

CINEMA TICKET SALES SYSTEM

Analysis report

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1. Project Context:

1.1 Introduction

The objective of this project is to create a novel information system intended for the administration of a fictional movie theater. This application is more than just a way to sell tickets; it's an interesting and instructive project with two main goals in mind:

Enhancement of Skills: This project offers me, a final-year student at the ENSG-Geomatics school, a priceless chance to hone my abilities and learn about new ideas. Practical development experience is a must for my academic specialization in computer science fields, and this project will help me hone my skills, especially with React and both noSQL and SQL databases. This is an opportunity to investigate payment gateway integration and discover how they work inside a web application. This hands-on experience will enhance my ability to apply computer science concepts to real-world scenarios.

Academic Significance: This project has significant academic value in addition to skill development. It's essential to my academic advancement and success, not just a side endeavor. The accomplishment of this project will make a substantial contribution to my educational path by showcasing my ability to adapt theoretical knowledge to practical situations.

The report and the code source for this project will be available in my github and gitlab repositories. The development phase of this project will run from October 29, 2023, to December 1, 2023.

1.2 Purpose of the Project:

The main goal of this project is to design and build a movie hall ticket sales system. This system will be a comprehensive solution for managing many parts of ticket sales, show scheduling, and seat reservations. It will be created as a web application using React. The main goal is to provide a platform that lets customers select particular seats from a seating map in addition to buying tickets and canceling reservations. Apart from enabling these user functions, the system will go beyond the fundamentals by proficiently overseeing several performances on distinct dates and guaranteeing that ticket sales end when a specific day reaches capacity. The main goal of the project is to create a reliable and adaptable system for managing cinema hall tickets.

1.3 Objectives:

The following essential components are included in the project's objectives:

User functionality: Create an intuitive user interface that lets users quickly purchase one or more tickets, amend or cancel their reservations, and manually select the seats they want on a seating chart.

Show Management: Put into practice the capacity to schedule various shows across a range of dates and times. Make sure the system can adjust to different timelines and show configurations.

Sales Control: To avoid overselling and guarantee a smooth booking process, design a system that can automatically stop ticket sales for a specific date when it reaches capacity.

Enable user management, including the ability to keep track of user information and transaction histories, for users who buy tickets or cancel reservations.

Integration with External Services: To retrieve and present a carefully selected selection of movies, communicate with a box office API. Additionally, incorporate the Stripe payment gateway to enable safe online transactions for ticket purchases.

2. Functional Analysis - Proposed Solutions:

We will examine the specific functional elements of the suggested movie hall ticket sales system solution in this section:

2.1 Event and Show Management:

In order to retrieve a carefully selected list of movies, the system will communicate with a box office API, simplifying the process of managing and showcasing a wide variety of shows. A key element will be event and show management, which gives administrators the ability to add, amend, and remove shows as needed. This feature makes sure that the system is always evolving and responsive to the audience's tastes and needs.

2.2 Show Scheduling:

One of the project's more complex tasks is show scheduling, which guarantees a daily lineup of 10 films spread across four halls that is well-balanced. The carefully scheduled shows take place twice a day at 11:00, 13:00, 15:00, 17:00, and 19:00. The system will effectively manage the scheduling of these performances, limiting the number of daily sessions that each hall can have while avoiding overbooking. A crucial component is flexibility, which enables adjustments to the number of sessions according to the availability of movies. Through the system's interface, administrators have the option to randomly assign shows or manage them manually.

2.3 Seat Booking and Reservation:

The system's primary purpose is to reserve and book seats. Every hall will have a detailed seating chart available for that particular date and session. This seating chart will be available for users to view, choose one or more seats, and make reservations for. Every seat's status will be carefully monitored by the system, which will indicate whether it is "booked" or "available." The system ensures a smooth and well-organized booking process by storing the name and phone number of the person who made the reservation when a seat is reserved.

2.4 Payment Gateway Integration:

The system will incorporate the Stripe payment gateway to enable safe and easy online payments. The ability to pay for reservations and ticket purchases will be provided by this integration, improving the user experience in general. Several payment options will be available for user convenience, and payment processing will be reliable and seamless.

2.5 User Access and Administration:

This system's administration and user access will be crucial components. Customers will be able to log in, view their booking history, and make new reservations through the platform's user accounts. A feature-rich panel on the administrator side will make it possible to manage user accounts, schedules, and shows. Administrators will have the capacity to monitor sales data, manage reservations. A structured database will be used to safely manage user data.

2.6 Reporting and Analytics:

The system will have analytics and reporting features to offer insightful performance data. Reports on revenue, popularity of shows, and ticket sales are available to administrators. Making data-driven decisions to maximize the cinema's services and operations will be made easier with the aid of these analytics.

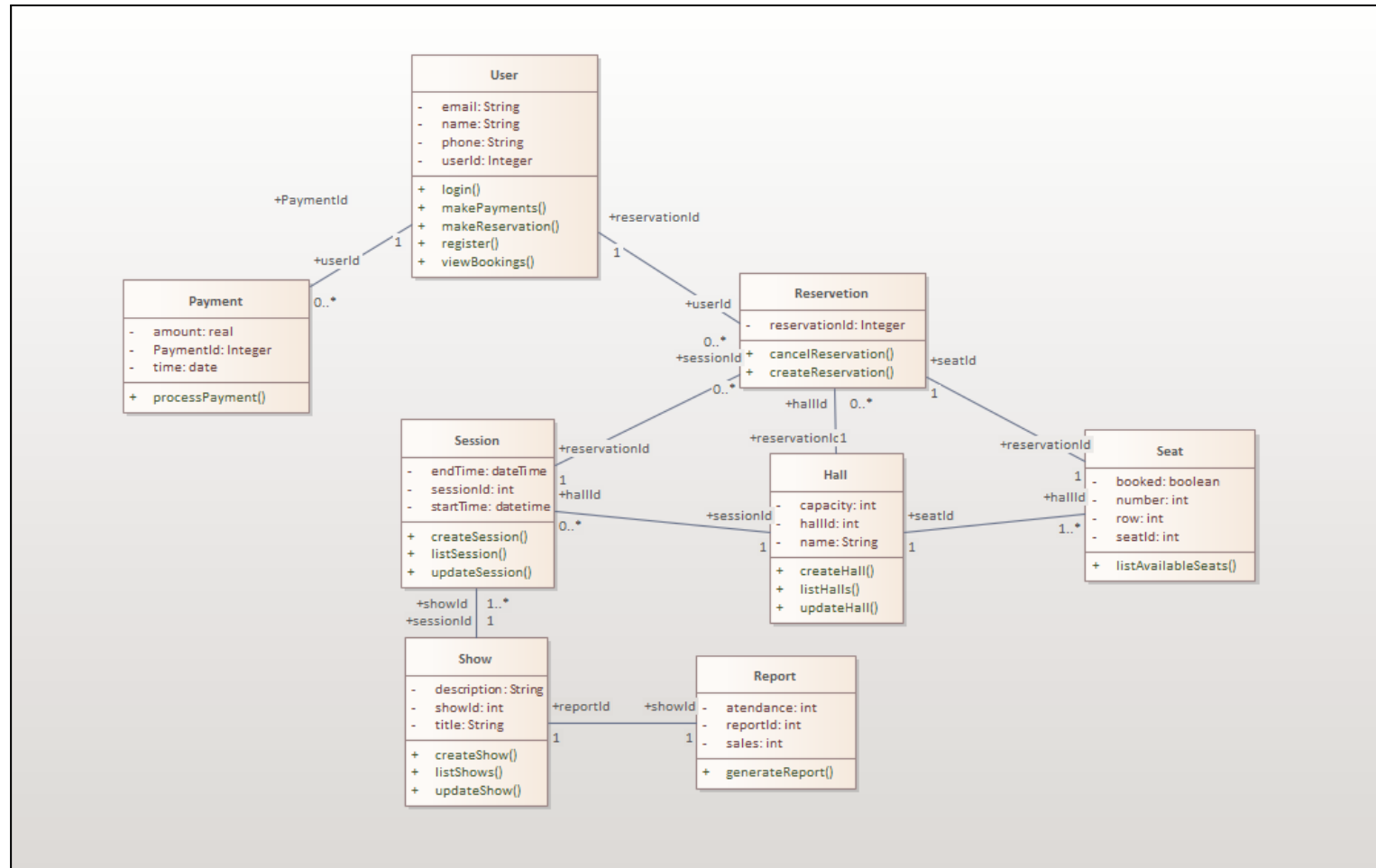
2.7 Accessibility and User Experience:

It is critical to guarantee both accessibility and a flawless user experience. To accommodate a diverse user base, the web application will be designed with a user-friendly interface, responsive design, and adherence to accessibility standards. User satisfaction and engagement will be increased by the user interface's ease of use and intuitiveness.

To sum up, the suggested solution includes a wide range of features, including seat reservations, payment integration, show management, scheduling, and user access. It will not only make a movie hall run more smoothly, but it will also give its audience a fun and convenient experience.

2.8 Classes diagram:

Figure 1. Classes diagram



2.9 activity diagrams:

2.9.1 Administration Activity Diagram

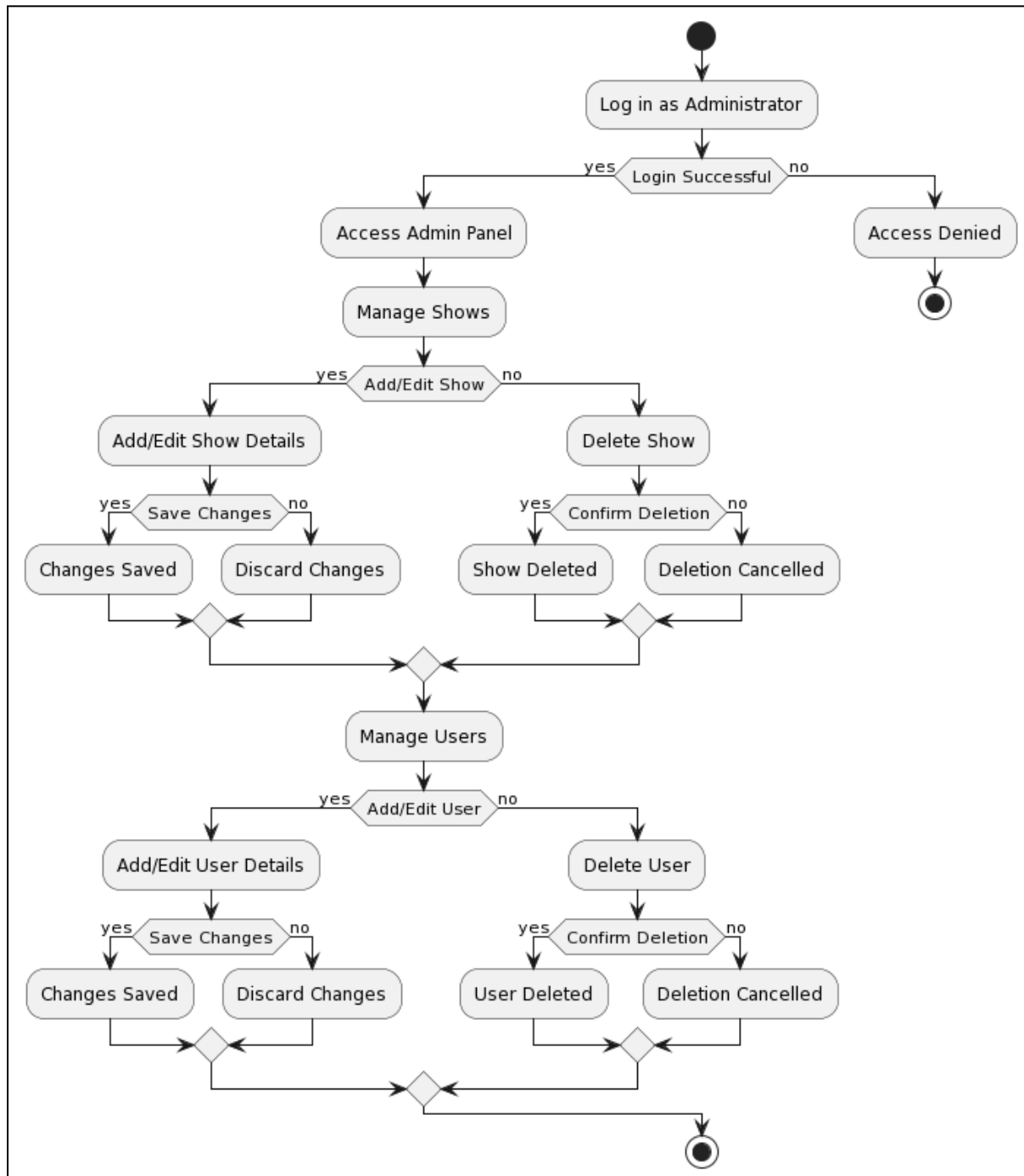


Figure 2. Administration Activity Diagram

2.9.2 Login and Sign-up Activity Diagram

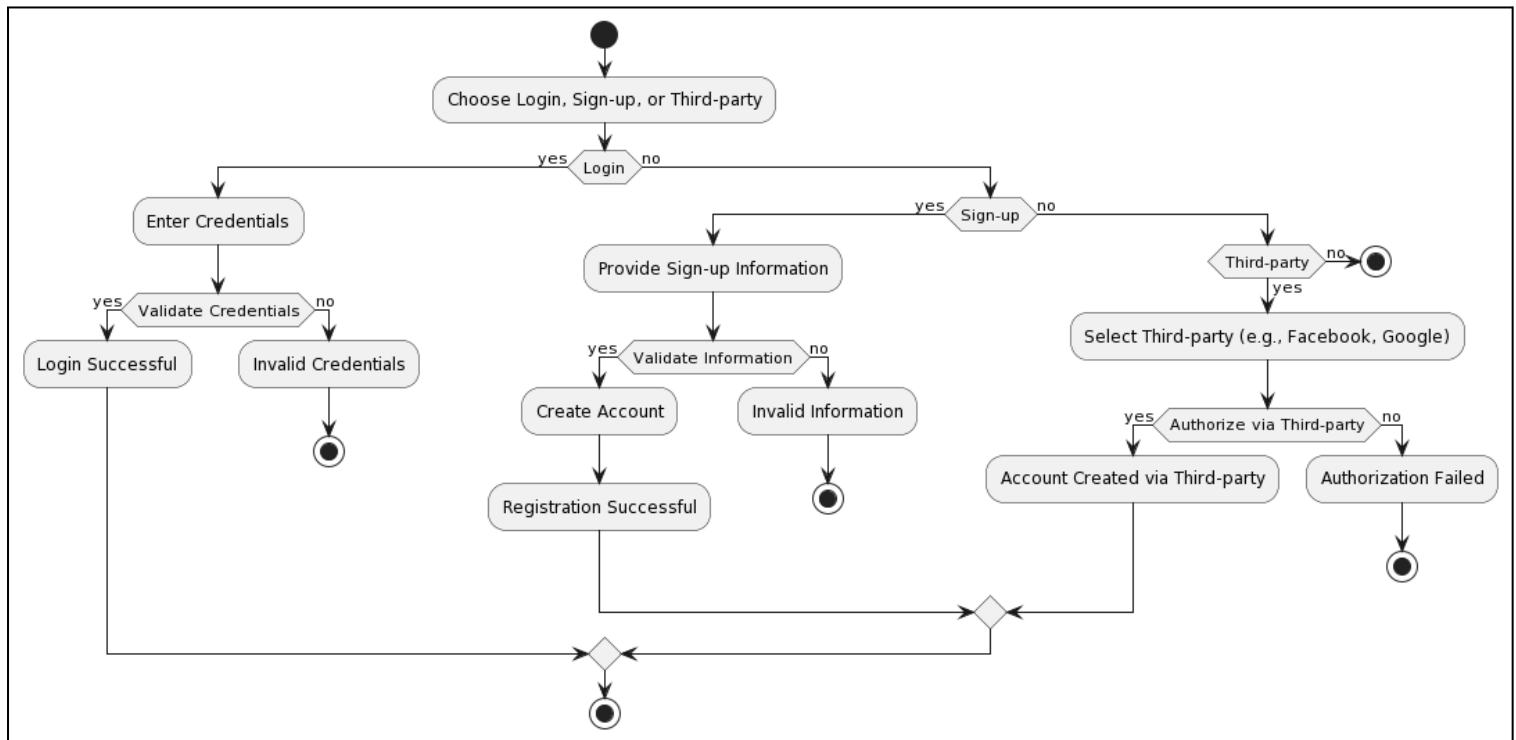


Figure 3. Login and Sign-up Activity Diagram

2.9.4 Ticket Purchase Activity Diagram

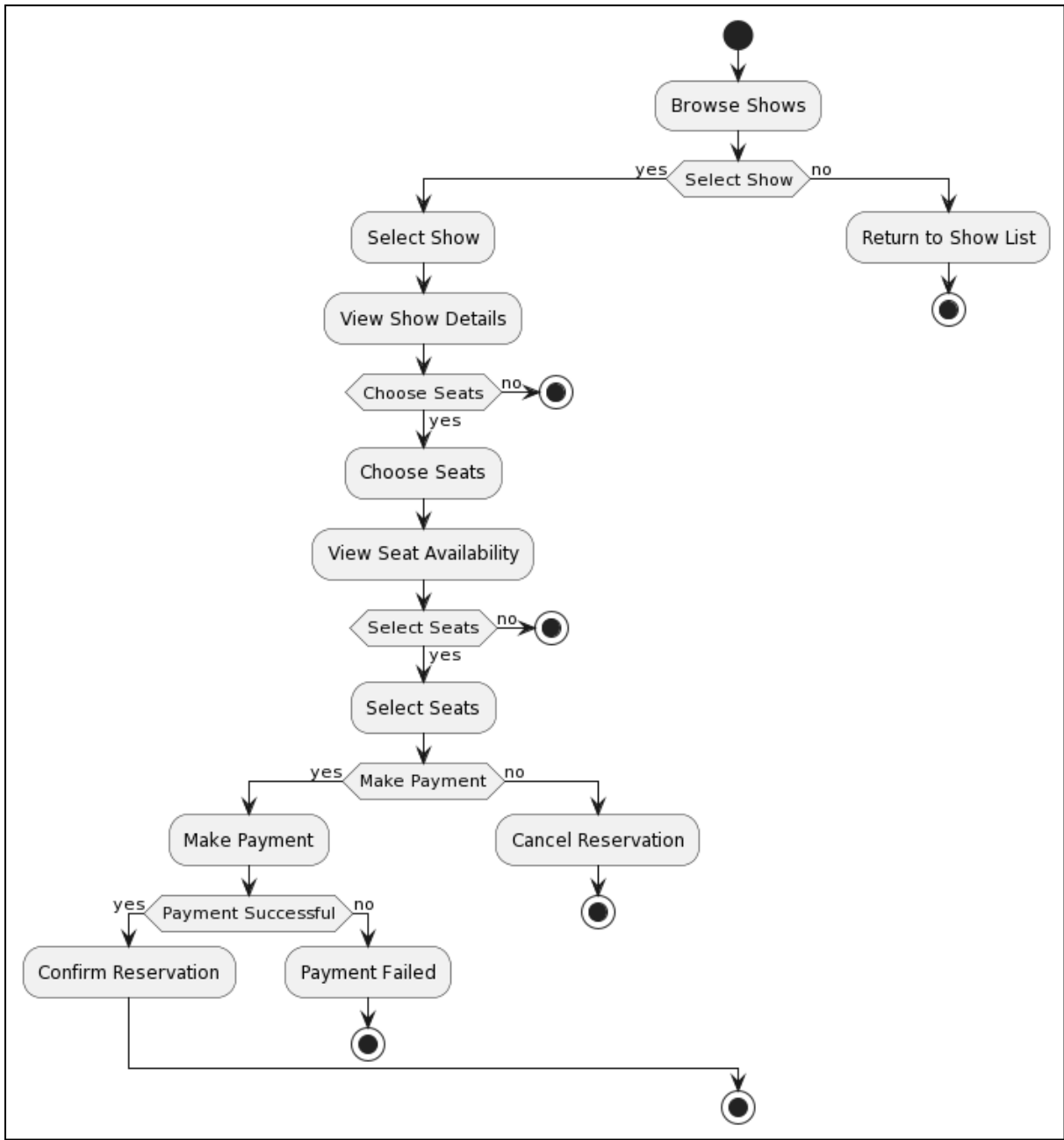


Figure 4. Ticket Purchase Activity Diagram

2.9.5 use case diagram

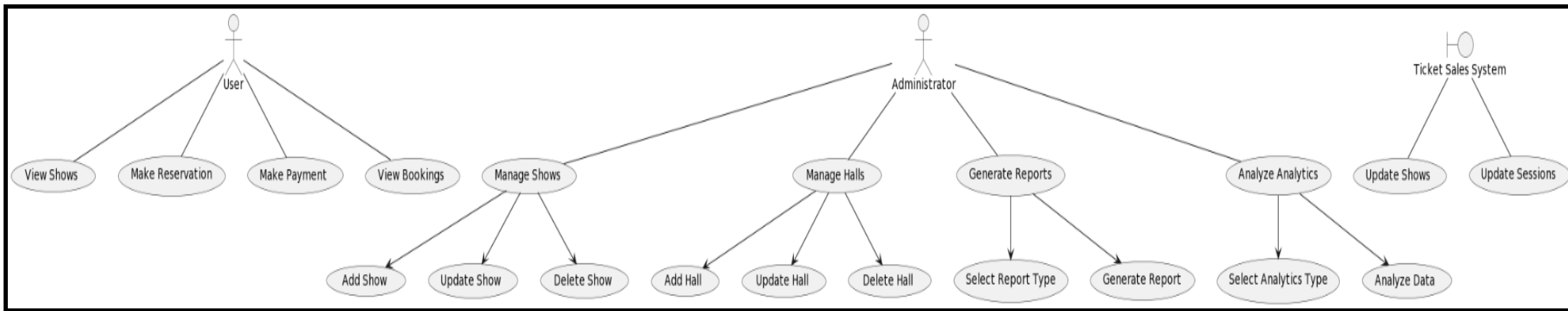


Figure 5. use case diagram

3. Technical Study: Software and Language Selection

3.1 Libraries and frameworks selection

Selecting the appropriate library or framework is essential to the project's success. Selecting tools that meet the unique needs of the application is crucial. The libraries taken into consideration for this project are listed here:

Library / Framework	Justification
React	Chosen as the front-end development framework because of its adaptability, popularity, and capacity for producing UIs that are responsive.
Node.js	Because of its rapid execution speed and capacity to manage numerous connections, which are essential for an online reservation application, it is used for the backend.
PostgreSQL	Chosen as the relational database for storing data because it offers sophisticated queries, robust data management features, and data integrity.
Stripe	Because of its simplicity and security, it is integrated as the online payment solution.
Firebase	Used for user data storage in PostgreSQL after being used for authentication to guarantee safe application access.

Table 1. List of chosen libraries and choice justification

3.2 Programming Language Selection

Selecting the appropriate programming languages is very important because it has an impact on the application's quality, performance, and maintainability. The programming languages chosen for this project are as follows:

JavaScript/ES6+: Because of its rich ecosystem of libraries and modules and browser compatibility, this language is used for frontend development with React.

Because of its high execution speed, scalability, and capacity to manage asynchronous operations, Node.js (JavaScript) is used for backend development.

SQL (PostgreSQL): SQL is used to manage databases and enables data integrity checks and sophisticated queries.

In tandem with React, HTML/CSS is used to create the user interface, guaranteeing a seamless and visually appealing user experience.

3.3 Deployment diagram

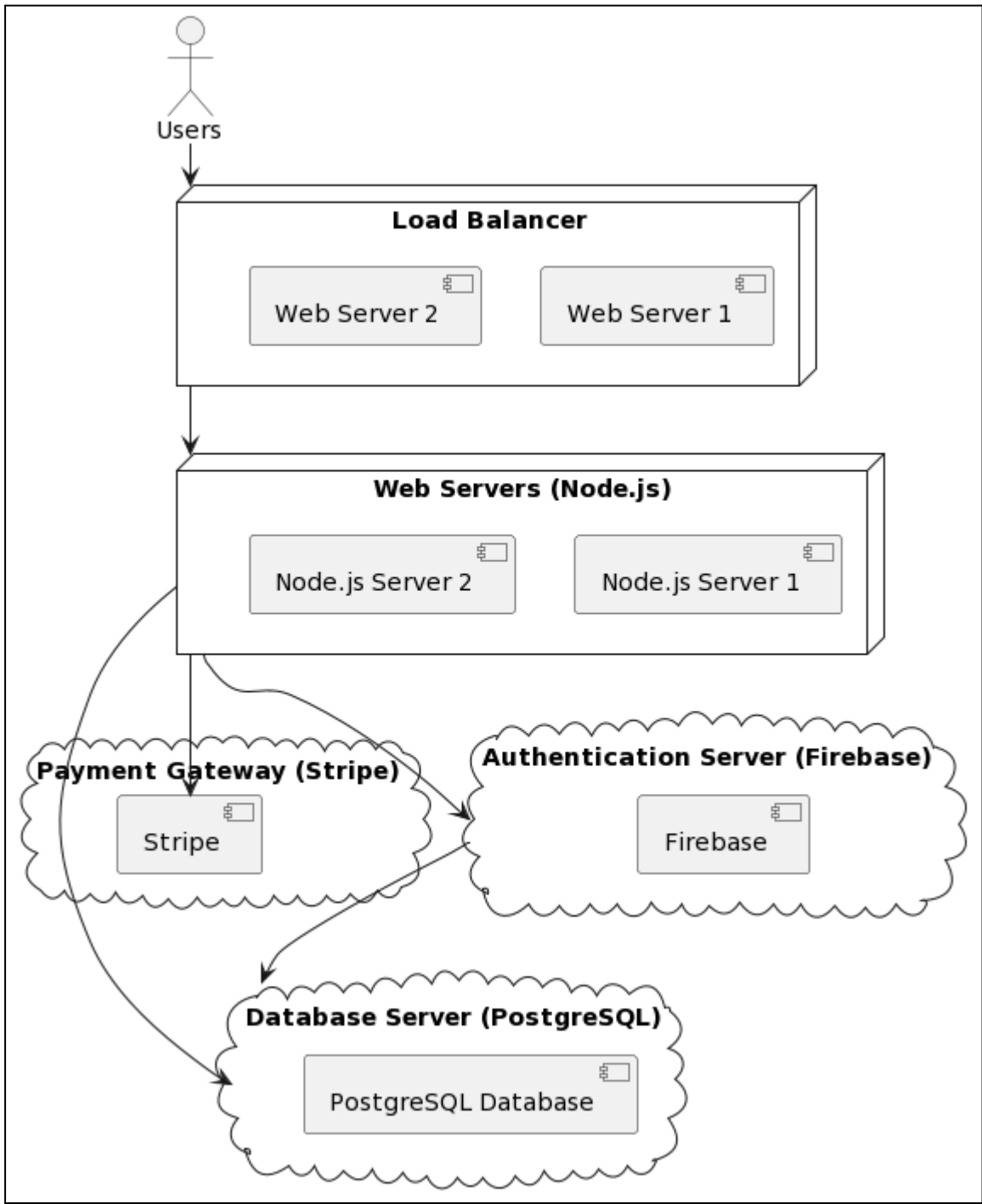


Figure 6. Deployment diagram