Table of Contents

- ✓ *Payment Gateway Software*: Seamless integration with payment gateway APIs is essential to enable secure payment processing for users. The software interfaces with these gateways to facilitate financial transactions.
- ✓ *Authentication Services*: User authentication is supported through the IRCTC 2.0 website and mobile app, ensuring secure access to personal booking information and maintaining data privacy.

3.4 Communication Interface Requirements

Effective communication interfaces are integral to IRCTC 2.0 for data exchange with passengers, railway authorities, and payment processors:

- ✓ *Secure Socket Layer (SSL)*: SSL encryption ensures secure communication between users' browsers and the IRCTC 2.0 website, safeguarding sensitive data during transmission.
- ✓ *SMS and Email Services*: Passengers receive essential information such as booking confirmations, ticket details, and travel updates through SMS and email notifications. These services enhance communication and keep passengers informed.
- ✓ *IRCTC 2.0 Helpline*: The system integrates with customer support channels, including a dedicated helpline, to provide passengers with prompt assistance for booking-related issues and inquiries, fostering a sense of trust and reliability

4. System Features

4.1 System Feature A

4.1.1 Description and Priority

System Feature A provides real-time seat availability information to empower passengers in making informed decisions regarding their train bookings. This feature is of high priority as it directly impacts the user experience and booking process.

4.1.2 Action/Result

- ✓ Passengers can check real-time seat availability for their chosen trains.
- ✓ The system displays accurate and up-to-the-minute information to help passengers secure their preferred seats.
- ✓ This feature is crucial for both individual and group bookings.

4.1.3 Functional Requirements

- ✓ The system must access and display real-time seat availability data from the Indian Railways Database.

- ✓ It should provide an intuitive user interface for passengers to search for seat availability based on various criteria, including source and destination stations, travel dates, class preferences, and train types.
- ✓ Passengers should be able to view seat availability for multiple trains simultaneously.
- ✓ The system must update seat availability information continuously to reflect real-time changes.

4.2 System Feature B

4.2.1 Description and Priority

System Feature B offers flexible ticket cancellation options, enhancing passenger satisfaction by providing convenient online ticket cancellation and refund processing. This feature is also of high priority as it contributes to the overall user convenience.

4.2.2 Action/Result

- ✓ Passengers can initiate ticket cancellations through the system.
- ✓ Refunds are processed in strict adherence to Indian Railways' cancellation policies.
- ✓ This feature provides passengers with the freedom to adjust their travel plans when needed.

4.2.3 Functional Requirements

- ✓ The system must support online ticket cancellation for all types of bookings, including e-tickets and physical tickets.
- ✓ It should calculate refunds automatically based on Indian Railways' cancellation policies and process them securely.
- ✓ Passengers should receive confirmation of their ticket cancellations via SMS and email.
- ✓ Cancellation requests should be handled in real-time, and passengers should be able to track the status of their refund requests.

4.3 System Feature C

4.3.1 Description and Priority

System Feature C focuses on a user-friendly booking history feature, allowing passengers to effortlessly review their past and upcoming journeys. This feature is a priority to enhance user experience and facilitate record-keeping.

4.3.2 Action/Result

- ✓ Passengers can access a user-friendly interface to review their booking history.
- ✓ This feature aids in keeping track of travel history, accessing e-tickets, and obtaining travel statements for reimbursement purposes.

4.3.3 Functional Requirements

- ✓ The system should maintain a comprehensive booking history for each user account.
- ✓ Passengers should be able to filter and search their booking history based on various parameters, including date, train, and booking status.
- ✓ E-tickets should be available for download and printing directly from the booking history.
- ✓ Passengers should receive email notifications of upcoming journeys and booking confirmations.

4.4 System Feature D

4.4.1 Description and Priority

System Feature D emphasizes secure payment options during the booking process, ensuring the safety of financial transactions. This feature is of high priority to instill trust in users and safeguard their financial data.

4.4.2 Action/Result

- ✓ Passengers have access to a variety of secure payment options, including debit/credit cards, net banking, digital wallets, and UPI.
- ✓ This enhances the overall booking experience and allows passengers to choose their preferred payment method securely.

4.4.3 Functional Requirements

- ✓ The system must integrate with multiple payment gateways securely to facilitate different payment methods.
- ✓ Payment data should be encrypted using industry-standard protocols to prevent unauthorized access.
- ✓ Users should receive payment confirmation and e-ticket details upon successful transactions.
- ✓ The system should provide a seamless payment experience, with quick response times.

5. Other Nonfunctional Requirements

5.1 Performance Requirements 5.1.1 Capacity

The IRCTC 2.0 infrastructure must exhibit high scalability to handle a substantial volume of concurrent users, supporting simultaneous booking transactions around the clock, 24 hours a day.

5.1.2 Dynamic Requirements

- ✓ Card Verification and User Authentication: These processes must execute within a response time target of 0.8 seconds under normal load and 1 second during peak server load.

- ✓ Fund Transfers and Booking: Response times should not exceed 2 seconds under normal load and 3 seconds during peak server load.
- ✓ Peak Hour Responsiveness: Response times should not exceed 4 seconds under normal load and 5 seconds during peak server load, especially during Tatkal ticket bookings.

5.1.3 Quality

- ✓ The website should maintain consistency across all elements, enhancing the overall user experience.
- ✓ Rigorous testing procedures, including unit testing, integration testing, and user acceptance testing, must be conducted to identify and address issues and bugs.

5.2 Safety Requirements

Safety measures should include backup power supplies to maintain continuous operation during power failures and database consistency to ensure data integrity.

5.3 Security Requirements

- ✓ Stringent password policies should be enforced, including password length, complexity, and limited login attempts.
- ✓ Captcha authentication should be implemented on the login page to prevent unauthorized access.

5.4 Software Quality Attributes

- ✓ Reliability and availability are critical attributes, ensuring passengers can trust the system and access services 24/7.
- ✓ Maintainability is essential to facilitate timely updates, debugging, and feature enhancements.
- ✓ Self-monitoring mechanisms should be in place to detect and report system faults.
- ✓ Flexibility is required to adapt to evolving policies and services mandated by Indian Railways.

5.5 User Documentation

User documentation is a critical component of the IRCTC 2.0 project, aimed at ensuring passengers can effectively use the system with ease and confidence. The user documentation will consist of the following elements:

5.5.1 User Guides

Comprehensive user guides will be provided, covering various aspects of using the IRCTC 2.0system. These guides will include step-by-step instructions and visual aids to assist

passengers in performing tasks such as:

- Creating and managing user accounts.
- Searching for trains and checking seat availability.
- Booking and canceling tickets.
- Accessing and utilizing the booking history feature.
- Making secure payments through various methods.
- Navigating the user interface.
- Troubleshooting common issues.

5.5.2 Tutorials and Videos

In addition to written guides, the user documentation will include video tutorials. These video tutorials will offer a more visual and interactive way for passengers to learn how to use the system effectively. Each tutorial will focus on a specific aspect of the system, allowing users to watch and follow along.

5.6 Project Documentation

Project documentation is essential for maintaining transparency, facilitating collaboration among project stakeholders, and supporting future maintenance and enhancements. The following project documentation will be maintained:

5.6.1 Requirements Documentation

This documentation will provide a detailed overview of the project's requirements, including functional and nonfunctional requirements. It will serve as a reference for project managers, developers, and testers to ensure that the system meets all specified requirements.

5.6.2 Design Documentation

Design documentation will outline the architecture, system design, and database schema of IRCTC 2.0. It will include diagrams, flowcharts, and system architecture descriptions to aid developers in understanding the system's structure.

5.6.3 Test Documentation

Test documentation will detail the testing strategy, test cases, and test results. This documentation is crucial for quality assurance and ensuring that the system functions as expected.

5.6.4 User Documentation

In addition to the user guides and tutorials mentioned in section 5.5, user documentation will also include help files that passengers can access directly from within the system. These help files will provide on-the-spot assistance and guidance for users as they navigate the platform.

5.6.5 Change Logs and Version History

Change logs will document any modifications, updates, or bug fixes made to the system. Version history will track the evolution of the software, including major and minor releases.

5.6.6 Project Management Documentation

Project management documentation will include project plans, schedules, and status reports. It will help project managers and stakeholders monitor progress, allocate resources, and make informed decisions throughout the project's lifecycle.

5.6.7 Legal and Compliance Documentation

This documentation will outline legal agreements, licenses, and compliance requirements related to the use of the IRCTC 2.0 system. It ensures that the project complies with all relevant laws and regulations.

6 Other Requirements

The "Other Requirements" section encompasses additional aspects and features of the IRCTC 2.0 Online Railway Reservation System that are essential for its functionality and user satisfaction. These requirements address predictive ticket availability, user-generated reviews and ratings, and other important considerations.

6.1 Predictive Ticket Availability

In an effort to surpass user expectations, IRCTC 2.0 will introduce predictive ticket availability. Passengers will have the ability to view the percentage chance of securing a confirmed ticket. This feature empowers passengers to make more informed decisions about their travel plans, especially during peak booking seasons.

6.2 User-Generated Reviews and Ratings

To enhance transparency and accountability within the railway system, IRCTC 2.0 will introduce a user review and rating system for trains, stations, and food service providers. Passengers will have the opportunity to share their experiences and insights, providing valuable feedback to improve services and overall passenger satisfaction.

Appendix A: Terminology/Glossary/Definitions List

This section will contain a list of terms, glossary, and definitions used throughout the project. Below are some entries:

1. **IRCTC**: Abbreviation for "Indian Railway Catering and Tourism Corporation," the organization responsible for online railway reservations in India.
2. **E-ticket**: An electronic ticket, or e-ticket, is a digital ticket that can be booked and managed online.

3. **PNR**: Passenger Name Record, a unique identifier for each railway booking that helps track and manage reservations.
4. **Tatkal**: A reservation system in India that allows passengers to book tickets on a short notice, typically one day before the journey.
5. **API**: Abbreviation for "Application Programming Interface," a set of rules and protocols for building and interacting with software applications.
6. **Captcha**: A security feature that distinguishes between human users and automated programs, often used to prevent unauthorized access.

Appendix B: To Be Determined

Appendix B serves as a flexible space to accommodate any additional requirements, details, or developments that may arise during the project's development and planning phases. Here, we can document specific project needs, constraints, or features that become apparent as the project progresses.

For example, we might include:

1. **Integration with External Services**: Any external services or APIs that need to be integrated into the system should be documented here, along with their specifications and requirements.
2. **Regulatory Compliance**: If there are specific regulatory requirements or standards that the system must adhere to, they should be detailed in this section.
3. **Data Migration Strategy**: If there is a need to migrate data from existing systems or sources, the strategy for data migration, including data mapping and transformation, should be outlined here.
4. **User Training**: Details about user training programs or materials that will be developed to help users effectively utilize the system.
5. **Performance Testing**: If specific performance testing criteria and methodologies are required, they can be documented here.
6. **Security Audits**: Any planned security audits or assessments should be outlined, including their scope and objectives.
7. **Scalability Requirements**: If the system needs to accommodate a growing user base, you can specify scalability requirements and strategies here.