**WATERFALL PROJECT1 – PART -1/2**

**Document 1- Business case document template**

**1. Project Name:**

New Railway Reservation System

**2. Executive Summary:**

The purpose of this project is to analyze, select, and implement an efficient New Railway Reservation System that enhances the booking and cancellation processes for customers to improve user experience, system reliability, and data security. The project will be executed within a budget of ₹2.64 Crores and a duration of 13 months.

**3. Project Background:**

The current railway reservation system faces several challenges, including outdated booking processes, inconsistent cancellation procedures, limited payment options, and poor user experience. This project aims to address these issues by developing a new system that enhances the booking and cancellation processes, increases system reliability, and ensures data security.

**4. Project Objectives:**

* Provide a user-friendly online platform for booking and cancellations.
* Solution selection according to design criteria, specifications, and requirements
* Solution prototyping and testing
* Improve customer experience in booking and cancellation processes
* Increase system reliability and performance
* Ensure data security and integrity
* Enhance user interface and user experience design

**5. Scope of the Project:**

* Development of a web and mobile application.
* Integration of booking and cancellation options.
* Features for browsing, selecting, and purchasing tickets.
* Logistics and schedule management.
* Support for multiple digital payment options.

**6. Stakeholder Analysis:**

Stakeholder analysis is a process of identifying and evaluating individuals or groups who have an

interest or influence in a project. By understanding their needs, expectations, and level of influence, we can ensure effective communication and manage their impact on the project.

**Stakeholder Analysis for the New Railway Reservation System**

|  |  |  |  |
| --- | --- | --- | --- |
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| Ms. Neha | Database Administrator | neha123@gmail.com, Phone: 7989607133, 8 AM - 9 PM IST |
| Mr. Sandeep | Quality Assurance Tester | sandeep123@gmail.com, Phone: 7989607133, 8 AM - 9 PM IST |
| Ms. Anjali | Quality Assurance Tester | anjali123@gmail.com, Phone: 7989607133, 8 AM - 9 PM IST |

**7. Business Requirements:**

* User-friendly interface for passengers and railway staff.
* Secure login and user authentication.
* **Real-time updates** on train schedules, seat availability, **delays** and pricing.
* Efficient booking, cancellation, and refund processing.
* **Integration with customer support for quick assistance.**
* Multiple language support for diverse users.
* Notifications for booking confirmations and changes.
* Secure payment gateway for safe transactions.
* Data insights for tracking user behavior and performance.
* User feedback for reviews and ratings.
* Accessibility features for users with disabilities.
* Loyalty rewards and discounts for frequent users.
* Advanced search options for train timings and classes.

**8. Gap Analysis:**

 **AS-IS Process:**

* Struggles with booking and cancellation.
* Limited access to payment options.
* Manual refund processing.
* Frequent system downtime and slow performance.
* Outdated and non-intuitive user interface.
* Limited customer support options.
* No real-time updates on seat availability and train schedules.
* Security concerns with data protection.

**TO-BE State:**

* Online booking and cancellation.
* Multiple payment options.
* Automated refund processing.
* Reliable and fast system performance.
* Modern and user-friendly interface.
* Enhanced customer support with 24/7 availability.
* Real-time updates on seat availability and train schedules.
* Strong security measures to protect user data.

**9. Benefits:**

* **Accessibility:** Passengers gain easier access to booking and cancellation services.
* **Cost Efficiency:** Reduced manual processes and improved operational efficiency.
* **Knowledge:** Informed booking decisions through detailed train information.
* **Efficiency:** Streamlined booking, cancellation, and refund processes.
* **Convenience:** Passengers can book and manage reservations from anywhere, anytime.
* **Time Savings:** Faster booking and cancellation processes save passengers’ time.
* **User Satisfaction:** Improved user experience leads to higher customer satisfaction.
* **Revenue Growth:** Increased ticket sales due to a more accessible and reliable system.
* **Environmental Impact:** Reduced paper usage with digital tickets and receipts.
* **Customer Loyalty:** Enhanced loyalty programs and discounts encourage repeat usage.
* **Reduced Errors:** Automation minimizes manual errors in booking and refunds.
* **Better Decision-Making:** Data analytics provide insights for better decision-making and service improvements.
* **Enhanced Communication:** Real-time notifications and updates keep passengers informed.

**10. Risks:**

**External Risks:**

* Market condition changes could impact the system's usage and profitability.
* Regulatory changes could affect how the system operates.
* Technological changes may require system updates or replacements.

**Internal Risks:**

* Inefficient resource allocation could delay the project.
* Skill gaps among team members could lead to mistakes.
* Miscommunication among team members can cause errors.

**BA Risks:**

* Incomplete or incorrect requirement gathering.
* Lack of stakeholder engagement can lead to conflicting requirements.
* Inaccurate documentation can cause development errors.

**Project-Based Risks:**

* Scope creep can expand the project beyond initial plans.
* Budget overruns can exceed the allocated ₹2.64 Crores.
* Timeline delays can result in not meeting the 13-month deadline.
* Inadequate testing can lead to a faulty product.

**11. Financial Analysis:**

**Budget:** ₹2.64 Crores

 **Cost Breakdown:**

* Development: ₹1,20,00,000
* Testing: ₹40,00,000
* Deployment: ₹50,00,000
* Maintenance: ₹54,00,000

**12. Timelines:**

* **Phase 1 (0-2 months):** Requirement gathering and analysis
* **Phase 2 (3-6 months):** System design
* **Phase 3 (7-10 months):** Development
* **Phase 4 (11-12 months):** Testing
* **Phase 5 (13 months):** Deployment and Go-live

**1. Why is this project initiated?**

This project aims to modernize the Railway Reservation System. The current system has many problems,

such as outdated booking processes and poor user experience. We want to improve efficiency, customer satisfaction, and competitiveness.

**2. What are the current problems?**

* **Confusing Booking and Collection:** Customers don't know how to book or where to pick up tickets.
* **Inconsistent Cancellations:** Canceling tickets is a hassle and requires going to offices.
* **System Downtime and Slow Performance:** The system often crashes and is slow.
* **Limited Payment Options:** Not many payment methods are available.
* **Poor User Interface:** The system is outdated and hard to use.
* **No Real-Time Updates:** No live info on seat availability or schedules.
* **Inadequate Customer Support:** Limited support options and long wait times.
* **Manual Refunds:** Refunds take a long time because they're done manually.
* **Security Concerns:** Customer data isn't well-protected.
* **Accessibility Issues:** Not user-friendly for people with disabilities.

**3. With this project, how many problems could be solved?**

This project aims to solve all the identified problems:

* **Simplify Booking and Collection:** Use a mobile app and easy web interface.
* **Standardize Cancellations:** Have one unified online cancellation process.
* **Enhance System Performance:** Improve system speed and reliability.
* **Expand Payment Options:** Add more payment methods, like digital wallets.
* **Improve UI/UX:** Make the interface modern and user-friendly.
* **Provide Real-Time Updates:** Show live info on seats and schedules.
* **Enhance Customer Support:** Use AI chatbots for 24/7 help.
* **Automate Refunds:** Speed up refunds with automation.
* **Strengthen Security:** Protect data with better security measures.
* **Improve Accessibility:** Add features for users with disabilities.

**4. What are the resources required?**

* **People:** Project manager, analysts, system architects, developers, designers, testers, IT support, training staff.
* **Technology:** Servers, network equipment, development tools, databases, security software, third-party services.
* **Financial Resources:** Estimated budget: ₹2,64,00,000.
* **Time:** Approximately 13 months.
* **Other Resources:** Office space, communication tools, training materials.

**5. How much organizational change is required to adopt this technology?**

* **Process Changes:** Moderate changes in booking, cancellation, and refund processes.
* **Training Needs:** Staff will need training to use the new system.
* **Policy Updates:** Update customer service and data management policies.
* **Cultural Shift:** Encourage a tech-savvy culture.
* **Infrastructure Upgrades:** Upgrade hardware and networks.

**6. Time frame to recover ROI?**

* **Estimated ROI Recovery Time:** 2 to 3 years after implementation.
* **Factors Contributing to ROI Recovery:**
	+ **Increased Ticket Sales:** Better user experience may boost sales.
	+ **Operational Efficiency:** Automation reduces costs.
	+ **Customer Retention:** Satisfied customers return.
	+ **Reduced Support Costs:** AI support lowers expenses.

**7. How to identify Stakeholders?**

* Conduct stakeholder interviews and surveys to gather information.
* Identify individuals or groups affected by the project or having an interest in its outcome (users, project team and financial sponsors).
* Analyse their influence and interest to categorize them (high influence/ interest to low influence/ interest)
* **Identification Methods:** ILS, RACI, Stakeholder mapping, surveys, organizational analysis, consultation meetings.

 **Document 2: BA Strategy**

BA Approach Strategy is a comprehensive plan detailing the methods, Techniques, and processes a BA will use to gather, analyse, and manage requirements throughout a project. It ensures that stakeholder needs are understood and addressed, risks are managed, and the project goals are met efficiently**.**

**Steps of the BA Approach Strategy**

**1. What Elicitation Techniques to apply:**

Elicitation Techniques are methods used to gather information and requirements from stakeholders and other sources. We have many elicitation techniques to apply used to gather requirements. Some of them are: Document Analysis, Observation, Workshops, Brainstorming, Reverse Engineering, Focus groups, Interviews Etc.

**2.How to do Stakeholder Analysis RACI:**

Stakeholder Analysis is the process of identifying, analysing and understanding the needs, influence and interest of the project stakeholders.

Stakeholder analysis can be done by using the RACI matrix involves identifying stakeholders and defining their roles and responsibilities with in a project- Identifying stakeholders, Define Roles and Responsibilities, Create the RACI Matrix, Assign RACI Roles.

We can also use Stakeholders Map, Engagement Plan and also identify Stakeholders.

**3.What document to write**

Key documents that capture requirement, design specifications and other project details

* **Business requirement Document (BRD):** Captures all business requirement.
* **Functional Requirement Document (FRD):** Details the functional aspects and features of the application.
* **Test Case Document:** Details test strategies and specific test to ensure quality.
* **Use Case Documentation:** Describe specific functionalities and scenarios.
* **Technical Specification Document:** Outlines the technical architecture and specifications.
* **Project Charter**: Overview of project objectives, scope, stakeholders, and timeline.
* **Stakeholder Analysis Document**: Identifies stakeholders and outlines their needs.
* **Risk Management Plan**: Documents potential risks and mitigation strategies.
* **Project Plan**: Detailed project schedule, milestones, and resource allocation.
* **Change Management Plan**: Process for managing changes to project scope and deliverables.
* **Training Plan**: Strategy and schedule for training users and staff.
* **Deployment Plan**: Steps and resources required for deploying the system.
* **User Manual**: Instructions and troubleshooting tips for end-users.
* **Maintenance Plan**: Procedures for maintaining and updating the system.
* **Requirements Traceability Matrix (RTM)**: Tracks requirements throughout the project lifecycle.

**4.What process to follow to sign off on the Documents:**

* Review and Approval: Present documents to stakeholders for feedback.
* Feedback Incorporation: Adjust documents based on stakeholder input.
* Formal Sign – off: Obtain official approval from key stakeholders.

Sign off to be taken on SRS as this is the primary and important document. Sign off can be taken by using E-mail confirmation from client.

**5. How to take approval from the client**

Establish a formal meeting with the client to keep them informed and get continuous feedback.

* Regular Check -ins: Schedule periodic meetings to review progress.
* Milestone Reviews: Hold reviews at key milestones to secure necessary approvals.
* Documentation: Maintain records of all approvals and decision.

**6.What communication Channels to establish and implement.**

Methods and tools used to facilitate effective communication among project team members and stakeholders.

Regular Meetings-Weekly status meetings, bi weekly sprint review, and monthly stakeholder updates.

Email, Project management Tools and Status Reports are communication channels.

**7.How to handle Change Requests:**

Process for managing changes to project scope requirements or timelines.

* Change Request Form: Standardize the submission of change request
* Impact Analysis: Assess how changes affect scope, timelines and budget.
* Approval Process: Implement a structured process to approve or reject changes.
* Documentation: Keep records of all changes and decision.

**8.How to update the progress of the project to the stakeholders:**

Keeping stakeholders informed about project progress and developments.

* Weekly Status Reports/Monthly Review Meetings: provide regular updates on progress, tasks and issues.
* Dashboard: Keeping stakeholders real -time project updates using a dashboard.
* Regular Meetings: Schedule periodic meeting for comprehensive updates.

**9. How to take signoff on the UAT -Client project Acceptance Form:**

User Acceptance Testing ensures the final product meets requirements, followed by formal acceptance from the client.

To take signoff on the UAT -Client project Acceptance form first UAT preparation to be done followed by Conducting UAT, fix Issues, Acceptance form, Final Reviews Meetings and finally Obtain Sign-off.

This BA Approach Strategy ensures a structured, thorough and transparent process from requirement gathering to project completion, addressing stakeholder needs, managing risks, and ensuring project success.

 **Document 3- Functional Specifications**

**Functional Specifications**

Functional Specifications are detailed documents that describe the capabilities, appearance, and interactions of a system or product. They outline what the system should do, how it should perform, and the constraints under which it must operate. These specifications serve as a guide for developers and stakeholders to ensure that the final product meets the required standards and user needs.

**Project Information**

|  |  |
| --- | --- |
| Field | Details |
| Project Name | New Railway Reservation System |
| Customer Name | Indian Railways |
| Project Version | 1.0 |
| Project Sponsor | Mr. Henry |
| Project Manager | Mr. Anil |
| Project Initiation Date | 1st January 2025 |

**Functional Requirement specifications**

|  |  |  |  |
| --- | --- | --- | --- |
| Req ID | Req Name | Req Description | Priority  |
| FR0001 | User Registration | Users should be able to register with email and phone number. | 10 |
| FR0002 | User Login | Secure login with username and password. | 10 |
| FR0003 | Password Recovery | Password recovery via email or SMS. | 7 |
| FR0004 | Train Search | Search for trains by date, source, and destination. | 10 |
| FR0005 | Seat Selection | Option to select seat classes and specific seats. | 10 |
| FR0006 | Online Booking | Online ticket booking and instant confirmation. | 10 |
| FR0007 | Online Cancellation | Option to cancel bookings online and receive automated refunds. | 9 |
| FR0008 | Payment Gateway Integration | Support for multiple payment options like credit/debit cards, net banking, and digital wallets. | 10 |
| FR0009 | Real-Time Updates | Display real-time information on train schedules, delays, and cancellations. | 10 |
| FR0010 | Notifications | Send notifications for booking confirmations, changes, and reminders. | 8 |
| FR0011 | Multilingual Support | Provide support for multiple languages. | 7 |
| FR0012 | Accessibility Features | Accessibility features for users with disabilities. | 7 |
| FR0013 | Customer Support Integration | Integration with live chat support and helpdesk ticketing system. | 8 |
| FR0014 | Admin Dashboard | Admin interface for managing user accounts, bookings, and cancellations. | 9 |
| FR0015 | Security Measures | Implement strong security protocols to protect user data. | 10 |

 **Document 4- Requirement Traceability Matrix**

**RTM (Requirements Traceability Matrix)** is a document used in software development and project management to ensure that all requirements defined for a system are tested in the test protocols. The RTM helps in ensuring that all requirements are covered by test cases and that no functionality is missed during testing.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Req ID | Req Name | Req Description | Design | Code | Unit Test (UT) | Component Test (CT) | System Test (ST) | System Integration Test (SIT) | UAT |
| FR0001 | User Registration | Users should be able to register with email and phone number. | ✅ | ✅ | ✅ | ✅ | ✅ |  |  |
| FR0002 | User Login | Secure login with username and password. | ✅ | ✅ | ✅ | ✅ |  |  |  |
| FR0003 | Password Recovery | Password recovery via email or SMS. | ✅ | ✅ | ✅ |  |  |  |  |
| FR0004 | Train Search | Search for trains by date, source, and destination. | ✅ | ✅ | ✅ | ✅ |  |  |  |
| FR0005 | Seat Selection | Option to select seat classes and specific seats. | ✅ | ✅ | ✅ | ✅ | ✅ |  |  |
| FR0006 | Online Booking | Online ticket booking and instant confirmation. | ✅ | ✅ | ✅ | ✅ |  |  |  |
| FR0007 | Online Cancellation | Option to cancel bookings online and receive automated refunds. | ✅ | ✅ |  |  |  |  |  |
| FR0008 | Payment Gateway Integration | Support for multiple payment options like credit/debit cards, net banking, and digital wallets. | ✅ | ✅ | ✅ | ✅ | ✅ |  |  |
| FR0009 | Real-Time Updates | Display real-time information on train schedules, delays, and cancellations. | ✅ | ✅ | ✅ | ✅ |  |  |  |
| FR0010 | Notifications | Send notifications for booking confirmations, changes, and reminders. | ✅ |  |  |  |  |  |  |
| FR0011 | Multilingual Support | Provide support for multiple languages. | ✅ | ✅ |  |  |  |  |  |
| NFR0012 | Security Measures | Implement strong security protocols to protect user data. | ✅ | ✅ | ✅ | ✅ | ✅ |  |  |
| NFR0013 | Performance | System should handle a high volume of users without performance degradation. | ✅ | ✅ | ✅ |  |  |  |  |
| NFR0014 | Reliability | Ensure system availability 99.99% of the time. | ✅ | ✅ |  |  |  |  |  |
| NFR0015 | Scalability | The system should be scalable to accommodate future growth. | ✅ | ✅ | ✅ | ✅ |  |  |  |

 **Document 5- BRD Template**

 

**Project Name**: New Railway Reservation System

**Project ID**: NRRS2025

**Version ID**: 1.0 **Author**: Shirisha

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* + 1. **Document Revisions**

|  |  |  |
| --- | --- | --- |
| Date | Version Number | Document Changes |
| 05/02/20xx | 0.1 | Initial Draft |
| 15/03/2025 | 0.2 | Added User Registration and Authentication Requirements |
| 25/04/2025 | 0.3 | Updated Booking and Cancellation Processes |
| 05/05/2025 | 0.4 | Integrated Payment Gateway Details |
| 15/06/2025 | 0.5 | Included Real-Time Updates and Notifications |
| 25/07/2025 | 0.6 | Added Accessibility and Customer Support Features |
| 05/08/2025 | 0.7 | Final Review and Approval |

* + 1. **Approvals**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Role | Name | Title | Signature | Date |
| Project Sponsor | Mr. Henry | Project Sponsor | XYZ | 01/08/2025 |
| Business Owner | Mr. Rajesh | Delivery Head | XYZ | 02/08/2025 |
| Project Manager | Mr. Anil | Project Manager | XYZ | 03/08/2025 |
| System Architect | Mr. Suresh | System Architect | XYZ | 04/08/2025 |
| Development Lead | Ms. Priya | Development Lead | XYZ | 05/08/2025 |
| User Experience Lead | Ms. Anjali | User Experience Lead | XYZ | 06/08/2025 |
| Quality Lead | Mr. Vijay | Quality Lead | XYZ | 07/08/2025 |
| Content Lead | Ms. Neha | Content Lead | XYZ | 08/08/2025 |

* + 1. **RACI Chart for This Document**

The RACI chart identifies the persons who need to be contacted whenever changes are made to this document. RACI stands for responsible, accountable, consulted, and informed. These are the main codes that appear in a RACI chart, used here to describe the roles played by team members and stakeholders in the production of the BRD. They are adapted from charts used to assign roles and responsibilities during a project. (RACI Can be made for IT side[Project stakeholder] as mentioned above, apart from that Can also Be made for Client side[Business Stakeholder]).

The following describes the full list of codes used in the table:

**Codes Used in RACI Chart**

* **Authorize:** Has ultimate signing authority for any changes to the document.
* **R Responsible:** Responsible for creating this document.
* **A Accountable:** Accountable for the accuracy of this document (for example, the project manager).
* **S Supports:** Provides supporting services in the production of this document.
* **C Consulted:** Provides input (such as an interviewee).
* **I Informed:** Must be informed of any changes.

**RACI Chart**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Position | Authorize | R | A | S | C | I |
| Mr. Henry | Project Sponsor | ✅ |  | ✅ |  |  | ✅ |
| Mr. Rajesh | Delivery Head |  |  |  |  | ✅ | ✅ |
| Mr. Anil | Project Manager |  | ✅ |  | ✅ | ✅ | ✅ |
| Mr. Suresh | System Architect |  |  |  | ✅ |  |  |
| Ms. Priya | Development Lead |  | ✅ |  | ✅ |  |  |
| Ms. Anjali | User Experience Lead |  |  |  | ✅ |  |  |
| Mr. Vijay | Quality Lead |  |  |  | ✅ |  |  |
| Ms. Neha | Content Lead |  |  |  | ✅ |  |  |
| Mr. Arjun | Java Developer |  | ✅ |  |  |  |  |
| Mr. Rohan | Java Developer |  | ✅ |  |  |  |  |
| Mr. Vivek | Java Developer |  | ✅ |  |  |  |  |
| Mr. Sandeep | Quality Assurance Tester |  | ✅ |  |  |  | ✅ |
| Mr. Mahesh | Financial Head |  |  |  |  | ✅ | ✅ |
| Mr. Rakesh | Project Coordinator |  |  |  |  | ✅ | ✅ |
| Mr. Manish | Network Administrator |  |  |  |  |  | ✅ |
| Ms. Pooja | Senior Java Developer |  |  |  |  | ✅ |  |

 **4. Introduction**

**4.1. Business Goals**

The goal of this project is to create a better railway reservation system for Indian Railways. This new system aims to:

* Make booking train tickets easier and faster.
* Provide real-time information about train schedules and delays.
* Improve customer service and support.
* Increase the efficiency of railway operations.
* Reduce manual errors and streamline processes.

**4.2. Business Objectives**

We want to develop an IT solution that includes:

* A mobile app for Android and iOS users.
* An online learning system for training railway staff.
* A human resource management system for managing employees.
* Integration with existing railway systems.
* Automated ticketing and seat allocation.

**4.3. Business Rules**

These are the rules and policies that need to be followed:

* Keep all user information secure and private.
* Follow Indian Railways' guidelines for booking and cancellations.
* Ensure all payment transactions are secure and comply with regulations.
* Regularly check and update the system to keep it safe.
* Maintain accurate records of all transactions.
* Provide user-friendly interfaces.

**4.4. Background**

This project started because the current railway reservation system has many issues like slow booking processes and lack of real-time updates. The new system will solve these problems and make the booking experience better for customers by:

* Addressing customer complaints and feedback.
* Analyzing the shortcomings of the existing system.
* Proposing a modern solution to meet current and future demands.

**4.5. Project Objective**

The main goal is to create a new railway reservation system that:

* Makes booking and managing train tickets easy for users.
* Provides real-time updates on train schedules and delays.
* Integrates smoothly with payment systems and customer support.
* Enhances user experience with intuitive design.
* Reduces operational costs through automation.

**4.6. Project Scope**

**What We Will Do:**

* Allow users to register and log in.
* Enable train searches and ticket bookings.
* Integrate various payment options.
* Provide real-time updates on trains.
* Support multiple languages.
* Offer customer support through the app.
* Create an admin dashboard for managing bookings and cancellations.
* Implement security measures to protect user data.
* Develop an API for third-party integrations.

**What We Will Not Do:**

* Connect with third-party travel agencies.
* Provide AI-driven recommendations.
* Integrate social media features.
* Implement dynamic pricing.
* Develop a desktop application.
* Offer offline booking capabilities.

**5. Assumptions**

These are the things we assume:

* Users will have internet access and smartphones.
* Payment systems will work properly and offer various options.
* Train schedule data will be accurate and updated.
* The project will have enough resources and budget.
* Stakeholders will provide timely feedback.

**6. Constraints**

These are the limitations we need to consider:

* We have strict deadlines to complete the project.
* We need to follow Indian Railways' regulations.
* Limited resources for development and testing.
* We depend on third-party services for payments and real-time data.
* Budget limitations may affect some features.

**7. Risks**

In this section, we describe potential risks that could affect the success or failure of the Railway Reservation System project. Regularly analyzing risks as the project progresses can help minimize their impact. For each risk, we will note the likelihood of its occurrence, the cost to the project if it does occur, and the strategy for handling it. Strategies include:

* **Avoid:** Do something to eliminate the risk.
* **Mitigate:** Do something to reduce damage if the risk materializes.
* **Transfer:** Pass the risk to another entity.
* **Accept:** Do nothing about the risk and accept the consequences.
1. **Technological Risks (TR)**
* **New technology issues:** Integration problems with existing systems.
* **System security vulnerabilities:** Risk of data breaches and cyberattacks.
* **Compatibility issues:** Problems with different devices and operating systems.
* **Performance issues:** System slowing down or crashing under high user load.
* **Likelihood**: Medium
* **Impact:** High
* **Strategy:** Mitigate by conducting thorough testing and having a backup pl
1. **Skills Risks (SR)**
* **Lack of expertise:** Not having staff with the required skills for the project.
* **Insufficient training:** Staff not adequately trained on new technologies.
* **High turnover:** Frequent changes in key project personnel.
* **Dependence on external experts:** Relying too much on outside consultants.
* Likelihood: Medium
* Impact: High
* Strategy: Mitigate by conducting market analysis and remaining adaptable to changes.

**Political Risks (PR)**

* **Government policy changes:** New regulations or policies affecting the project.
* **Political instability:** Unstable political climate causing delays or disruptions.
* **Loss of support:** Changes in government or management reducing project backing.
* **Compliance requirements:** Stricter regulations needing additional compliance efforts.

**achieve the expected return on investment.**

* Likelihood: Medium
* Impact: High
* Strategy: Mitigate by conducting thorough market analysis and feasibility studies.

**Business Risks (BR)**

* **Project cancellation:** The risk of the project being stopped or canceled.
* **Budget overruns:** Spending more than the allocated budget.
* **Market changes:** Shifts in market demand affecting project relevance.
* **Low ROI:** Failure to achieve the expected return on investment.
* Likelihood: Low
* Impact: High
* Strategy: Mitigate by securing commitment and support from top management and stakeholders.

**Requirements Risks (RR)**

* **Incorrect requirements:** Misunderstanding or misdocumenting what is needed.
* **Changing requirements:** Frequent changes during the project lifecycle.
* **Stakeholder disagreements:** Conflicting requirements from different stakeholders.
* **Incomplete requirements:** Missing important aspects of the project scope.
* Likelihood: Medium
* Impact: High
* Strategy: Mitigate by involving stakeholders in the requirement-gathering process and regularly reviewing requirements.

**Communication Risks (CR)**

* **Miscommunication:** Information not being clearly shared among stakeholders.
* **Information delays:** Critical information not reaching the team on time.
* **Language barriers:** Communication issues due to different languages spoken by team members.
* **Cultural differences:** Misunderstandings arising from diverse cultural backgrounds.
* Likelihood: Medium
* Impact: Medium
* Strategy: Mitigate by ensuring clear and regular communication channels.

**Documentation Risks (DR)**

* **Incomplete documentation:** Key details missing from project documents.
* **Inaccurate documentation:** Errors in project descriptions and requirements.
* **Version control issues:** Problems tracking document changes and updates.
* **Accessibility issues:** Difficulties in accessing necessary documents.

**Stakeholder Engagement Risks (SER)**

* **Lack of involvement:** Stakeholders not participating actively in the project.
* **Conflicting interests:** Different stakeholders having opposing priorities.
* **Resistance to change:** Stakeholders resisting new processes or technologies.
* **Unclear expectations:** Ambiguity about project goals and deliverables.

**Quality Risks (QR)**

* **Poor quality deliverables:** Outputs not meeting quality standards.
* **Inadequate testing:** Insufficient testing leading to undiscovered issues.
* **Non-compliance:** Failure to meet industry standards or regulations.
* **User dissatisfaction:** End-users unhappy with the final product.
* Likelihood: Medium
* Impact: High
* Strategy: Mitigate by conducting regular quality checks and reviews.

**Budget Risks (BR)**

* **Cost overruns:** Spending more than planned.
* **Unexpected expenses:** Unanticipated costs arising during the project.
* **Funding issues:** Delays or shortfalls in project funding.
* **Cost estimation errors:** Incorrect budgeting leading to financial strain.
* Likelihood: Medium
* Impact: High
* Strategy: Mitigate by careful budget planning and monitoring.

**Data Risks (DR)**

* **Data inaccuracies:** Incorrect or outdated information.
* **Data loss:** Loss of important data due to technical failures.
* **Data breaches:** Unauthorized access to sensitive data.
* **Inconsistent data:** Discrepancies in data across different systems.
* Likelihood: Medium
* Impact: High
* Strategy: Mitigate by implementing data validation and regular audits.

###

###  **8. Business Process Overview**

This section describes the overall process flow from each phase.

####   **8.1. Legacy System (AS-IS)**

The current railway reservation system is outdated and has many issues. The booking process is slow, there are frequent system downtimes, and customers often face problems with payment processing. Below is a brief explanation of the process in the legacy system:

* Struggles with booking and cancellation.
* Limited access to payment options.
* Manual refund processing.
* Frequent system downtime and slow performance.
* Outdated and non-intuitive user interface.
* Limited customer support options.
* No real-time updates on seat availability and train schedules.
* Security concerns with data protection.

 **Diagramaticlally**

 Start--> User Visits Railway Station or Online Portal

 User Registration: Account Creation and Manual Verification

 Search and Check Availability: Manual or Slow Seat Availability Check

 Booking Tickets: Fill Form, Select Train and Class

 Payment Processing: Payment Processed (May be Slow/Error-prone

####

####  Ticket Issuance: Printed or Emailed, No Real-time Updates

####  Ticket Cancellation and Refunds: Manual Processing

 Customer Support: Phone Calls or In-Person Visits

 End

#### **8.2. Proposed Recommendations (TO-BE)**

The recommended system aims to address the challenges in the legacy system by introducing the following improvements:

* Online booking and cancellation.
* Multiple payment options.
* Automated refund processing.
* Reliable and fast system performance.
* Modern and user-friendly interface.
* Enhanced customer support with 24/7 availability.
* Real-time updates on seat availability and train schedules.
* Strong security measures to protect user data.

**9. Business Requirements**

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Req ID | Req Name | Req Description | Priority | Design | Code | Unit Test (UT) | Component Test (CT) | System Test (ST) | System Integration Test (SIT) | UAT |
| Functional Requirements |  |  |  |  |  |  |  |  |  |  |
| FR0001 | User Registration | Users should be able to register with email and phone number. | 10 | ✅ | ✅ | ✅ | ✅ | ✅ |  |  |
| FR0002 | User Login | Secure login with username and password. | 10 | ✅ | ✅ | ✅ | ✅ |  |  |  |
| FR0003 | Password Recovery | Password recovery via email or SMS. | 7 | ✅ | ✅ | ✅ |  |  |  |  |
| FR0004 | Train Search | Search for trains by date, source, and destination. | 10 | ✅ | ✅ | ✅ | ✅ |  |  |  |
| FR0005 | Seat Selection | Option to select seat classes and specific seats. | 10 | ✅ | ✅ | ✅ | ✅ | ✅ |  |  |
| FR0006 | Online Booking | Online ticket booking and instant confirmation. | 10 | ✅ | ✅ | ✅ | ✅ |  |  |  |
| FR0007 | Online Cancellation | Option to cancel bookings online and receive automated refunds. | 9 | ✅ | ✅ |  |  |  |  |  |
| FR0008 | Payment Gateway Integration | Support for multiple payment options like credit/debit cards, net banking, and digital wallets. | 10 | ✅ | ✅ | ✅ | ✅ | ✅ |  |  |
| FR0009 | Real-Time Updates | Display real-time information on train schedules, delays, and cancellations. | 10 | ✅ | ✅ | ✅ | ✅ |  |  |  |
| FR0010 | Notifications | Send notifications for booking confirmations, changes, and reminders. | 8 | ✅ |  |  |  |  |  |  |
| FR0011 | Multilingual Support | Provide support for multiple languages. | 7 | ✅ | ✅ |  |  |  |  |  |
| FR0012 | Accessibility Features | Accessibility features for users with disabilities. | 7 | ✅ | ✅ |  |  |  |  |  |
| FR0013 | Customer Support Integration | Integration with live chat support and helpdesk ticketing system. | 8 | ✅ | ✅ | ✅ |  |  |  |  |
| FR0014 | Admin Dashboard | Admin interface for managing user accounts, bookings, and cancellations. | 9 | ✅ | ✅ |  |  |  |  |  |
| Non-Functional Requirements |  |  |  |  |  |  |  |  |  |  |
| NFR0015 | Security Measures | Implement strong security protocols to protect user data. | 10 | ✅ | ✅ | ✅ | ✅ |  |  |  |
| NFR0016 | Performance | System should handle a high volume of users without performance degradation. | 10 | ✅ | ✅ | ✅ | ✅ | ✅ |  |  |
| NFR0017 | Reliability | Ensure system availability 99.99% of the time. | 9 | ✅ | ✅ | ✅ | ✅ |  |  |  |
| NFR0018 | Scalability | The system should be scalable to accommodate future growth. | 9 | ✅ | ✅ |  |  |  |  |  |
| NFR0019 | Usability | The system should be user-friendly and easy to navigate. | 8 | ✅ | ✅ |  |  |  |  |  |
| NFR0020 | Maintainability | The system should be easy to maintain and update. | 8 | ✅ | ✅ |  |  |  |  |  |
| NFR0021 | Compatibility | The system should be compatible with different devices and browsers. | 8 | ✅ | ✅ | ✅ | ✅ | ✅ |  |  |

 **10. Appendices**

**10.1. List of Acronyms**

* **FR**: Functional Requirement
* **NFR**: Non-Functional Requirement
* **UT**: Unit Test
* **CT**: Component Test
* **ST**: System Test
* **SIT**: System Integration Test
* **UAT**: User Acceptance Test
* **BRD**: Business Requirements Document
* **API**: Application Programming Interface

**10.2. Glossary of Terms**

* **Functional Requirement**: A specific behavior or function of a system, such as user authentication or data processing.
* **Non-Functional Requirement**: Defines system attributes such as security, reliability, performance, maintainability, and scalability.
* **Unit Test (UT)**: Testing individual components of the software to ensure they function correctly.
* **Component Test (CT)**: Testing integrated components to verify their interaction.
* **System Test (ST)**: Testing the complete system to validate its compliance with the requirements.
* **System Integration Test (SIT)**: Testing the system's integration with external systems.
* **User Acceptance Test (UAT)**: Testing conducted by end-users to ensure the system meets their needs and requirements.
* **Business Requirements Document (BRD)**: A document that outlines the business requirements, goals, and objectives for a project.
* **Application Programming Interface (API)**: A set of protocols and tools for building software and applications.
* **Real-Time Updates**: Providing current information without delays, such as live train schedules and availability.
* **Accessibility Features**: Design elements that make the system usable for people with disabilities.

**10.3. Related Documents**

* **Project Charter**: Document outlining the project's objectives, scope, stakeholders, and high-level timeline.
* **Requirements Specification**: Detailed documentation of the functional and non-functional requirements of the system.
* **Design Specification**: Document describing the system architecture, design decisions, and technical details.
* **Test Plan**: Document outlining the testing strategy, objectives, schedule, and resources required for testing.
* **User Manual**: Guide for end-users on how to use the system, including instructions and troubleshooting tips.
* **Maintenance Plan**: Document describing the procedures for maintaining and updating the system post-implementation.
* **Risk Management Plan**: Document detailing the identified risks, their impact, likelihood, and mitigation strategies.
* **Training Plan**: Document outlining the training strategy, schedule, and resources required for training users and staff.
* **Deployment Plan**: Document describing the steps, schedule, and resources required for deploying the system.