "Add to Cart", and the book is stored in the cart (frontend state).
- The user proceeds to checkout, where they enter payment details.
- The frontend sends the order details to the Spring Boot backend.

3) Payment Processing

- The backend validates the order.
- The backend reserves the book for the user.
- The supplier is notified about the rental request.
- Payment is processed, and rental duration is set.

4) Supplier Management (For Rentals)

- Suppliers can list books for rent.
- They provide details such as: Book title, quote price and delivery dates.
- The system stores supplier listings in the PostgreSQL database.
- When a user rents or buys a book, the supplier is notified.