
Software Requirements Specification

for

Railway Reservation Portal

Version 1.0

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Revision History

Name	Date	Reason For Changes	Version
Initial Product/System Specifications	29/02/2024	Adding all the project specification details for the SRS	1

1. Introduction

1.1 Purpose

The primary goal of this *Railway Reservation Portal* is to provide a convenient and efficient way for users to book train tickets through an online platform- they can check seat availability, select their preferred seats and coaches, and make reservations and cancellations. Once a ticket is booked, the passenger can also select their food preferences. This system also provides a smoother and more efficient travel experience as the passengers do not have to queue at ticket counters. It also provides a real-time status of all the trains arriving and departing at multiple train stations.

1.2 Document Conventions

The font used when writing this *Software Requirements Specification for the Railway Reservation Portal* is Times New Roman, size 12 for regular text and size 14 bold for headings. The text is made *italics* for highlighting purposes and **bold** for stating subpoints. The document is justified throughout.

1.3 Intended Audience and Reading Suggestions

The intended audience of this document and project are the developers of this application, testers, admins who operate the system and lastly, the end users who utilize the system to book train tickets.

The project is being done under the guidance of Prof. Akshay K. C. and other staff of the ICT department.

The readers are suggested to refer section 1.5 References to understand the meaning of certain abbreviations and acronyms used in this SRS document.

1.4 Product Scope

The *Railway Reservation Portal* is a standalone product aimed at revolutionizing the railway booking experience. It provides a comprehensive solution for users to efficiently reserve and manage train tickets, access real-time train information, and book enroute services. The system introduces a user-friendly interface for passengers and robust administrative tools for railway authorities. As a self-contained system, it serves as a platform, enhancing the overall efficiency and user experience within the railway reservation domain.

1.5 References

Acronyms/Abbreviations:

- SRS – Software Requirement Specifications
- DBMS – Database Management System
- RRP – Railway Reservation Portal
- CPU – Central Processing Unit
- RAM – Random Access Memory

- SQL – Structured Query Language
- OS – Operating System
- RDBMS – Relational Database Management System
- GUI – Graphical User Interface
- API – Application Programming Interface

2. Overall Description

2.1 Product Perspective

The *Railway Reservation Portal (RRP)* is a self-contained product designed to modernize and enhance the railway booking experience. It replaces manual and fragmented digital solutions, integrating comprehensive features for users and administrators. As a standalone system, RRP aims to streamline the process of train reservations, real-time updates, and administrative management. It operates within a larger railway operation ecosystem, interfacing with external data sources and systems for real-time information, payment processing, and analytics. This SRS outlines its capabilities, interfaces, and the technological framework required to support its objectives.

2.2 Product Functions

Below are the product functions of the Railway Reservation Portal:

- **Train Booking and Management:** Allows users to search, view, and book train tickets based on real-time seat availability, with options for seat and class preferences.
- **User Account Management:** Enables users to create and manage their profiles, track booking history, and handle ticket cancellations and modifications.
- **Enroute Services Booking:** Offers passengers the ability to book additional services like meals, bedding, and Wi-Fi during their journey.
- **Real-Time Train Status Updates:** Provides users with up-to-the-minute information on train schedules, delays, platform changes, and current location.
- **Administrative Functions:** Gives administrators the power to manage train schedules, routes, and service offerings, as well as oversee user activities and bookings.
- **Financial Reporting and Analytics:** Allows for the generation of financial reports detailing revenue expenses and offers analytics for data-driven decision making.
- **Automated Alerts and Notifications:** Sends automated messages regarding booking confirmations, cancellations, and travel reminders to users.

2.3 User Classes and Characteristics

1. Regular Passengers

- a. Frequency of Use: High
- b. Product Functions Used: Primarily engaged in train booking and management, real-time train status updates, enroute services booking, usage of loyalty points for booking of next journeys.
- c. Characteristics: These users range from daily commuters to occasional travelers. They require a straightforward, efficient booking process and timely information for planning their trip.

2. Occasional Travelers

- a. Frequency of Use: Low to Medium
- b. Product Functions Used: May use a broader range of services less frequently, including user account management for viewing booking history, and automated alerts.
- c. Characteristics: Less familiar with the system, requiring a user-friendly interface and intuitive navigation. They value ease of access to travel information and support services.

3. Administrators

- a. Frequency of Use: High
- b. Product Functions Used: Train and schedule management, user and booking oversight, financial reporting, and analytics.
- c. Characteristics: Technical staff with advanced permissions for system management. Requires comprehensive tools for monitoring system operations, user activity, and financial performance.

2.4 Operating Environment

The *Railway Reservation Portal* will operate in a web-based environment, accessible across various devices and platforms including desktops, laptops, tablets, and smartphones. It will support major operating systems such as Windows, macOS, Linux, iOS, and Android. The system will be developed to be compatible with major web browsers like Chrome, Firefox, Safari, and Edge. Integration with payment gateways and email notification services will be required for transaction and communication functionalities.

2.5 Design and Implementation Constraints

The system must adhere to data protection regulations and ensure secure handling of user information and transactions. It will be developed using specific technologies, including a relational database management system (e.g., Oracle SQL, MySQL) for backend storage, and a web development framework (e.g., React for frontend, Node.js for backend). Performance constraints include high availability and responsiveness during peak usage times. The design will also need to accommodate scalability for future expansion.

2.6 User Documentation

User documentation will include a comprehensive user manual, FAQs, and online help resources. Tutorials for both end-users and administrators will be provided to ensure smooth onboarding and usage. Documentation will be available in digital formats (PDF, web-based guides) to ensure accessibility and ease of update.

2.7 Assumptions and Dependencies

Proper functioning of this portal requires a few assumptions and dependencies taken into consideration.

Below are the Assumptions and Dependencies listed:

Assumptions

- **Stable Internet Connectivity:** It is assumed that both the users and the system administrators will have consistent and reliable access to the internet to ensure uninterrupted service usage and management.
- **Third-Party Services Reliability:** The system's efficiency in processing payments, sending notifications (SMS/email), and real-time data fetching (e.g., train statuses) depends on the reliability of third-party services.
- **User Device Compatibility:** Users' devices are assumed to be compatible with the latest web technologies used in the system's development, ensuring a seamless user experience across different platforms.

Dependencies

- **Payment Gateway Integration:** The system's ability to process transactions depends on integration with one or more third-party payment gateways, which must support various payment methods (credit/debit cards, net banking, etc.).
- **SMS/Email Service Providers:** Dependence on external service providers for sending automated alerts and notifications to users.
- **Web Development Frameworks and Libraries:** The project's development timeline and feature set depend on specific web development frameworks (e.g., React, Node.js) and libraries, assuming their continued support and availability.

3. External Interface Requirements

3.1 User Interfaces

The *Railway Reservation Portal* has an intuitive user interface, offering a seamless experience for both Users and Administrators. Users interact with a user-friendly platform, enabling easy train searches, real-time seat availability checks, and hassle-free booking with immediate confirmations. There is also a view booking option to view your ticket confirmation details.

Administrators benefit from a robust interface, facilitating efficient schedule management, user oversight, and financial reporting. The system adheres to GUI standards, providing consistency, and incorporates automated alerts and notifications for enhanced user engagement. Detailed user interface specifications are available in a separate document for further reference.

3.2 Hardware Interfaces

The only hardware interface between the software product and the user includes standard devices such as a computer, laptop, tablet, or a smartphone. The system relies on robust communication protocols for data exchange, ensuring efficient interactions between software and hardware. It is accessible across various platforms.

3.3 Software Interfaces

The *Railway Reservation Portal* interfaces with various software components to ensure seamless operations. It relies on a specific database system (e.g., MySQL version 8.0) to store and retrieve booking information, user details, and system data. The system is built on a web-based architecture, leveraging JavaScript based framework React.js for the user interface. Communication with the

server occurs via HTTP/HTTPS protocols. APIs facilitate interactions with payment gateways, enabling secure transactions.

3.4 Communications Interfaces

This system relies on secure and efficient communication interfaces for seamless interactions. Utilizing HTTPS protocols, the system ensures encrypted data transfer, safeguarding user information during online transactions. It supports standard web browser interactions for user accessibility. Automated alerts and notifications leverage email communication. The system provides real-time updates on train status and analytics. With standardized communication protocols and encryption measures, the *Railway Reservation Portal* prioritizes secure and reliable data exchange between users, administrators, and external services.

4. System Features

The *Railway Reservation Portal* has features catering to general users who want to plan a trip and book train tickets and the system administrators who will be able to manage the portal and gain insights on the functioning of the Railway Network.

4.1 Train Booking and Management

4.1.1 Description and Priority

This feature allows users to search for, view, and book train tickets based on real-time seat availability. Users can select their preferred tier/coach and berth, along with food preferences.

Priority: High - This feature is crucial as it directly impacts the user experience and system's usability.

4.1.2 Stimulus/Response Sequences

User Action: Enters journey details (date, source, destination).

System Response: Displays available trains.

User Action: Selects preferred train and enters details (tier/coach, berth, food preferences).

System Response: Confirms booking and sends a confirmation message.

4.1.3 Functional Requirements

REQ-1: The system must provide a search interface for entering journey details.

REQ-2: The system must display available trains based on entered search criteria.

REQ-3: Users must be able to select their preferred seating and add-on services.

REQ-4: The system must confirm the booking and provide a digital ticket.

REQ-5: The system should handle payment processing securely and efficiently.

REQ-6: In case of errors or invalid inputs, the system should provide clear error messages and guidance for correction.

4.2 User Account Management

4.2.1 Description and Priority

Enables users to register, manage their profiles, track booking history, and handle ticket modifications or cancellations.

Priority: High - Essential for personalized user experience and operational efficiency.

4.2.2. Stimulus/Response Sequences

User Action: Registers or logs into their account.

System Response: Provides access to user profile and booking history.

User Action: Requests ticket cancellation or modification.

System Response: Processes the request and updates the booking status accordingly.

4.2.3 Functional Requirements

REQ-1: Secure registration and login process for users.

REQ-2: Ability to view and manage booking history.

REQ-3: Functionality to cancel or modify existing bookings.

REQ-4: System must securely handle user data and comply with data protection regulations.

REQ-5: In the event of a failed cancellation or modification, the system must inform the user and provide alternatives.

4.3 Booking Details

4.3.1 Description and Priority

This feature enables users to view detailed information about their bookings, including train details, seat assignments, and enroute service selections.

Priority: High - Due to its direct impact on user satisfaction and engagement.

4.3.2. Stimulus/Response Sequences

User Action: User logs into their account and navigates to the "My Bookings" section.

System Response: Displays a list of current and past bookings with an option to view detailed information for each.

4.3.3 Functional Requirements

REQ-1: The system shall allow users to view detailed information about each booking, including train name, departure and arrival times, seat number, and any selected enroute services.

REQ-2: The system shall provide options for users to cancel or modify bookings directly from the booking details page.

4.4 Admin Portal to Manage Trains

4.4.1 Description and Priority

Allows administrators to add, view, modify, and delete train schedules and details.

Priority: High – This feature is essential for maintaining and updating train services.

4.4.2. Stimulus/Response Sequences

User Action: Admin User logs into the portal and selects the option to manage trains.

System Response: Provides an interface to add new trains, view all train schedules, and edit or delete existing entries.

4.4.3 Functional Requirements

REQ-1: The system shall enable administrators to add new train entries, including details like train name, route, and timings.

REQ-2: The system shall allow administrators to view a comprehensive list of all trains and select individual trains to edit or delete.

4.5 Admin Insights

4.5.1 Description and Priority

This feature provides administrators with analytics and insights into system usage, booking trends, and financial reports.

Priority: Medium– Feature allows strategic planning and decision-making.

4.5.2 Stimulus/Response Sequences

User Action: Admin accesses the Insights section from the admin dashboard.

System Response: Displays analytics on user engagement, popular routes, revenue generated, and other relevant metrics.

4.5.3 Functional Requirements

REQ-1: The system shall generate and display analytics on booking volumes, cancellations, revenue by route, and user demographics.

5. Other Nonfunctional Requirements

5.1 Performance Requirements

The portal should be able to handle multiple simultaneous concurrent requests to cater to users and for this the server that the application is hosted on should have a good CPU processing power and RAM. These requirements ensure the system remains responsive and efficient, providing a seamless user experience even during peak usage times.

5.2 Safety Requirements

The system must ensure the safety of personal and financial data, adhering to data protection regulations such as ISO27001. It should implement safeguards against data breaches and unauthorized access, including regular security audits and encryption of sensitive information. In case of system failure, there must be mechanisms for data recovery and minimal operational downtime, safeguarding against loss or damage.

5.3 Security Requirements

The system requires secure user authentication mechanisms, such as two-factor authentication, to protect user accounts. The system should employ regular vulnerability assessments and adhere to security best practices to protect against threats and unauthorized data access.

5.4 Software Quality Attributes

- **Availability:** The system should be available 24/7 excluding scheduled maintenance.
- **Maintainability:** Code should be modular and well-documented to facilitate easy updates and bug fixes.
- **Reliability:** The system must perform its required functions under stated conditions for a specified period.
- **Usability:** The user interface should be intuitive and accessible, requiring minimal training for users.
- **Scalability:** Designed to efficiently handle an increase in users and data volume, with the ability to scale resources up or down based on demand.

5.5 Business Rules

Only registered users can make bookings, guest checkout is not permitted to ensure accountability and service personalization.

Administrators have the authority to modify or cancel train schedules and bookings in response to operational requirements or emergencies.

Personal data of users can only be accessed by authorized personnel for legitimate business purposes, in compliance with privacy laws.

6. Other Requirements

Database Requirements: The system requires a scalable, relational database management system (RDBMS) like Oracle SQL or MySQL capable of handling complex queries with high efficiency.

Internationalization Requirements: The system should support multiple languages and currencies, allowing for easy adaptation to different countries' regulations and user preferences.

Legal Requirements: Compliance with local and international laws regarding online transactions, consumer rights, and data protection is necessary.

Reuse Objectives: Components of the system, especially the core modules for booking and user management, should be designed for potential reuse in other projects or platforms within the organization.

Appendix A: Glossary

<Define all the terms necessary to properly interpret the SRS, including acronyms and abbreviations. You may wish to build a separate glossary that spans multiple projects or the entire organization, and just include terms specific to a single project in each SRS.>

- TBD

Appendix B: Analysis Models

<Include high level architecture and entity-relationship diagrams.>

- TBD

Appendix C: To Be Determined List

- *System Architecture and Communication between frontend and backend*
- *Schema Constructs for Features*
- *ER Diagrams*
- *Initialization of Database and Backend technologies*
- *Glossary to be populated*