**ASSIGNMENT – 1**

Question 1: Please make a BRD, which can be presented, to the client along with complete development and resource plan.

Answer:-

**Business Requirement Document:-**

Project Name: Unified Inventory & Delivery Management System

Client: NIC Ice-Cream & Milk Products Company

Project ID: NIC-INVDEL-2025-01

Version ID: NIC-INVDEL-2025-01-V1.0

Prepared by: Komal Chauhan – Business Analyst

**Executive Summary**

This document outlines the requirements for developing software solution for NIC Company, manufacture ice cream and milk products with an extensive network of manufacturing plant and warehouses across the country. The proposed system will focus on two primary objective i.e. effective inventory management and enable the quickest delivery to customers. By achieving these goals, the company aims to enhance the operational efficiency, reduce waste and improve customer satisfaction.

**1. Document Revisions:-**

|  |  |  |
| --- | --- | --- |
| **Date** | **Version ID** | **Document Changes** |
| 23-04-2025 | NIC-INVDEL-2025-01-V1.0 | Initial version of the BRD created, including business goal, objectives, scope, and basic process flow |
| 25-04-2025 | NIC-INVDEL-2025-01-V1.1 | Added risks, RTM, glossary, and related documents |
| 28-04-2025 | NIC-INVDEL-2025-01-V2.0 | Final version post stakeholder review and sign-off |

**2. Approvals:-**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role** | **Name** | **Title** | **Signature** | **Date** |
| Project Sponsor | Rakesh Sharma | Director of Operations | R. Sharma | 23-04-2025 |
| Business Owner | Anjali Mehta | Head of Supply Chain | A. Mehta | 23-04-2025 |
| Project Manager | Karan Desai | IT Project Manager | K. Desai | 23-04-2025 |
| Business Analyst | Komal Chauhan | Lead Business Analyst | Komal Chauhan | 23-04-2025 |
| System Architect | Nikhil Rao | Enterprise Architect | N. Rao | 23-04-2025 |
| Development Lead | Mohit Verma | Software Development Lead | M. Verma | 23-04-2025 |
| Quality Lead | Sneha Reddy | Quality Assurance Lead | S. Reddy | 23-04-2025 |

**3. RACI Chart:-**

* **IT Side Stakeholder:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Task** | **Name** | **Position** | **R** | **A** | **C** | **I** |
| Define business goals, Requirements | Komal Chauhan | Business Analyst | R | A | C | I |
| System design architecture | Nikhil Rao | System Architect | R | A | C | I |
| Application development | Mohit Verma | Development Lead | R | A | I | I |
| Quality testing & UAT | Sneha Reddy | Quality Lead | R | A | C | I |
| Deployment, Reporting | Karan Desai | Project Manager | R | A | C | I |

* **Client Side Stakeholder:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Task** | **Name** | **Position** | **R** | **A** | **C** | **I** |
| Business input, Requirements, UAT | Anjali Mehta | Business Owner | – | A | C | I |
| Architecture feedback, Approval | Rakesh Sharma | Project Sponsor | – | A | C | I |
| Infra support, Post-deployment liaison | Client IT Rep | IT Coordinator | – | A | C | I |

**4. Business Goals:-**

The business goal of this project is to digitally transform the company’s supply chain operations by establishing an integrated system that ensures accurate inventory control and rapid product delivery. This initiative aims to support the company’s growth by increasing efficiency, reducing operational bottlenecks, and strengthening its competitive edge in the dairy and frozen dessert market through superior service and streamlined logistics.

**5. Business Objective:-**

The business objective of this project is to implement a centralized, digital software solution that enables real-time inventory management and optimizes delivery operations across all manufacturing plants and warehouses. By improving inventory visibility, automating stock tracking, and integrating route optimization for deliveries, the company aims to enhance operational efficiency, reduce product wastage, lower logistics costs, and ensure the fastest possible delivery of ice-cream and milk products to customers, thereby significantly improving customer satisfaction and enabling scalable growth.

**6. Business Rules:-**

1. Products must be dispatched based on the First-In-First-Out principle, especially for perishable items like milk and ice-cream.
2. The system must trigger alerts when inventory falls below or exceeds predefined thresholds at any location.
3. Products nearing expiry i.e within 5 days cannot be dispatched to customers.
4. Orders must be fulfilled from the closest location i.e. plant or warehouse that has available stock to minimize delivery time.
5. Users can only perform operations permitted by their roles e.g., only warehouse staff can update stock, only admin can access system-wide reports.
6. All stock movements inbound, outbound, transfers must be updated in real-time.
7. A delivery is considered complete only after confirmation is received from the customer or delivery personnel.
8. Delivery routes must be optimized using location data and traffic conditions to ensure quickest delivery.
9. The system must not accept customer orders for products that are out of stock.

**7. Project Background:-**

NIC Company operates a network of manufacturing plants and warehouses across the country, producing and distributing ice-cream and milk products to a broad customer base. Currently, inventory tracking and delivery coordination are managed through semi-manual processes, leading to challenges such as stock discrepancies, delayed deliveries, and product spoilage. To overcome these inefficiencies and support future growth, the company has decided to invest in a centralized software solution that can digitize and streamline inventory and delivery operations, improve visibility, and ensure timely customer service.

**8. Project Objective:-**

The objective of this project is to design and implement a comprehensive software system that centralizes inventory management and optimizes delivery operations across all manufacturing plants and warehouses. The system will provide real-time visibility into stock levels, automate order fulfillment, and use intelligent routing to ensure the fastest possible delivery to customers. This will enhance operational control, reduce waste, improve delivery accuracy, and support the company's long-term scalability and customer service excellence.

**9. Scope of supply:-**

**In scope:**

* Real-time inventory tracking at plants and warehouses.
* Automatic stock updates after production, dispatch, and returns.
* Capturing order, order validation against available stock, real time order tracking
* Auto-suggest prime warehouse for fulfillment based on nearness and stock availability
* Route optimization for quickest deliveries
* Inventory, delivery & stock report
* Role-based access control
* Mobile dashboard for warehouse managers and drivers for real-time updates

**Out of scope:**

* Manufacturing Process Management
* No customer service ticketing or CRM integration
* No invoicing, payment collection, or finance module integration
* No onboarding system for new transport vendors or suppliers in this phase

**10. Assumptions:-**

* All manufacturing plants and warehouses have internet connectivity and can access the centralized system.
* Designated staff at each location will be trained to use the new software.
* Basic hardware like computers, tablets, barcode scanners required to operate the system is already available.
* Inventory data at the time of implementation will be provided in a clean, structured format for migration.
* Delivery vehicles are available and managed internally by the company.
* The company will designate a point of contact from each department for requirements gathering and UAT.

**11. Constraints:-**

1. The system must be developed, tested, and deployed within the agreed project timeline to align with seasonal demand peaks.
2. Development must stay within the allocated budget, limiting scope to high-priority features in the initial release.
3. Availability of key personnel like IT, warehouse managers for inputs, testing, and training may be limited.
4. Existing inventory and warehouse data might have inconsistencies. Hence, cleaning and migration must be carefully planned to ensure accuracy.

**12. Risk analysis:-**

**A. Technological risk:**

(i) System Downtime: Risk of server crashes, slow system performance, or failures due to load during peak seasons.

Avoid: Design a high-availability system with redundancy and proven stable technology.

Mitigate: Implement real-time monitoring, regular backups, and stress testing.

Transfer: Host on a cloud provider with a strong uptime SLA (e.g., AWS, Azure).

Accept: Plan for minimal downtime during low-usage periods with rapid incident response.

(ii) Data Migration Issues: Problems during importing old stock or order data into the new system.

Avoid: Perform detailed data profiling and cleansing before migration begins.

Mitigate: Conduct phased data migration with validation checks and backups.

Transfer: Engage experienced third-party data migration specialists under SLA contracts.

Accept: Allow for minor non-critical data errors with manual correction post-migration.

(iii) Security Vulnerabilities: Risk of unauthorized access, data leakage, or hacking attempts if system is not well-secured.

Avoid: Follow secure coding practices and perform security audits from the start.

Mitigate: Implement strong authentication, encryption, and regular vulnerability scans.

Transfer: Use cloud providers and security services with built-in compliance and protection guarantees.

Accept: Accept minimal residual risk while enforcing strict monitoring and quick incident response.

**B. Skill risk:**

(i) Lack of Expertise: The project requires specialized knowledge in software development, supply chain management, and integration. There is a risk that internal resources may not have the necessary expertise.

Avoid: Hire external consultants or experts during the planning and development phases to fill skill gaps.

Mitigate: Offer internal training and development programs to upskill current employees.

Transfer: Contract specialized external vendors for specific technical expertise.

Accept: Accept short-term limitations in skills and capabilities while training internal staff over time.

(ii) User Adoption: There is a risk that employees may face difficulties in adapting to the new software or may resist changes, leading to inefficiencies.

Avoid: Involve end-users early in the process and gather continuous feedback to ensure the system meets their needs.

Mitigate: Provide comprehensive training sessions and support materials to ease the transition to the new system.

Accept: Accept a gradual user adoption rate and continuously improve the system based on user feedback.

Transfer: Engage change management experts or consultants to guide the adoption process.

**C. Political risk:**

(i) Regulatory Changes: Changes in local, regional, or national regulations such as those governing food safety, data protection, or logistics could impact the software's functionality or compliance.

Avoid: Stay informed about potential changes in regulations that could affect system functionality, and ensure the system is adaptable to future changes.

Mitigate: Work closely with legal and compliance teams to proactively incorporate flexibility into the system to accommodate regulatory changes.

Transfer: Engage with legal advisors or consultants to handle compliance issues.

Accept: Accept regulatory changes as a normal part of doing business and adjust the system accordingly.

**D. Business risk:**

(i) Unclear Business Requirements: If the business requirements are not well-defined or change mid-project, it could lead to delays, scope creep, or a solution that doesn’t fully meet business needs.

Avoid: Ensure comprehensive requirements gathering sessions with key stakeholders at the outset of the project.

Mitigate: Regularly revisit business requirements and keep documentation updated.

Transfer: Work with business consultants to clarify and define business requirements.

Accept: Accept that some minor changes to business requirements will occur as the project progresses and adapt accordingly.

(ii) Operational Disruptions: The implementation of the new software might disrupt existing business operations, especially during the transition phase.

Avoid: Plan a phased rollout to minimize disruptions to business operations during the transition.

Mitigate: Set up contingency plans and provide ongoing support to handle any disruptions that may arise during implementation.

Transfer: Outsource operational continuity planning to third-party consultants or vendors.

Accept: Accept small, short-term disruptions as part of the system transition.

**E. Requirement risk:**

(i) Misalignment of Stakeholder Expectations: There is a risk that different stakeholders might have differing expectations for the functionality or features of the new system.

Avoid: Establish clear communication channels and ensure alignment with all stakeholders at every phase of the project.

Mitigate: Hold regular alignment meetings to manage expectations and make adjustments as needed.

Transfer: Use external project management or consulting experts to mediate and ensure alignment across teams.

Accept: Accept minor misalignments and adjust as needed during the project’s execution.

(ii) Scope Creep: The scope of the project might expand beyond what was initially agreed upon, leading to delays or over budget costs.

Avoid: Define and document the project scope clearly at the outset, with a formal change request process.

Mitigate: Closely monitor any changes to scope and control them through a structured change management process.

Transfer: Use an external project manager or consultant to monitor scope and prevent scope creep.

Accept: Accept small scope changes that align with business priorities, but avoid large, disruptive changes.

**F. Other risk:**

(i) Vendor Risk: If the vendor responsible for software development fails to deliver as expected or faces financial difficulties, it could jeopardize the success of the project.

Avoid: Carefully vet vendors, ensuring they have a proven track record of success and financial stability.

Mitigate: Include contractual safeguards, such as penalties for non-delivery or poor performance.

Transfer: Transfer the risk by outsourcing key components of the project to trusted third-party providers.

Accept: Accept the risk of potential delays or issues from a vendor, as long as there are provisions for penalties and fixes.

(ii) Data Migration Risks: Migrating legacy data into the new system can lead to errors or loss of critical information if not done correctly.

Avoid: Ensure a comprehensive data migration plan that includes testing and validation before going live.

Mitigate: Perform data audits and reconcile data before, during, and after migration.

Transfer: Use third-party data migration experts to ensure accuracy and efficiency.

Accept: Accept minor discrepancies in data migration that can be rectified post-implementation.

(iii) Cybersecurity Threats: Given the sensitive nature of the data e.g., customer and inventory data, there is a risk of cybersecurity threats or breaches.

Avoid: Implement strong security protocols, including encryption, access control, and regular system audits.

Mitigate: Continuously monitor for threats and apply patches and updates to the software.

Transfer: Engage third-party cybersecurity firms for penetration testing and regular security assessments.

Accept: Accept a baseline level of cybersecurity risk and continually work to improve security measures over time.

**13. Business Process overview:-**

This section describes the end-to-end process flow of NIC Company’s current operations, highlighting the legacy (AS-IS) system used for manufacturing, inventory management, and delivery. Understanding the AS-IS process is critical in identifying gaps, inefficiencies, and areas of improvement for the proposed solution.

**(i) Legacy System (AS-IS):**

NIC Company currently uses a mix of manual processes, Excel spreadsheets, and basic standalone tools across its supply chain—from production to delivery. The absence of a centralized, integrated system results in limited real-time visibility, poor coordination, and delays, particularly in managing perishable goods.

**Key pain points:**

* Lack of real-time inventory tracking
* Manual delivery planning with no optimization
* Order processing delays
* Data silos and reporting inconsistencies
* High dependency on individual knowledge and manual intervention
* Production Planning: No real-time demand linkage; decisions based on historical data only.
* Inventory Management: Manual stock entries; no automation or alert system for low stock.
* Order Management: Delays due to manual order capture and validation.
* Delivery Coordination: No optimization; routes planned by staff without software assistance.
* Visibility & Tracking: No real-time vehicle tracking or live delivery updates.
* Reporting: Data compiled manually; prone to human error and delays.

**AS-IS Process Flow Diagram:-**



**(ii) Proposed recommendation (TO BE):**

To overcome the limitations of the current system, a centralized, integrated software solution is recommended. The proposed system will digitize and automate the entire supply chain workflow—from production planning to delivery and reporting.



### ****Key befits of the TO-BE System****

* **Real-time inventory updates across all plants and warehouses.**
* **Faster customer order fulfillment through optimized dispatch.**
* **Minimization of human errors in inventory and delivery records.**
* **Elimination of manual paperwork and spreadsheet dependency.**
* **Reduction in stockouts and excess inventory.**
* **Smart delivery scheduling with efficient route planning.**
* **Centralized visibility of operations for all stakeholders.**
* **Role-based system access for data security and relevance.**
* **Real-time alerts and notifications for quicker decisions.**
* **Enhanced customer satisfaction through timely and accurate deliveries.**

**14. Business Requirement:-**

|  |  |  |
| --- | --- | --- |
| **BR ID** | **Business Requirement Name** | **Business Requirement Description** |
| BR-001 | Centralized Inventory Tracking | The system must track inventory across all plants and warehouses in real time. |
| BR-002 | Stock Reconciliation | The system should reconcile physical and system stock periodically. |
| BR-003 | Multi-Warehouse Visibility | Users must be able to view stock levels for all warehouses. |
| BR-004 | Product Categorization | The system should support classification of products (ice cream, milk, etc.). |
| BR-005 | Batch and Expiry Tracking | The system must track product batches and expiry dates. |
| BR-006 | Minimum Stock Alert | System should alert users when stock drops below defined thresholds. |
| BR-007 | Order Placement Interface | Customers should be able to place orders through a user-friendly interface. |
| BR-008 | Real-Time Order Tracking | Customers must be able to track their orders in real time. |
| BR-009 | Warehouse Dispatch Automation | The system must automate the process of dispatching items from the nearest warehouse. |
| BR-010 | Route Optimization for Delivery | Deliveries must be routed automatically using the shortest path. |
| BR-011 | Delivery Personnel Assignment | The system should assign delivery personnel based on availability and proximity. |
| BR-012 | Return and Refund Management | System must handle product returns and initiate refunds if applicable. |
| BR-013 | Inventory Adjustment Logging | Any manual adjustment to inventory must be logged and auditable. |
| BR-014 | Role-Based Access Control | Different users should have different levels of access (admin, manager, operator). |
| BR-015 | Real-Time Notifications | System must send alerts (e.g., low stock, order dispatched) via email/SMS/in-app. |
| BR-016 | Daily/Weekly/Monthly Reporting | System should generate customizable inventory and delivery reports. |
| BR-017 | Integration with GPS/Tracking Systems | The system must integrate with GPS tools to show real-time delivery location. |
| BR-018 | Demand Forecasting | The system should provide demand forecasting using historical data. |
| BR-019 | Mobile Compatibility | The system should be accessible on mobile devices for field staff and delivery personnel. |
| BR-020 | Scalability for Multi-Country Expansion | The platform must be scalable to support operations in new regions or countries in the future. |

* **Functional requirement:**

|  |  |  |  |
| --- | --- | --- | --- |
| Req. ID | Req. Name | Req. Description | Priority |
| FR0001 | User Login | Users shall be able to log into the system using a secure username and password. | 10 |
| FR0002 | User Logout | Users shall be able to securely log out of the system from any device. | 10 |
| FR0003 | Forgot Password | Users shall be able to reset their password through a "Forgot Password" feature. | 8 |
| FR0004 | Change Password | Logged-in users shall be able to change their password from the settings page. | 8 |
| FR0005 | Multi-User Support | The system shall allow multiple users to access the platform concurrently without conflicts. | 9 |
| FR0006 | Role-Based Menu Access | System shall display features based on user role (e.g., admin vs. delivery staff). | 10 |
| FR0007 | User Profile Management | Users shall be able to view and update their own profile details (email, phone, etc.). | 9 |
| FR0008 | Access Logs | The system shall maintain a log of all user logins, logouts, and failed login attempts. | 9 |
| FR0009 | Notification Alerts | Users shall receive system alerts or notifications for key events (e.g., order dispatch). | 8 |
| FR0010 | Search & Filter Functionality | Users shall be able to search and filter orders, inventory items, and delivery records easily using keywords, dates, or status. |  |
| FR0011 | Real-Time Inventory Update | System shall allow real-time stock updates at each manufacturing plant and warehouse. | 10 |
| FR0012 | Low-Stock Alerts | System shall trigger alerts and suggest reorders when stock drops below defined thresholds. | 10 |
| FR0013 | Order Stock Validation | System shall validate each customer order against current stock levels before confirmation. | 10 |
| FR0014 | Route Optimization | System shall generate optimized delivery routes based on location, volume, and time. | 10 |
| FR0015 | Delivery Tracking | System shall enable GPS tracking for all deliveries with real-time updates. | 10 |
| FR0016 | Order & Delivery Management | System shall manage order details, track delivery status, and record proof of delivery. | 10 |
| FR0017 | Role-Based Access Control | System shall allow role-based access for admin, warehouse, and delivery users. | 9 |
| FR0018 | Reporting & Analytics | System shall generate reports (e.g., stock summary, delivery performance, trends). | 9 |
| FR0019 | Audit Trail | System shall log all user actions for tracking and compliance. | 9 |
| FR0020 | ERP Integration | System shall integrate with existing ERP and logistics tools to sync critical data. | 10 |

* **Non Functional requirement:**

|  |  |  |  |
| --- | --- | --- | --- |
| Req. ID | Req. Name | Req. Description | Priority |
| NFR0001 | System Availability | The system shall be available 99.9% of the time (uptime). | 10 |
| NFR0002 | Performance | The system shall respond to user actions within 3 seconds under normal load. | 10 |
| NFR0003 | Scalability | The system shall support growth in users, locations, and product lines. | 10 |
| NFR0004 | Data Security | All sensitive data shall be encrypted in transit and at rest. | 10 |
| NFR0005 | Backup & Recovery | The system shall support automated backups and disaster recovery. | 9 |
| NFR0006 | Responsive Design | The system shall be usable across desktop and mobile devices. | 6 |
| NFR0007 | Concurrent User Support | The system shall support at least 200 concurrent users. | 9 |
| NFR0008 | Legal & Regulatory Compliance | The system shall comply with relevant local data protection and food safety regulations. | 10 |
| NFR0009 | Session Timeout | System shall automatically log out users after a defined period of inactivity. | 10 |
| NFR0010 | System Maintainability | Maintainability The system shall be easy to maintain and allow for future updates, bug fixes, and enhancements with minimal downtime. | 9 |

### Requirement ****Traceability Matrix:-****

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Req. ID | Req. name | Req. description | Priority | Design | D1 | T1 | D2 | T2 | D3 | T3 | D4 | T4 | UAT |
| FR0001 | User Login | Users shall be able to log into the system using a secure username and password. | 10 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FR0002 | User Logout | Users shall be able to securely log out of the system from any device. | 10 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FR0003 | Forgot Password | Users shall be able to reset their password through a "Forgot Password" feature. | 8 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FR0004 | Change Password | Logged-in users shall be able to change their password from the settings page. | 8 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FR0005 | Multi-User Support | The system shall allow multiple users to access the platform concurrently without conflicts. | 9 | Yes | Yes | WIP | No | No | No | No | No | No | No |
| FR0006 | Role-Based Menu Access | System shall display features based on user role (e.g., admin vs. delivery staff). | 10 | Yes | WIP | No | No | No | No | No | No | No | No |
| FR0007 | User Profile Management | Users shall be able to view and update their own profile details (email, phone, etc.). | 9 | Yes | WIP | No | No | No | No | No | No | No | No |
| FR0008 | Access Logs | The system shall maintain a log of all user logins, logouts, and failed login attempts. | 9 | Yes | Yes | Yes | Yes | WIP | No | No | No | No | No |
| FR0009 | Notification Alerts | Users shall receive system alerts or notifications for key events (e.g., order dispatch). | 8 | Yes | WIP | No | No | No | No | No | No | No | No |
| FR0010 | Search & Filter Functionality | Users shall be able to search and filter orders, inventory items, and delivery records easily using keywords, dates, or status. |   | Yes | Yes | No | No | No | No | No | No | No | No |
| FR0011 | Real-Time Inventory Update | System shall allow real-time stock updates at each manufacturing plant and warehouse. | 10 | WIP | No | No | No | No | No | No | No | No | No |
| FR0012 | Low-Stock Alerts | System shall trigger alerts and suggest reorders when stock drops below defined thresholds. | 10 | Yes | Yes | Yes | Yes | WIP | No | No | No | No | No |
| FR0013 | Order Stock Validation | System shall validate each customer order against current stock levels before confirmation. | 10 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FR0014 | Route Optimization | System shall generate optimized delivery routes based on location, volume, and time. | 10 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FR0015 | Delivery Tracking | System shall enable GPS tracking for all deliveries with real-time updates. | 10 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| FR0016 | Order & Delivery Management | System shall manage order details, track delivery status, and record proof of delivery. | 10 | WIP | No | No | No | No | No | No | No | No | No |
| FR0017 | Role-Based Access Control | System shall allow role-based access for admin, warehouse, and delivery users. | 9 | Yes | Yes | Yes | WIP | No | No | No | No | No | No |
| FR0018 | Reporting & Analytics | System shall generate reports (e.g., stock summary, delivery performance, trends). | 9 | Yes | Yes | Yes | WIP | No | No | No | No | No | No |
| FR0019 | Audit Trail | System shall log all user actions for tracking and compliance. | 9 | Yes | WIP | No | No | No | No | No | No | No | No |
| FR0020 | ERP Integration | System shall integrate with existing ERP and logistics tools to sync critical data. | 10 | Yes | WIP | No | No | No | No | No | No | No | No |
| NFR0001 | System Availability | The system shall be available 99.9% of the time (uptime). | 10 | Yes | WIP | No | No | No | No | No | No | No | No |
| NFR0002 | Performance | The system shall respond to user actions within 3 seconds under normal load. | 10 | Yes | WIP | No | No | No | No | No | No | No | No |
| NFR0003 | Scalability | The system shall support growth in users, locations, and product lines. | 10 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| NFR0004 | Data Security | All sensitive data shall be encrypted in transit and at rest. | 10 | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| NFR0005 | Backup & Recovery | The system shall support automated backups and disaster recovery. | 9 | No | No | No | No | No | No | No | No | No | No |
| NFR0006 | Responsive Design | The system shall be usable across desktop and mobile devices. | 6 | No | No | No | No | No | No | No | No | No | No |
| NFR0007 | Concurrent User Support | The system shall support at least 200 concurrent users. | 9 | WIP | No | No | No | No | No | No | No | No | No |
| NFR0008 | Legal & Regulatory Compliance | The system shall comply with relevant local data protection and food safety regulations. | 10 | WIP | No | No | No | No | No | No | No | No | No |
| NFR0009 | Session Timeout | System shall automatically log out users after a defined period of inactivity. | 10 | No | No | No | No | No | No | No | No | No | No |
| NFR0010 | System Maintainability | Maintainability The system shall be easy to maintain and allow for future updates, bug fixes, and enhancements with minimal downtime. | 9 | No | No | No | No | No | No | No | No | No | No |

**15. Development and resource plan:-**

**Development plan:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sr. No.** | **Phase** | **Description** | **Time** |
| 1 | Requirement gathering | Stakeholder Workshops, interviews, and process analysis with stakeholders. | 4 weeks |
| 2 | System design | Define architecture, UI/UX mockups, database structure, and system modules. | 10 weeks |
| 3 | Development | Development of core modules like inventory, Order, delivery, integration external systems (APIs, GPS) & legacy system. | 12 weeks |
| 4 | Testing | Unit testing, integration testing, UAT, bug fixing. | 4 weeks |
| 5 | Deployment |

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| Live deployment, final data migration, environment setup. |

 | 4 weeks |
| 6 | Training & Support | End-user training, admin manuals, and post-go-live support. | 4 weeks |

**Resource Plan:**

|  |  |  |
| --- | --- | --- |
| Role | Responsibility | Estimated Effort |
| Project Manager | Oversee planning, scheduling, risk management, and stakeholder communication. | Full-time |
| Business Analyst | Gather requirements, prepare BRD, user stories, and ensure business alignment. | Full-time (Phase 1–3) |
| UI/UX Designer | Design wireframes, mockups, and ensure user-friendly interfaces. | Part-time (Phase 2) |
| Frontend Developer | Develop the user-facing application interface. | Full-time (Phase 3–4) |
| Backend Developer | Build APIs, business logic, database integration. | Full-time (Phase 3–4) |
| QA Tester | Conduct system testing, UAT support. | Full-time (Phase 4) |
| DevOps Engineer | Setup deployment environment. | Part-time (Phase 5) |
| Trainer / Support Agent | Conduct user training, create manuals, and handle support queries. | Part-time (Phase 6) |

* **Estimated Budget & Timeline:-**

Budget: Rs. 10,00,000

Total Duration: 3 to 4 months

**16. Appendices:-**

**List of Acronyms:**

|  |  |
| --- | --- |
| Acronym | Full Form |
| NIC | Natural Ice Cream  |
| BRD | Business Requirement Document |
| ERP | Enterprise Resource Planning |
| WMS | Warehouse Management System |
| SLA | Service Level Agreement |
| GPS | Global Positioning System |
| API | Application Programming Interface |
| POD | Proof of Delivery |
| UI/UX | User Interface / User Experience |
| UAT | User Acceptance Testing |
| CI/CD | Continuous Integration / Continuous Deployment |
| KPI | Key Performance Indicator |
| RTM | Requirement Traceability Matrix |
| FEFO | First Expiry, First Out (Inventory Principle) |
| IT | Information Technology |
| NFR | Non-Functional Requirement |
| FR | Functional Requirement |
| T1, T2, T3, T4 | Test Phases (e.g., T1 = Unit Testing, T2 = Integration Testing, etc.) |
| D1, D2, D3, D4 | Design Phases (e.g., D1 = Initial Design, D2 = Final Design, etc.) |

**Glossary of terms:**

1. Enterprise Resource Planning: A software system used to manage and integrate key business processes such as inventory, orders, finance, human resources, and supply chain.

2. FEFO - First Expiry, First Out: A method of managing inventory where products that are closest to their expiration date are used or dispatched first, particularly useful for perishable goods.

3. Global Positioning System: A satellite-based navigation system used for tracking the location of delivery vehicles in real-time.

4. Route Optimization: The process of planning the most efficient delivery routes for logistics, considering factors like distance, traffic conditions, load capacity, and delivery time windows.

5. Stockouts: A situation where inventory is unavailable to fulfill customer orders, typically caused by poor inventory forecasting or supply chain issues.

6. User Roles: Differentiated access levels within the system, ensuring that users can only access features and data according to their specific job functions e.g., admin, warehouse staff, delivery staff.

7. API (Application Programming Interface): A set of protocols and tools that allow different software applications to communicate with each other, facilitating integration between systems.

8. Data Migration: The process of transferring data from one system to another, ensuring data integrity and accuracy during the transition.

9. Data Security: Measures taken to protect sensitive business data from unauthorized access, breaches, or loss, ensuring compliance with data protection regulations.

10. Concurrent Users: The number of users who can simultaneously use the system without performance degradation, a key factor in system scalability.

11. Cloud-Based System: A system that relies on cloud computing resources for storage, processing, and management of data, offering scalability and accessibility.

12. Business Intelligence (BI): The technology and practices used to analyze and interpret business data to support decision-making and improve business operations.

* **Related documents:**

1. Feasibility Study Report: Assesses the technical, operational, economic, and legal feasibility of the proposed system.

2. Market Analysis Report: Analyzes industry trends, competitor software, and market fit for inventory and delivery optimization.

3. Stakeholder Requirement Document (SRD): Captures stakeholder-specific needs, expectations, pain points, and system goals.

4. Risk Management Plan: Identifies potential risks, mitigation strategies, and responsibilities.

5. Stakeholder Analysis Report: Identifies and assesses the influence and interests of all stakeholders involved in the project.

6. Communication Management Plan: Defines how project information will be communicated to stakeholders.

Question 2: Prepare process flow diagram using your imagination.

Answer:



**ASSIGNMENT 2**

Question 1: Write an introduction letter to a client introducing yourself as a business analyst in charge of working with the client and his team to start the business understanding process.

Answer:-

Subject: Introduction As Your Business Analyst Partner

Dear Sir,

I hope this message finds you well.

My name is Komal Chauhan, and I am delighted to introduce myself as the Business Analyst assigned to collaborate with you and your team on this exciting project.

Understanding the challenges and opportunities within the manufacturing and logistics sectors—particularly in delivery and exceptional customer service—is a domain I am passionate about. With your vision of managing inventory and ensuring the quickest delivery of your ice cream and milk products, my role will be to work closely with you to transform these goals into a robust, tailor-made software solution.

To begin, I aim to gain a thorough understanding of your current processes, challenges, and aspirations. Together, we will explore your operational workflow, identify key requirements, and map out a strategic plan that aligns with your business objectives. Your insights will be invaluable in ensuring the solution we design is practical, scalable, and optimized for your unique needs.

I look forward to discussing your expectations and gathering inputs from your team during our initial meetings. In the meantime, please feel free to share any documents, current processes, or initial thoughts that could help us hit the ground running.

Thank you for the opportunity to collaborate on this project. I am confident that, together, we will develop a solution that adds significant value to your business operations. Please let me know a convenient time for us to connect further.

Looking forward to working with you.

Warm regards,

Komal Chauhan

Business Analyst

Question 2: Prepare a brief BRD and SRS for a project- Horoscope or Ticketing system or online store.

Answer:

Topic: IRCTC Ticketing system

**Business Requirement Document:**

Project Name: IRCTC Online Ticketing System

Project ID: PRJ-IRCTC-2025-TKT

Client: Indian Railways (IRCTC)

Date: 17/04/2025

Prepared by: Komal Chauhan – Business Analyst

**Executive Summary**

The IRCTC Online Ticketing System aims to streamline the process of booking railway tickets across India. It provides users with the ability to search trains, check availability, book or cancel tickets, and view schedules through a secure, scalable, and user-friendly web and mobile interface.

**1. Document Revision:-**

|  |  |  |
| --- | --- | --- |
| Date | Version | Document Changes |
| 23-04-2025 | 1 | Initial draft including Business Goal, Objectives, Scope, and Business Rules. |
| 25-04-2025 | 1.1 | Added Functional Requirements like Payment, Assumptions, and Constraints. |
| 26-04-2025 | 1.2 | Included Risk Analysis, Process Flow - As-Is. |
| 27-04-2025 | 1.3 | Added Non-functional Requirements, RTM, Glossary, and Final Edits. |

**2. Approvals:-**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Role** | **Name** | **Title** | **Signature** | **Date** |
| Project Sponsor | Ravi Sharma | Director, Indian Railways | R Sharma | 23-04-2025 |
| Business Analyst | Komal Chauhan | Business Analyst | P Mehta | 23-04-2025 |
| Project Manager | Amit Verma | IT Project Manager | A Verma | 23-04-2025 |
| QA Lead | Rajat Singh | Quality Assurance Manager | R Singh | 23-04-2025 |
| Business Owner | Anil Deshmukh | Chief Digital Officer | A Deshmukh | 23-04-2025 |
| System Architect | Sneha Roy | Senior System Architect | S Roy | 23-04-2025 |
| Development Lead | Karan Malhotra | Lead Developer | K Malhotra | 23-04-2025 |
| User Experience Lead | Ritu Kapoor | UX/UI Design Head | R Kapoor | 23-04-2025 |

**3. RACI Chart:-**

* **IT Side Stakeholder:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Task** | **Name** | **Position** | **R** | **A** | **C** | **I** |
| Requirements Gathering | Komal Chauhan | Business Analyst | R | A |   | I |
| System Design | Sneha Roy | System Architect | R | A | C | I |
| Development | Karan Malhotra | Development Lead | R | A |   | I |
| QA and Testing | Rajat Singh | QA Lead | R | A | C | I |
| Deployment | Karan Malhotra | Development Lead | R | A | C | I |
| UX Design | Ritu Kapoor | UX Lead | R | A |   | I |
| Stakeholder Communication | Amit Verma | Project Manager | R | A | C | I |

* **Client Side Stakeholder:**

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Task** | **Name** | **Position** | **R** | **A** | **C** | **I** |
| Business Approval | Anil Deshmukh | Business Owner |   | A | C | I |
| Final Project Sign-off | Ravi Sharma | Project Sponsor |   | A | C | I |
| Requirements Validation | Anil Deshmukh | Business Owner |   |   | C | I |
| User Acceptance Testing | Ravi Sharma | Project Sponsor |   |   | C | I |
| Feedback on UX/Content | Anil Deshmukh | Business Owner |   |   | C |   |
| Go-Live Approval | Ravi Sharma | Project Sponsor |   | A | C | I |

### 4. ****Business Goal:-****

The IRCTC Online Ticketing System aims to digitize and modernize the railway ticket booking process across India by providing a centralized, real-time, and secure platform for passengers. It enables users to search trains, check seat availability, book and cancel tickets, and view train schedules through both web and mobile applications. The system is designed to handle millions of concurrent users with high performance and availability. It reduces dependency on physical ticket counters, enhances operational efficiency, and improves the overall travel experience. The platform will support multiple quotas like General, Tatkal, Ladies, etc. with a dynamic pricing, and secure payment integration. Additionally, it aligns with government initiatives for digital transformation and ensures compliance with data privacy and financial regulations.

### 5. ****Business Objectives:-****

The business objective of the IRCTC Online Ticketing System is to reduce crowding and manual booking at railway stations by offering a real-time, digital ticketing solution. It aims to provide passengers with instant access to train availability, schedules, and fares through a user-friendly platform. The system will enhance customer satisfaction, improve service efficiency, and support high traffic volumes securely. Additionally, it will generate revenue through online bookings and related services.

### 6. ****Business Rules:-****

* Tickets can be booked up to 120 days in advance.
* Tatkal bookings open 1 day before the date of travel.
* One user can book up to six tickets per month.
* Refunds follow IRCTC refund policy rules.
* ID verification is mandatory during registration.
* Passengers must provide a valid government-issued ID during journey verification.
* Tickets once booked cannot be transferred to another individual.
* No refund is allowed on confirmed Tatkal tickets except in case of train cancellation.
* Children below 5 years of age travel for free but do not get a separate seat or berth.
* Users are not allowed to book tickets between 11:45 PM and 12:20 AM due to system maintenance.
* Senior citizens can avail concession only if opted during booking and carry age proof during the journey.

### 7. ****Project Background:-****

IRCTC currently manages millions of daily passengers, but its manual and semi-digital systems struggle with growing demand and efficiency. The project aims to build a fully integrated, scalable online ticketing system that simplifies the booking process. It will enable users to search, book, and cancel tickets online, reducing dependence on physical counters. The new system is designed to improve speed, accuracy, and accessibility while supporting future growth and digital initiatives.

### 8. ****Project Objective:-****

The objective is to build a secure, scalable, and user-friendly online ticketing system for IRCTC. It will enable passengers to search trains, check seat availability, book or cancel tickets, and make payments online. The system will be accessible via web and mobile platforms. It aims to reduce manual workload, improve booking efficiency, and enhance the overall user experience.

### 9. ****Project Scope:-****

#### In-Scope Functionality

* User registration and login
* Train search, schedule viewing, seat availability
* Booking and cancellation of tickets
* Tatkal, Ladies, Senior Citizen, and other quotas
* Payment integration
* Ticket generation and e-delivery on SMS or email
* Refund processing
* Display of dynamic pricing based on demand and quota rules
* Seat preference selection like e.g., upper, lower, side berth
* Notifications and alerts via SMS or email for booking status, cancellations, delays
* Train status tracking like live updates via integration with railway data
* Multilingual support like Hindi, English, regional languages.

#### Out-of-Scope Functionality

* Hotel, cab, or food booking integration
* International train ticket booking
* Integration with flight or bus booking platforms
* Offline ticket booking via kiosks or SMS-based systems
* Freight or parcel booking is not included.

### 10. ****Assumptions:-****

1. Users will have internet access and devices capable of using the smartphones, laptops, desktops that support modern browsers or mobile apps.
2. The backend systems of Indian Railways will maintain accurate and real-time data regarding train schedules, seat availability, and delays.
3. Third-party payment gateway services are reliable and support secure, real-time transactions.
4. Third-party payment gateways like UPI, Credit/Debit Cards, Digital Wallets will be integrated and compliant with Indian payment regulations.
5. Users will register with valid details, and verification mechanisms like OTP, email confirmation will be in place to authenticate users.
6. The system will comply with data protection and privacy laws as mandated by the Indian Government.
7. The system will support major mobile platforms (iOS and Android) with up-to-date app versions.

### 11. ****Constraints:-****

1. The system must be built and delivered within a fixed time (e.g., 6 months).
2. The total cost of the project must not exceed the approved budget.
3. The system must follow rules set by Indian Railways and data privacy laws.
4. Only allowed payment gateways or third-party services can be used.

### 12. ****Risks:-****

### 1. ****Technological Risk:****

(i) System Downtime or Crash:

High user traffic especially during peak hours like Tatkal booking may crash the server or slow down the system.

* Avoid: Use load balancers, efficient code, and database optimization from the start.
* Mitigate: Implement auto-scaling, backup servers, and real-time monitoring.
* Transfer: Host the system on a reliable third-party cloud provider.
* Accept: Minimal outages during non-peak hours may be tolerated with prior communication to users.

(ii) Payment Gateway Failures:

Integration issues in third-party payment services could delay or fail transactions.

* Avoid: Partner only with reliable and tested payment providers.
* Mitigate: Integrate multiple gateways and fallback options, retry mechanism on failure.
* Transfer: Shift financial liability to gateway providers through SLAs (Service Level Agreements).
* Accept: Accept minor, short-term failures with clear user messaging and retry options.

(iii) Data Loss:

System database crashes could lead to loss or corruption of booking data.

* Avoid: Use structured data handling.
* Mitigate: Enable automated backups, version control, and regular data audits.
* Transfer: Use managed database services with recovery guarantees.
* Accept: Tolerate minor non-critical data issues in logs or historical data with restoration plans.

(iv) Security Vulnerabilities:

Risk of hacking, data breaches, or unauthorized access to user or payment data.

* Avoid: Implement secure coding practices, data encryption, and access control from day one.
* Mitigate: Conduct regular security audits, penetration testing, and use firewalls/anti-malware.
* Transfer: Insure against cyber threats or outsource security to specialized providers.
* Accept: Accept low-risk vulnerabilities temporarily if non-critical and under close monitoring.

### 2. ****Skills Risk:****

#### (i) **Lack of Expertise in Required Technology:**

#### The project team may not have sufficient experience with the specific technologies like programming languages, databases, tools required to build and maintain the ticketing system efficiently, which can lead to delays or low-quality output.

* **Avoid:** Hire developers with proven experience in the required tech stack (e.g., Java, React, DBMS).
* **Mitigate:** Provide training or workshops for team members to upskill quickly.
* **Transfer:** Outsource complex components to expert vendors or consultants.
* **Accept:** Accept a learning curve for non-critical modules, with extended timelines if needed.

#### (ii) **Inadequate Testing or QA Skills:**

#### The team may lack proper skills or resources for effective testing and quality assurance.This can result in undetected bugs, performance issues, and lower system reliability.

* **Avoid:** Recruit a qualified QA team from the start.
* **Mitigate:** Use automated testing tools and peer code reviews.
* **Transfer:** Partner with third-party testing companies.
* **Accept:** Accept limited manual testing for non-critical components in early stages.

### 3. ****Political Risk:****

Political risks involve changes in government policies, regulations could affect the ticketing system’s implementation or operation.

**(i) Change in Government Policies:**

**Policy changes by the government may affect project scope, timelines, or compliance requirements.**

**This can lead to delays or rework based on new regulations.**

* **Avoid: Regularly review applicable policies during planning.**
* **Mitigate: Design the system to be flexible for quick updates.**
* **Transfer: Involve legal/compliance advisors to handle regulatory changes.**
* **Accept: Accept minor adjustments post-deployment if changes are unavoidable.**

**(ii) Delays in Government Approvals:**

**Slow or pending approvals from railway authorities or other departments can block progress.**

**This can pause development.**

* **Avoid: Begin early communication with decision-makers.**
* **Mitigate: Maintain a buffer in the project timeline for approval delays.**
* **Transfer: Delegate approval tracking to a government liaison or agency.**
* **Accept: Accept minor hold-ups and adjust timelines accordingly.**

### 4. ****Business Risk:****

### **(i) Low User Adoption:**

Users may prefer traditional booking methods or face difficulty with the new system.
This could lead to reduced usage and poor return on investment.

* **Avoid:** Conduct user research and design an intuitive UI/UX.
* **Mitigate:** Offer training, guides, and customer support for new users.
* **Transfer:** Partner with agencies to run awareness campaigns.
* **Accept:** Accept slow adoption during the initial launch phase.

### **(ii) Budget Overrun**

Project costs may exceed estimates due to unforeseen requirements or delays.
This could impact profitability or funding availability.

* **Avoid:** Create a realistic and detailed project budget upfront.
* **Mitigate:** Track expenses closely and adjust non-critical features.
* **Transfer:** Use fixed-price contracts for vendors and developers.
* **Accept:** Accept minor overruns if they lead to essential feature completion.

### 5. ****Requirement Risk:****

This risk stems from changes in system requirements during the development phase or unclear/unverified requirements that might lead to scope creep or misaligned deliverables. This can cause delays, increased costs, or unsatisfactory project outcomes.

(i) **Incomplete or Unclear Requirements:**
Ambiguous or incomplete requirements can lead to incorrect or delayed development.
This results in rework, user dissatisfaction, and missed deadlines.

* **Avoid:** Conduct detailed requirement-gathering sessions with stakeholders.
* **Mitigate:** Use prototypes, mockups, and frequent reviews to validate understanding.
* **Transfer:** Assign a dedicated business analyst to manage and refine requirements.
* **Accept:** Accept minor clarification delays if caught early in the cycle.

### (ii) **Frequently Changing Requirements:**Frequent changes in scope can disrupt timelines, inflate costs, and lower quality.They may also cause developer burnout or confusion.

* **Avoid:** Lock down core features with formal approval.
* **Mitigate:** Use change control processes and impact analysis for new requests.
* **Transfer:** Include change management clauses in contracts with clients/vendors.
* **Accept:** Accept changes that improve user value, within controlled limits.

### 6. **Other Risks:**

### **(i) Resource Availability Risk:**Team members may become unavailable due to personal reasons or other projects. This could delay the project or reduce its quality.

* **Avoid:** Plan for resource backups and ensure proper workforce planning.
* **Mitigate:** Cross-train team members to share responsibilities.
* **Transfer:** Outsource critical tasks to third-party contractors or agencies.
* **Accept:** Accept minor delays when resource unavailability is unavoidable.

### **(ii) External Dependency Risk:**Reliance on third-party services or systems e.g., payment gateways could cause delays or failures. If these services experience outages or changes, the ticketing system could be impacted.

* **Avoid:** Choose reliable, well-established third-party vendors.
* **Mitigate:** Set up fallback options, like multiple payment gateways or service providers.
* **Transfer:** Transfer risk via service level agreements (SLAs) with third-party vendors.
* **Accept:** Accept occasional external service downtime with contingency plans.

### (iii) **Communication Breakdown:** Poor communication between teams, clients, or stakeholders could lead to misunderstandings. This can cause delays, missed requirements, or mismatched expectations.

* **Avoid:** Establish clear communication protocols and regular meetings.
* **Mitigate:** Use collaboration tools and maintain an updated project documentation hub.
* **Transfer:** Outsource communication management to a project manager or coordinator.
* **Accept:** Accept minor delays in decision-making if the impact is low.

### 13. ****Business Process Overview****

#### (i) Legacy System: As-Is Process

The **As-Is Process - Current Manual** describes the existing, traditional ticket booking process for passengers at railway stations before the implementation of any digital systems. This process involves multiple manual steps that may be time-consuming and inconvenient for both passengers and station staff.

**Process Flow diagram of AS IS:**



### ****Challenges of the Current Process:****

* **Time-Consuming:** The manual steps take time, leading to long queues, delays, and frustration.
* **Prone to Errors:** Human errors in form-filling or payment can result in mistakes and incorrect tickets being issued.
* **Limited Accessibility:** Passengers have to physically visit the station, which can be inconvenient, especially for those far from the station.
* **Security Risks**: Handling cash increases the possibility of theft or fraud.
* **Inefficiency:** The overall process is inefficient for both passengers and railway staff.

**(ii) Proposed Recommendations (TO-BE)**

The **To-Be Process - With System** represents the future, streamlined, and digital version of the IRCTC ticketing process after the implementation of the online ticketing system. This process improves convenience, efficiency, and user experience. Here is process flow diagram of TO BE Process:



* **Key Advantages of the To-Be Process:**
* **Convenience**: Users can book tickets from home or on the go, without the need to physically visit the station.
* **Speed**: Searching for trains and booking tickets is much faster, with real-time updates on seat availability and train schedules.
* **Security**: Payments are securely processed online, reducing the risks associated with cash transactions.
* **Accessibility**: The system supports a wide range of devices and making it accessible to a broader audience.
* **Environmentally Friendly**: Reduces the need for paper tickets, promoting eco-friendly travel options.

### 14. Business Requirement:-

|  |  |  |
| --- | --- | --- |
| **BR ID** | **Business Requirement Name** | **Business Requirement Description** |
| BR-01 | User Registration and Login | Allow users to create an account, log in securely. |
| BR-02 | Train Search Functionality | Search trains by source, destination, date, and class. |
| BR-03 | Ticket Booking | Book train tickets easily with seat selection. |
| BR-04 | Ticket Cancellation | Users can cancel their tickets with automated refund calculation. |
| BR-05 | View Booking History | Allow users to view and download past bookings. |
| BR-06 | Real-Time Seat Availability | Show live seat availability updates. |
| BR-07 | Payment Gateway Integration | Support multiple payment methods like UPI, Cards, Net Banking, Wallets. |
| BR-08 | Booking Confirmation Notification | Send booking/cancellation confirmation via email/SMS. |
| BR-09 | Dynamic Pricing and Tatkal Booking | Update fares dynamically based on demand (Tatkal and Premium Tatkal). |
| BR-10 | Refund Management | Process and track refunds automatically after ticket cancellation. |
| BR-11 | Support Ticket System | Allow users to raise queries, complaints, and track their resolution status. |
| BR-12 | Feedback Collection Post Journey | Collect feedback from users post journey for service improvements. |
| BR-13 | Multi-Language Support | Provide website and app interface in multiple Indian languages. |
| BR-14 | Loyalty/Reward Program | Implement a loyalty points system for frequent travelers. |
| BR-15 | Integration with Travel Insurance | Offer travel insurance as an optional add-on during booking. |
| BR-16 | E-Wallet for Quick Payment | Maintain a digital wallet for faster repeat transactions. |
| BR-17 | Mobile App Access | Fully functional Android and iOS mobile applications. |
| BR-18 | 24/7 Customer Support Chatbot | Deploy an AI chatbot for handling common support queries. |
| BR-19 | Real-Time Train Running Status | Display live train running information with expected arrival/departure. |
| BR-20 | Advanced Analytics Dashboard (Admin) | Provide an analytics dashboard for monitoring ticket sales, cancellation trends, complaints, etc. |

* **Requirement Traceability Matrix:-**

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **BR ID** | **Business Requirement Name** | **Business Requirement Description** | **Priority** | **Design** | **D1** | **T1** | **D2** | **T2** | **D3** | **T3** | **D4** | **T4** | **UAT** |
| BR-01 | User Registration and Login | Allow users to create an account, log in securely. | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| BR-02 | Train Search Functionality | Search trains by source, destination, date, and class. | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| BR-03 | Ticket Booking | Book train tickets easily with seat selection. | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| BR-04 | Ticket Cancellation | Users can cancel their tickets with automated refund calculation. | Yes | WIP | No | No | No | No | No | No | No | No | No |
| BR-05 | View Booking History | Allow users to view and download past bookings. | No | No | No | No | No | No | No | No | No | No | No |
| BR-06 | Real-Time Seat Availability | Show live seat availability updates. | Yes | Yes | Yes | WIP | No | No | No | No | No | No | No |
| BR-07 | Payment Gateway Integration | Support multiple payment methods like UPI, Cards, Net Banking, Wallets. | Yes | Yes | WIP | No | No | No | No | No | No | No | No |
| BR-08 | Booking Confirmation Notification | Send booking/cancellation confirmation via email/SMS. | Yes | Yes | Yes | Yes | WIP | No | No | No | No | No | No |
| BR-09 | Dynamic Pricing and Tatkal Booking | Update fares dynamically based on demand (Tatkal and Premium Tatkal). | Yes | Yes | Yes | Yes | Yes | WIP | No | No | No | No | No |
| BR-10 | Refund Management | Process and track refunds automatically after ticket cancellation. | Yes | WIP | No | No | No | No | No | No | No | No | No |
| BR-11 | Support Ticket System | Allow users to raise queries, complaints, and track their resolution status. | Yes | Yes | Yes | WIP | No | No | No | No | No | No | No |
| BR-12 | Feedback Collection Post Journey | Collect feedback from users post journey for service improvements. | Yes | Yes | Yes | WIP | No | No | No | No | No | No | No |
| BR-13 | Multi-Language Support | Provide website and app interface in multiple Indian languages. | Yes | Yes | Yes | Yes | Yes | WIP | No | No | No | No | No |
| BR-14 | Loyalty/Reward Program | Implement a loyalty points system for frequent travelers. | Yes | Yes | Yes | Yes | Yes | Yes | No | No | No | No | No |
| BR-15 | Integration with Travel Insurance | Offer travel insurance as an optional add-on during booking. | Yes | Yes | WIP | No | No | No | No | No | No | No | No |
| BR-16 | E-Wallet for Quick Payment | Maintain a digital wallet for faster repeat transactions. | Yes | Yes | WIP | No | No | No | No | No | No | No | No |
| BR-17 | Mobile App Access | Fully functional Android and iOS mobile applications. | Yes | Yes | Yes | WIP | No | No | No | No | No | No | No |
| BR-18 | 24/7 Customer Support Chatbot | Deploy an AI chatbot for handling common support queries. | Yes | WIP | No | No | No | No | No | No | No | No | No |
| BR-19 | Real-Time Train Running Status | Display live train running information with expected arrival/departure. | Yes | Yes | Yes | Yes | Yes | WIP | No | No | No | No | No |
| BR-20 | Advanced Analytics Dashboard (Admin) | Provide an analytics dashboard for monitoring ticket sales, cancellation trends, complaints, etc. | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |

### 15. Appendices:-

### ****List of Acronyms****

* IRCTC – Indian Railway Catering and Tourism Corporation
* API – Application Programming Interface
* RTM – Requirements Traceability Matrix
* BR – Business requirement
* NFR – Non-Functional Requirement
* FR – Functional Requirement
* PCI-DDS- Payment Card Industry Data Security Standard

### ****Glossary of Terms****

### **Tatkal:** Emergency ticket booking quota

### Quota: Special reservation categories

### Ticket ID: Unique ID for a train booking

### Refund: Amount returned upon ticket cancellation

### ****Related Documents****

* Project Plan – Timeline, deliverables, team roles, and major milestones.
* Project Charter – Overview of the project’s purpose, goals, and key stakeholders.
* Feasibility Study – Evaluation of the project’s technical, economic, legal, and operational feasibility.
* Market Analysis – Study of user demand and digital adoption trends in the ticketing sector.
* Enterprise Analysis – Assessment of how the project aligns with organizational structure, goals, and processes.
* Stakeholder Document – Detailed list of stakeholders, their roles, influence, and communication needs.
* Change Request Log – Tracks changes to scope, requirements, or features.
* Requirements Traceability Matrix (RTM) – Maps requirements to design, development, and test coverage.

**Software Requirement Specifications (SRS) Document:-**

1. **Overview of project:-**

The IRCTC Ticketing System project aims to develop an online platform that allows users to search trains, book tickets, make payments, and manage travel plans efficiently. It is designed to improve user experience by offering a fast, reliable, and secure way to handle railway reservations. This project modernizes traditional booking processes and supports high user traffic nationwide.

1. **Purpose of this project:-**

The purpose of this project is to design and develop a comprehensive Ticketing System that allows users to raise support tickets, ensures efficient ticket management, tracks issue resolution, and enhances customer satisfaction through faster turnaround and feedback collection.

1. **Product Scope:-**

The product scope of the IRCTC Ticketing System encompasses the development of a comprehensive digital platform enabling users to search train schedules, verify seat availability, perform ticket bookings, and process secure payments. The system will facilitate user account management, ticket cancellations, and automated refund handling, while ensuring compliance with industry standards for security and data integrity. Key functionalities include real-time booking confirmation through SMS/email notifications and e-ticket generation. Furthermore, the platform will support administrative capabilities for managing train schedules, transaction records, and system performance analytics.

1. **Stakeholder list:-**

|  |  |  |
| --- | --- | --- |
| **Name** | **Designation** | **Role** |
| Ravi Sharma | Director, Indian Railways | Project Sponsor – Provides strategic direction and funding |
| Komal Chauhan | Business Analyst | Gathers, analyzes, and documents business requirements |
| Amit Verma | IT Project Manager | Manages project execution, team coordination, and timeline tracking |
| Neha Kulkarni | Lead Software Engineer | Leads the technical development and architecture |
| Rajat Singh | Quality Assurance Manager | Ensures system quality through planning and execution of testing |
| Ritu Kapoor | UI/UX Designer | Designs user interfaces and improves overall user experience |

1. **System Architecture:-**

**1. Presentation Layer:**

This is the part where users see and interact with.

Example: users to register, login, search, book, payment, cancel ticket, raise refund, history, help & support, real time alerts.

**2. Application Layer:**

This layer handles all the logic and processing.

It communicates between the user interface and the database.

Example: Authentication & Authorization, Processing payments, checking train availability, Fare Calculation Logic, API Services, PNR Generation.

**3. Database Layer:**

This stores all the data like users, bookings, and train schedules.

Example: MySQL or PostgreSQL database for User data storage, maintain train routes, seat management, booking record, payment history, data backup & recovery to prevent from data loss.

1. **Hardware & Software requirement:-**

**Hardware:**

* Laptop: Used by staff for development, testing, or support-related activities
* Desktop: For administrative users and operations team
* Web Server: Hosts the web application and handles user interaction requests
* Database Server: Stores user data, train schedules, bookings, and transaction logs
* Application Server: Hosts business logic, APIs, and internal processes
* Storage system: For storing logs, backups, and system files
* Firewall: Protects network from unauthorized access and external threats.
* Network Infrastructure: Ensures seamless connectivity and communication between components
* Load balancer: Distributes traffic to ensure high availability and scalability.
* **Software:**
* Operating System Software (Windows server): Provides the foundational environment for hosting server applications
* Web Server Software: Manages and serves web content, handles HTTP requests from users
* Database System like MySQL / PostgreSQL: Stores and manages user, ticketing, train, and transaction data
* Payment Gateway API: Enables secure and real-time online payment processing
* Security Tools: SSL, Firewalls, Antivirus- Protects system from unauthorized access, data breaches, and vulnerabilities
* Analytics & Reporting: PowerBI Or Tableae for Provides insights into usage, performance, and transaction trends.
1. **Functional Requirement:**

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| --- | --- | --- | --- |
| **Req. ID** | **Req. name** | **Req. description** | **Priority** |
| FR-001 | User Authentication and Account Management | The system must allow users to create accounts, log in securely, and manage their account details such as personal information, preferences, and password. |  10 |
| FR-002 | Train Search by Source, Destination, Date | Users should be able to search for available trains by specifying source station, destination station, and travel date. |  10 |
| FR-003 | View Seat Availability | The system should display seat availability for selected trains, including information on classes (e.g., AC, Sleeper) and seat types (e.g., window, aisle). |  10 |
| FR-004 | Booking with Class and Quota Options | Users can choose the train class (AC, Sleeper) and select a booking quota (general, ladies, senior citizens, etc.) before confirming the booking. |  9 |
| FR-005 | Payment Gateway Integration | The system must integrate with multiple payment gateways (e.g., debit/credit card, UPI, digital wallets) to process payments securely. |  10 |
| FR-006 | Ticket Download and Receipt | After a successful booking, the user must be able to download an electronic ticket (E-Ticket) and a receipt, which will be sent via email or SMS as well. |  8 |
| FR-007 | Ticket Cancellation and Refund | Users can cancel their tickets and apply for a refund, with the system automatically processing refund requests based on cancellation policies. |  8 |
| FR-008 | View Ticket Details | Users should be able to view the details of their tickets, including train details, seat assignment, and booking status. |  9 |
| FR-009 | Reservation Confirmation Email/SMS | The system must send confirmation emails or SMS with booking details once a ticket is successfully booked. |  8 |
| FR-010 | Multiple Passenger Booking | Users should be able to book tickets for multiple passengers in a single transaction by entering their details collectively. |  7 |
| FR-011 | Train Schedule Viewing | The system should allow users to view the train schedule, including departure and arrival times, intermediate stops, and delays. |  8 |
| FR-012 | User Profile Management | The system must allow users to manage and update their profiles, including contact details and preferences. |  7 |
| FR-013 | Payment Confirmation Notification | After payment is processed, the system should send a confirmation of the transaction to the user, indicating whether it was successful or failed. |  9 |
| FR-014 | Booking History | Users should be able to view their past booking history, including past tickets, cancellations, and payment status. |  8 |
| FR-015 | Real-Time Train Status Updates | The system should provide real-time updates about train delays, cancellations, and arrivals/departures. |  10 |
| FR-016 | Mobile-Friendly Interface | The ticketing system should be fully accessible and optimized for mobile devices (iOS and Android). |  9 |
| FR-017 | Seat Preferences (e.g., lower berth) | Users should be able to choose seat preferences such as lower berth, upper berth, or window seat, based on availability. |  7 |
| FR-018 | Special Discounts (Senior Citizen, etc.) | The system should apply applicable discounts based on user details (e.g., senior citizens, students) during booking. |  8 |
| FR-019 | Multi-Language Support | The system should offer multi-language support, including English, Hindi, and other regional languages. |  7 |
| FR-020 | Payment Processing | The system shall allow users to make payments using multiple methods such as credit/debit cards, UPI, and net banking, and confirm the payment status in real-time before ticket confirmation. |  10 |

1. **Non Functional Requirement:**

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| --- | --- | --- | --- |
| **Req. ID** | **Req. name** | **Req. desciption** | **Priority** |
| NFR-001 | System Availability | The ticketing system should have a minimum uptime of 99.9%, ensuring high availability for users at all times. |  10 |
| NFR-002 | System Scalability | The system should be able to scale up to handle 1 million concurrent users during peak demand periods, such as holidays and festivals. |  10 |
| NFR-003 | Security | All payment transactions must comply with security standards & user data should be encrypted using secure protocols. |  10 |
| NFR-004 | Performance | The system must load all pages and complete ticket booking processes within 2-3 seconds for a seamless user experience. |  9 |
| NFR-005 | Compatibility | The system must be compatible with all major web browsers like Chrome, Firefox, Safari, Edge and mobile platforms iOS, Android. |  9 |
| NFR-006 | Data Backup and Recovery | The system must include regular backups and a disaster recovery plan to ensure no loss of data in case of system failure. |  9 |
| NFR-007 | Compliance with Regulations | The system must adhere to local regulations such as data privacy laws like GDPR in case of international users, or India's Personal Data Protection Bill. |  9 |
| NFR-008 | Usability | The user interface should be intuitive, with a simple design, easy navigation, and user-friendly instructions for booking, payment, and cancellations. |  9 |
| NFR-009 | Load Handling | The system must be able to handle up to 100,000 concurrent transactions without performance degradation during peak times like booking during festivals. |  9 |
| NFR-010 | Support for Mobile Platforms | The system must be responsive, with mobile apps for iOS and Android that allow users to search, book, and manage tickets directly from their mobile devices. |  9 |

1. **Use Case Diagram:**



1. **Use Case Specifications:-**

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| --- | --- |
| Use Case ID | UC001 |
| Use case name | User Registration |
| Use Case description | This use case allows a new user to create an account in the system by entering personal and contact details. |
| Created by | Ms. Komal Chauhan | Last updated | NA |
| Date created | 28/04/2025 | Last revision date | NA |
| Primary Actor | New User |
| Secondary Actor | Authentication Service, Notification Service (for OTP/email) |
| Basic Flow | User clicks on "Register"Enters name, email, mobile, valid ID proof number and passwordSystem sends OTP to mobile/emailUser enters OTPSystem verifies OTP and creates the accountRegistration successful message is shown |
| Alternate Flow | If OTP is not received, user can resend OTPIf email already exists, prompt user to login |
| Exceptional Flow | Invalid email or mobile formatOTP entered incorrectly multiple times |
| Pre-condition | User is not already registeredValid internet connection |
| Post condition | User account is created and stored in databaseUser is redirected to login |
| Assumptions | User has a valid and accessible mobile/emailSystem can send OTP in real-time |
| Constraints | OTP is valid only for 5 minutesPassword must meet security policy |
| Dependencies | SMS/Email OTP gatewayUser database |
| Input | Name, email, mobile number, password, valid ID proof number, OTP |
| Output | Success or error messages, OTP, confirmation message |
| Business Rules | Mobile number must be uniquePassword should contain at least 8 characters, one number, and one special character |
| Miscellaneous Information | Multi-language support may be required in future |

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| --- | --- |
| Use Case ID | UC002 |
| Use case name | Login |
| Use Case description | Allows a registered user to log into the system using email/mobile and password. |
| Created by | Ms. Komal Chauhan | Last updated | NA |
| Date created | 28/04/2025 | Last revision date | NA |
| Primary Actor | Registered User |
| Secondary Actor | Authentication Service |
| Basic Flow | User clicks "Login"Enters credentialsSystem validates credentialsUser is granted access to dashboard |
| Alternate Flow | If user forgets password, clicks “Forgot Password”Receives link/OTP to reset password |
| Exceptional Flow | Multiple failed attempts trigger account lockUser tries to login with unregistered email |
| Pre-condition | User is already registeredValid credentials are provided |
| Post condition | User is redirected to the dashboard |
| Assumptions | User enters correct login credentialsAuthentication server is online |
| Constraints | Max 3 attempts before lockSession timeout set to 15 mins of inactivity |
| Dependencies | Authentication serverUser account database |
| Input | Email/mobile, password |
| Output | Access granted, error messages |
| Business Rules | Passwords are encrypted and not stored in plain textSession ID is created after successful login |
| Miscellaneous Information | CAPTCHA may be added for security. |

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| --- | --- |
| Use Case ID | UC003 |
| Use case name | Select train & seat |
| Use Case description | This use case allows the user to search for available trains based on journey details and select a train along with preferred class and seat. |
| Created by | Ms. Komal Chauhan | Last updated | NA |
| Date created | 28/04/2025 | Last revision date | NA |
| Primary Actor | Registered User |
| Secondary Actor | Payment Gateway, Bank/Wallet Service Provider, Ticketing System |
| Basic Flow | User reviews fare summary and selects a payment method (Card, UPI, Net Banking, Wallet).System redirects to the secure payment gateway.User enters required payment details and authorizes payment.Payment is processed and confirmation is received.System generates payment receipt and proceeds to ticket confirmation. |
| Alternate Flow | If user selects "Cash on Counter" (if applicable), system saves booking for offline payment.Retry option provided in case of payment timeout or failure. |
| Exceptional Flow | Payment declined due to insufficient funds or authentication failure.Payment session times out or user cancels midway |
| Pre-condition | Fare is calculated and seat is reserved (temporarily)Secure connection is established for payment |
| Post condition | Payment confirmation is recordedTicket is confirmed or booking is failed and seat is released |
| Assumptions | Payment gateway and bank servers are availableUsers enter valid payment credentials |
| Constraints | Payment must be completed within a limited time e.g., 15 minutesOnly supported payment modes can be used |
| Dependencies | Third-party payment gateways (e.g., Razorpay, Paytm, BillDesk)Bank APIs, UPI network |
| Input | Payment method, card/UPI details, OTP/authentication |
| Output | Payment success/failure status, transaction ID, receipt |
| Business Rules | Refunds are subject to cancellation policyTicket is issued only on successful payment confirmationPartial payments are not allowed |
| Miscellaneous Information | Payment information must comply with PCI-DSS standards |

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| --- | --- |
| Use Case ID | UC004 |
| Use case name | Payment processing |
| Use Case description | This use case handles the process of securely collecting fare payment from the user after train, seat, and passenger details have been confirmed. |
| Created by | Ms. Komal Chauhan | Last updated | NA |
| Date created | 28/04/2025 | Last revision date | NA |
| Primary Actor | User |
| Secondary Actor | Train Scheduling System, Seat Allocation Engine |
| Basic Flow | User enters source, destination, journey date, and passenger type.System displays list of available trains with departure time, fare, class, and availability.User selects a train and chooses the desired class (e.g., Sleeper, AC).System displays available seats.User selects a seat and confirms selection. |
| Alternate Flow | If no seats are available in selected class, system suggests alternative classes or dates.Option to choose "Auto Seat Allocation" instead of selecting manually. |
| Exceptional Flow | User enters an invalid route or dateTrain is cancelled or not operational on selected date |
| Pre-condition | User has access to the search interfaceTrains are scheduled and seat availability is updated |
| Post condition | Train and seat selection are stored for the next step (passenger detail entry) |
| Assumptions | Trains and seat availability data is real-timeSeat selection is first-come, first-serve |
| Constraints | Time-out after 10 mins of inactivitySeats can’t be held without payment beyond a defined period |
| Dependencies | Train databaseReal-time seat availability serviceRoute and fare engine |
| Input | Source, destination, date, class |
| Output | Train list, seat map, confirmation of seat selection |
| Business Rules | Only valid routes and operational trains shownOne user cannot book more than 6 seats at once |
| Miscellaneous Information | Integration with dynamic pricing or quotas (Tatkal, Ladies, Senior Citizen) may apply |

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| --- | --- |
| Use Case ID | UC005 |
| Use case name | Ticket confirmation |
| Use Case description | After successful payment, the system confirms the train ticket by allocating a seat, generating a PNR number, and notifying the user via multiple channels. |
| Created by | Ms. Komal Chauhan | Last updated | NA |
| Date created | 28/04/2025 | Last revision date | NA |
| Primary Actor | User |
| Secondary Actor | Ticketing System, Notification System (Email/SMS) |
| Basic Flow | System verifies payment success.Allocates confirmed seat or updates waitlist status.Generates PNR and ticket reference number.Sends e-ticket via email/SMS to user.Displays confirmation page with journey details. |
| Alternate Flow | If ticket is waitlisted, system notifies user with current waitlist number.If quota is full, system prompts user to choose another train or retry later. |
| Exceptional Flow | Technical failure in generating ticket or PNR number.Failure in sending confirmation due to email/SMS service outage. |
| Pre-condition | Valid payment must be confirmed.Selected seat/train is still available. |
| Post condition | Ticket is booked and details are stored in the system.Confirmation message is sent to user. |
| Assumptions | Train data and seat availability are up to date.User contact details are accurate. |
| Constraints | Seat allocation is subject to availability at the time of confirmation.Confirmation must be completed within a fixed time window. |
| Dependencies | PNR generation systemEmail and SMS service providers |
| Input | Payment confirmation, passenger and train data |
| Output | PNR number, seat details, e-ticket |
| Business Rules | PNR must be unique and system-generated.Booking history must be saved for each user.E-tickets are considered valid travel documents. |
| Miscellaneous Information | Data should be stored securely in compliance with privacy norms.User should be able to retrieve ticket from their account anytime. |

1. **Activity Diagram:-**
2. Registration & Login:



1. Select & Select train & ticket:



1. Add Passenger Details:



1. Payment:



1. Ticket Confirmation:



Question No. 3: Make an ERD of creating a support ticket/Ticketing life cycle.



4. User story of shopping from ecommerce.

**E-Commerce Application: Myntra**

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| --- | --- | --- |
| User Story ID. 1 | Tasks: 3 | Priority: Highest |
| As a new user, I want to register an account on the platform so that I can access personalized recommendations and place orders. |
| BV: 500 | CP: 05 |
| Acceptance criteria:User can register using email, phone number, or social media accounts.The user must receive a verification email or SMS.The user is prompted to complete their profile after registration. |

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| --- | --- | --- |
| User Story ID. 2 | Tasks: 3 | Priority: Highest |
| As a registered user, I want to log in to my account so that I can view my past orders and preferences. |
| BV: 500 | CP: 03 |
| Acceptance criteria:User can log in using email, phone number, or social media accounts.If the login details are incorrect, an error message is shown.User is redirected to the homepage upon successful login. |

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| --- | --- | --- |
| User Story ID. 3 | Tasks: 2 | Priority: Highest |
| As a user, I want to recover my forgotten password so that I can log in again. |
| BV: 200 | CP: 05 |
| Acceptance criteria:User can request a password reset email/SMS.The link in the email/SMS should redirect the user to a page to reset the password.The new password must be validated before being updated. |

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| User Story ID. 4 | Tasks: 4 | Priority: Highest |
| As a user, I want to browse products by categories so that I can find the items I need. |
| BV: 200 | CP: 08 |
| Acceptance criteria:Products are categorized (e.g., Men, Women, Kids, Electronics).Users can navigate through sub-categories.The user can see product images, names, and prices. |

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| --- | --- | --- |
| User Story ID. 5 | Tasks: 3 | Priority: Medium |
| As a user, I want to search for products by name or filter so that I can quickly find what I am looking for. |
| BV: 200 | CP: 05 |
| Acceptance criteria:The search bar should show suggestions as the user types.Search results are relevant to the query.Users can filter search results based on price, brand, color, and size. |

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| User Story ID. 6 | Tasks: 5 | Priority: Highest |
| As a user, I want to view detailed information about a product so that I can make an informed purchase decision. |
| BV: 500 | CP: 08 |
| Acceptance criteria:The product page should display images, price, description, size options, and color options.Users should be able to read reviews and ratings.Availability and stock status should be visible. |

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| User Story ID. 7 | Tasks: 4 | Priority: Highest |
| As a user, I want to add products to my shopping cart so that I can purchase multiple items at once. |
| BV: 500 | CP: 05 |
| Acceptance criteria:The user can add multiple items to the cart.The cart icon should show the number of items added.A confirmation message should appear when an item is added. |

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| User Story ID. 8 | Tasks: 5 | Priority: Highest |
| As a user, I want to view the contents of my shopping cart so that I can review my order before checkout. |
| BV: 200 | CP: 08 |
| Acceptance criteria:The user can see all added items, including product name, price, quantity, and total price.Users can remove or change quantities of items in the cart.Users can see estimated shipping fees and taxes. |

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| --- | --- | --- |
| User Story ID. 9 | Tasks: 4 | Priority: Highest |
| As a user, I want to proceed to checkout so that I can complete my purchase. |
| BV: 500 | CP: 05 |
| Acceptance criteria:User can view and edit their shipping address, payment method, and order summary.The "Proceed to Checkout" button should be prominent.Users can see the total cost before confirming the order. |

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| User Story ID. 10 | Tasks: 3 | Priority: Highest |
| As a user, I want to apply a discount code so that I can receive a discount on my order. |
| BV: 200 | CP: 05 |
| Acceptance criteria:The discount code field should be visible at checkout.The discount should be applied correctly after entering the valid code.Invalid codes should show an error message. |

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| User Story ID. 11 | Tasks: 5 | Priority: Highest |
| As a user, I want to choose a payment method so that I can pay for my order. |
| BV: 200 | CP: 08 |
| Acceptance criteria:The platform should support multiple payment methods (credit card, debit card, UPI, wallet, COD).Payment should be processed securely.The user should see a confirmation page after payment is successful. |

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| User Story ID. 12 | Tasks: 3 | Priority: Highest |
| As a user, I want to receive an order confirmation after I complete the payment so that I know my purchase is successful. |
| BV: 200 | CP: 05 |
| Acceptance criteria:The user should receive a confirmation email/SMS.The confirmation page should display the order ID, summary, and estimated delivery date. |

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| User Story ID. 13 | Tasks: 5 | Priority: Medium |
| As a user, I want to track my order so that I can know its status and expected delivery time. |
| BV: 200 | CP: 08 |
| Acceptance criteria:The user can track the order from the order history section.The tracking page shows real-time status updates, such as "Dispatched," "In Transit," and "Out for Delivery."Delivery time should be accurate. |

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| User Story ID. 14 | Tasks: 3 | Priority: Medium |
| As a user, I want to leave a review for a product I purchased so that I can share my experience with others. |
| BV: 200 | CP: 05 |
| Acceptance criteria:The user can rate the product from 1 to 5 stars.The user can write a review with text.Reviews are displayed on the product page. |

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| User Story ID. 15 | Tasks: 3 | Priority: Medium |
| As a user, I want to view a size guide so that I can choose the right size for clothing or shoes. |
| BV: 500 | CP: 05 |
| Acceptance criteria:A size guide link is provided on the product page.The size guide shows measurements for different sizes.The guide is easy to understand. |

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| User Story ID. 16 | Tasks: 5 | Priority: Highest |
| As a user, I want to receive product recommendations based on my previous purchases or browsing history. |
| BV: 200 | CP: 08 |
| Acceptance criteria:The recommendations are personalized based on user behavior.Recommended products are shown on the homepage or product detail page.Users can click to view more recommendations. |

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| User Story ID. 17 | Tasks: 8 | Priority: Medium |
| As a user, I want to save items for later so that I can purchase them at another time. |
| BV: 200 | CP: 05 |
| Acceptance criteria:The user can click “Save for Later” on items in the cart.Saved items are stored in a separate list.Users can move items back to the cart. |

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| User Story ID. 18 | Tasks: 3 | Priority: Low |
| As a user, I want to add items to my wishlist so that I can track items I may want to purchase in the future. |
| BV: 200 | CP: 05 |
| Acceptance criteria:Users can add products to a wishlist from the product page.Users can view and remove items from the wishlist.Wishlist items are saved for future visits. |

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| User Story ID. 19 | Tasks: 5 | Priority: Highest |
| As a user, I want to filter products by brand so that I can narrow down my choices. |
| BV: 200 | CP: 08 |
| Acceptance criteria:The user can select multiple brands from the filter options.Products are filtered to show only those from the selected brands.The applied filters are displayed on the screen. |

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| User Story ID. 20 | Tasks: 3 | Priority: Highest |
| As a user, I want to sort products by price, popularity, or ratings so that I can find the best products easily. |
| BV: 500 | CP: 05 |
| Acceptance criteria:Sorting options like “Price Low to High,” “Best Selling,” and “Top Rated” should be available.The sorting should be applied immediately and reflect on the product list.Users can clear the sort and view products by default. |

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| User Story ID. 21 | Tasks: 5 | Priority: Low |
| As a user, I want to cancel my order before it is shipped so that I can avoid receiving unwanted products. |
| BV: 500 | CP: 08 |
| Acceptance criteria:The user can cancel the order if the status is “Pending” or “Processing.”The user is notified if cancellation is successful.The amount paid should be refunded after cancellation. |

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| User Story ID. 22 | Tasks: 4 | Priority: Highest |
| As a user, I want to initiate a return or exchange for a product if it doesn’t meet my expectations. |
| BV: 500 | CP: 08 |
| Acceptance criteria:Users can initiate a return/exchange within a specific period (e.g., 30 days).The user can select the reason for return or exchange.A refund or replacement is processed based on the return policy. |

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| User Story ID. 23 | Tasks: 3 | Priority: Medium |
| As a user, I want to select a shipping option during checkout so that I can choose the most convenient delivery method. |
| BV: 200 | CP: 05 |
| Acceptance criteria:The user can select between standard and expedited shipping.The estimated delivery date should be shown for each shipping option.The cost for each shipping option should be displayed. |

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| User Story ID. 24 | Tasks: 3 | Priority: Medium |
| As a user, I want to add, edit, or remove delivery addresses so that I can have my products shipped to the correct location. |
| BV: 100 | CP: 05 |
| Acceptance criteria:Users can add multiple delivery addresses to their profile.Users can select a default delivery address.Users can edit or delete existing addresses. |

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| User Story ID. 25 | Tasks: 5 | Priority: Low |
| As a user, I want to purchase and redeem gift cards so that I can gift credit to others. |
| BV: 100 | CP: 08 |
| Acceptance criteria:Users can select the gift card value and add it to the cart.Users can redeem gift cards at checkout.The system should validate and apply the gift card amount to the total order. |

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| User Story ID. 26 | Tasks: 5 | Priority: Medium |
| As a user, I want to view my order history so that I can track past purchases and re-order items. |
| BV: 200 | CP: 05 |
| Acceptance criteria:The user can view all past orders with order IDs, dates, and statuses.Users can view the details of each order, including products and payment method.Users can reorder items directly from the order history. |

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| User Story ID. 27 | Tasks: 5 | Priority: Medium |
| As a user, I want to chat with customer support if I have any issues with my order or the platform. |
| BV: 500 | CP: 08 |
| Acceptance criteria:A live chat option is available on the website.The user can initiate a conversation with support agents.The user receives prompt responses and resolutions. |

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| User Story ID. 28 | Tasks: 3 | Priority: Low |
| As a user, I want to receive an invoice for my order so that I can keep it for my records. |
| BV: 100 | CP: 03 |
| Acceptance criteria:An invoice is generated and sent via email after the order is confirmed.The invoice includes details such as product names, prices, taxes, and shipping charges.Users can download the invoice from their account. |

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| --- | --- | --- |
| User Story ID. 29 | Tasks: 4 | Priority: Highest |
| As a seller, I want to register on the platform so that I can list my products for sale. |
| BV: 500 | CP: 08 |
| Acceptance criteria:Seller can register using an email, business information, and relevant legal documentation.The seller receives a confirmation email after registration.Seller account is approved and activated once documentation is verified. |

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| --- | --- | --- |
| User Story ID. 30 | Tasks: 4 | Priority: Highest |
| As a seller, I want to list my products on the platform so that customers can browse and purchase them. |
| BV: 500 | CP: 08 |
| Acceptance criteria:Sellers can upload product details (name, description, price, images, size, and color options).The seller can select relevant categories and tags for the product.Products must be approved by the platform admin before going live. |

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| User Story ID. 31 | Tasks: 5 | Priority: Highest |
| As a seller, I want to view and manage orders placed for my products so that I can fulfill customer requests. |
| BV: 500 | CP: 13 |
| Acceptance criteria:Sellers can view a list of all orders received, including customer details, product information, and shipping address.Sellers can mark orders as “Shipped” and update tracking information.Sellers can cancel or modify orders before they are shipped. |

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| User Story ID. 32 | Tasks: 4 | Priority: Medium |
| As a seller, I want to set and modify prices for my products so that I can offer competitive rates. |
| BV: 100 | CP: 05 |
| Acceptance criteria:Sellers can set individual prices for each product.Sellers can update the price based on promotions, sales, or competitive strategies.Price changes are reflected immediately on the platform. |

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| User Story ID. 33 | Tasks: 3 | Priority: Medium |
| As a seller, I want to create discount codes or promotions for my products so that I can drive sales. |
| BV: 200 | CP: 05 |
| Acceptance criteria:Sellers can create promo codes for specific products or store-wide discounts.The seller can specify discount amounts, validity periods, and usage limits.The discount code is applied during checkout, and the seller’s revenue is adjusted accordingly. |

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| User Story ID. 34 | Tasks: 5 | Priority: Low |
| As a seller, I want to have a dashboard to track my sales, revenue, and performance so that I can make informed decisions. |
| BV: 200 | CP: 08 |
| Acceptance criteria:The seller dashboard displays key metrics like total sales, orders, revenue, and product performance.The seller can view detailed reports and analytics over custom time periods.The dashboard also provides insights into customer behavior and market trends. |

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| User Story ID. 35 | Tasks: 3 | Priority: Highest |
| As a seller, I want to manage returns and refunds for products purchased by customers so that I can handle disputes effectively. |
| BV: 500 | CP: 05 |
| Acceptance criteria:Sellers can view requests for returns or refunds.Sellers can accept or reject return/refund requests based on their return policy.The platform automatically processes the refund if the request is approved. |

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| User Story ID. 36 | Tasks: 5 | Priority: Highest |
| As a seller, I want to receive payments securely and on time for the orders fulfilment. |
| BV: 500 | CP: 08 |
| Acceptance criteria:The platform processes payments on a regular schedule e.g., weekly.Payments are deposited directly into the seller’s bank account or wallet.Transaction fees are clearly outlined before and after sales. |

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| User Story ID. 37 | Tasks: 8 | Priority: Highest |
| As a payment gateway provider, I want to support multiple payment methods like credit card, debit card, UPI, wallets so that customers can choose their preferred payment option. |
| BV: 500 | CP: 08 |
| Acceptance criteria:Payment gateway supports major payment methods e.g., Visa, MasterCard, UPI, PayPal.Payment methods are visible during checkout.Transactions can be processed successfully using any supported method. |

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| User Story ID. 38 | Tasks: 4 | Priority: Highest |
| As a payment gateway provider, I want to ensure all transactions are secure using encryption and fraud protection mechanisms. |
| BV: 500 | CP: 08 |
| Acceptance criteria:Payment transactions should be encrypted with SSL or other secure protocols.Fraud detection and prevention tools should be in place.The system alerts when suspicious activities are detected. |

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| User Story ID. 39 | Tasks: 2 | Priority: Highest |
| As a delivery person, I want to view a list of deliveries assigned to me so that I know what I need to deliver. |
| BV: 200 | CP: 03 |
| Acceptance criteria:The list shows order ID, customer name, address, contact info, and delivery window.Deliveries are sorted by priority or location. |

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| User Story ID. 40 | Tasks: 5 | Priority: Medium |
| As a delivery person, I want to mark orders as picked up from the warehouse or seller so that I can update the delivery status. |
| BV: 500 | CP: 08 |
| Acceptance criteria:Delivery person can scan the package and confirm pickup.The system updates order status to "Picked Up."Timestamp of pickup is recorded. |