

**Software Requirements Specification (SRS)**  
**For E-commerce Application**

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# Introduction

## Purpose

This document outlines the **software requirements** for an E-commerce application. It serves as a guide for stakeholders, developers, testers, and project managers to understand the functionalities, performance requirements, and constraints involved in the design, development, testing, and deployment of the E-commerce application. This document also acts as a communication tool between technical and non-technical stakeholders.

Additionally, it serves as the foundation for tracking changes, managing expectations, and ensuring the alignment of business objectives throughout the software development life cycle. Furthermore, it ensures the application adheres to industry standards and any relevant regulatory requirements during development.

## Scope

The E-commerce application will allow users to purchase products online. the system will include features that authenticate the user details, search products, filtering, cart management, and payment processing. In addition, track the order summary, and review. However, this document does not contain any hardware or infrastructure specifications, nor will it address external systems like logistics or accounting platforms.

## Definitions, Acronyms, and Abbreviations

- SRS: Software Requirements Specification
- UI: User interface
- API: Application programming interface
- GDPR: General Data Protection Regulation

## Descriptions

### Product Perspective

The E-commerce application is a **standalone** web-based platform designed to allow users to browse, select, and purchase products online. It integrates with several external systems and services to facilitate key business operations such as payment processing, inventory management, and shipping.

### System Context and Interfaces

- The E-commerce platform will integrate with the following external systems as mentioned below
  - **Payment Gateways:** Payment processing will be handled through secure integrations with third-party services such as “**PayPal, Razorpay, and Stripe**”
  - **Shipping Services:** The application will connect with shipping providers like “**E-kart, Delivery, Express Bee, FedEx, and DHL**” for order tracking and delivery management
  - **Inventory Management System:** Real-time stock availability and updates will be managed through queries to the internal inventory system

### Modularity

The system comprises the following key modules

- **User Interface (UI):** It Allows customers to browse products, manage their shopping cart, and place orders
- **Admin Interface:** Provides administrators with tools to manage product listings, track orders, and generate reports
- **Payment Gateway Integration:** Handles safe and secure transactions and interactions with payment service providers
- **Order Management System:** Tracks the status of orders from placement through delivery and communicates with shipping services

### Interfaces with Other Systems

The E-commerce application will communicate with:

- **Payment Gateways (e.g., PayPal, Stripe, etc)** for processing transactions
- **Inventory Management System** for maintaining real-time product availability

- **Email Service Providers** for sending **order confirmations, promotional communications, and password recovery emails**
- **Shipping Services (e.g., FedEx, DHL)** for order tracking and logistics management

### Dependencies

The application relies on:

- Third-party payment gateway APIs for secure payment transactions
- Cloud hosting services (e.g., AWS or Azure) for scalability and performance
- Third-party libraries for functionalities such as image rendering, product search optimization, and caching mechanisms

### Positioning and Constraints

- The application must be compatible with multiple web browsers, including **Chrome, Firefox, and Safari**
- It should provide a responsive design for optimal user experience on both **Android and iOS mobile devices**
- The platform is designed to handle a minimum of 10,000 concurrent users while maintaining low latency to ensure a smooth shopping experience

### Product Functions

The E-commerce application will have the following key functions

#### User Registration and Authentication

- **Description:** Users can create an account to register on the platform. This includes inputting their email, password, and personal details.
- **Functionality:**
  - Users can log in with their email and password
  - Users can reset their password via an email link
  - Admin can manage user accounts

#### Product Browsing and Searching

- **Description:** Users can browse through product categories and search for specific items using filters
- **Functionality:**
  - Users can view a list of products with options to filter by **category, price, and ratings**
  - Users can search for products using keywords
  - Users can view product details, including images, descriptions, and reviews

#### Shopping Cart Management

- **Description:** Users can add, remove, and manage products in their shopping cart.
- **Functionality:**
  - Users can add products to the shopping cart from product detail pages.
  - Users can view and modify quantities of items in the cart.
  - Users can remove items from the cart and proceed to checkout.

#### Order Placement and Payment Processing

- **Description:** Users can place orders and make payments securely.
- **Functionality:**
  - Users can enter shipping information and select a delivery method.

- Users can choose a payment method (e.g., credit card, PayPal).
- The system processes payments and generates order confirmations.

### Order Tracking

- **Description:** Users can track the status of their orders.
- **Functionality:**
  - Users can view order history and current order status.
  - Users receive notifications about shipping and delivery updates.

### Review and Rating System

- **Description:** Users can submit reviews and ratings for purchased products.
- **Functionality:**
  - Users can write and submit reviews for products they have purchased.
  - Users can rate products on a scale (e.g., 1 to 5 stars).
  - Reviews are displayed on the product page for other users to see.

### Admin Management Functions

- **Description:** Admin users have additional functionalities to manage the platform.
- **Functionality:**
  - Admins can add, update, or delete product listings
  - Admins can view sales reports and user activity
  - Admins can manage user accounts and handle inquiries

### User Classes and Characteristics

The E-commerce application will serve multiple user classes, each with distinct characteristics, roles, and needs

#### Customers

- **Description:** Individuals who browse products, make purchases, and manage their profile
- **Characteristics:**
  - **Demographics:** Aged 18-60, varying educational backgrounds
  - **Technical Proficiency:** Ranges from novice to experienced online shoppers
  - **Goals:** To easily find and purchase products, manage orders, and receive updates
  - **Needs:** User-friendly navigation, detailed product information, secure payment options, and order tracking

#### Administrators

- **Description:** Users responsible for operations and managing the platform, including product listings and user accounts, other system integration (i.e. third-party involvements)
- **Characteristics:**
  - **Demographics:** Professionals with experience in e-commerce or retail management
  - **Technical Proficiency:** High, comfortable with web applications and data management
  - **Goals:** To ensure smooth platform operation, update product information, and manage user inquiries
  - **Needs:** Access to management tools, reporting features, and user support systems

## Guest Users

- **Description:** Unregistered users who browse the platform without creating an account
- **Characteristics:**
  - **Demographics:** Varies widely, includes first-time visitors and potential customers
  - **Technical Proficiency:** May have limited experience with e-commerce platforms
  - **Goals:** To explore products and prices without commitment to register
  - **Needs:** Easy access to product information and a straightforward path to registration

## Support Staff

- **Description:** Individuals who assist customers with inquiries and support issues
- **Characteristics:**
  - **Demographics:** Individuals with experience in customer service or technical support
  - **Technical Proficiency:** familiar with CRM systems and support tools
  - **Goals:** To efficiently resolve customer issues and improve user customer satisfaction
  - **Needs:** Access to customer information, order details, and support resources

## Marketing Team

- **Description:** Users responsible for promoting products and analyzing user engagement
- **Characteristics:**
  - **Demographics:** Marketing professionals with experience in digital marketing
  - **Technical Proficiency:** Proficient and familiar with analytics tools and online advertising, SEO, SEM
  - **Goals:** To increase user engagement, increase traffic, drive sales, and analyse marketing performance
  - **Needs:** Access to analytics dashboards, promotional tools, and campaign management features

## Operating Environment

The E-commerce application will operate in the following environment

### Client Side

#### Minimum

- 2 GB RAM
- 1.5 GHz processor
- 10 GB available disk space
- Display resolution: 1024x768

#### Recommend

- 4 GB RAM or higher
- 2 GHz multi-core processor
- 20 GB available disk space
- Display resolution: 1920x1080

### Server Side

#### Minimum

- 8 GB RAM
- Quad-core processor

- 100 GB disk space
- SSD for fast read/write access

## Software Requirements

- **Client-Side**
  - Web browsers: Google Chrome, Firefox, Safari, Edge (latest versions)
  - Mobile platforms: iOS 12 or higher, Android 9.0 or higher
  - Desktop operating systems: Windows 10, macOS 10.14 or later
- **Server-Side**
  - **Operating System:** Linux (Ubuntu 18.04 or higher), Windows Server 2016 or higher
  - **Web Server:** Apache 2.4+, Nginx 1.18+
  - **Database:** MySQL 5.7 or higher, PostgreSQL 12 or higher
  - **Programming Languages:** PHP 7.4+, Node.js 14+
  - **Application Framework:** Laravel, Express.js

## Network Requirements

- **Client-Side**
  - Internet connection: Minimum 3 Mbps download speed, 1 Mbps upload speed
- **Server-Side**
  - 1 Gbps internet connectivity to handle large traffic volumes
  - Load balancing and CDN for optimized performance

## Security Environment

- **Client-Side**
  - SSL/TLS encryption for secure transactions
- **Server-Side**
  - HTTPS protocol for secure communication
  - Firewall and DDoS protection
  - Data encryption (AES-256) for sensitive user information
  - Regular security patches and updates

## Supported Platforms

- **Web Application:** Compatible with modern web browsers (Chrome, Firefox, Safari, Edge)
- **Mobile Application:** Native applications for iOS (iOS 12 and later) and Android (Android 9.0 and later)

## Functional Requirements

The section describes the core functionalities that the E-commerce application must perform. The E-commerce application must support the following functionalities

### User Interface Requirements

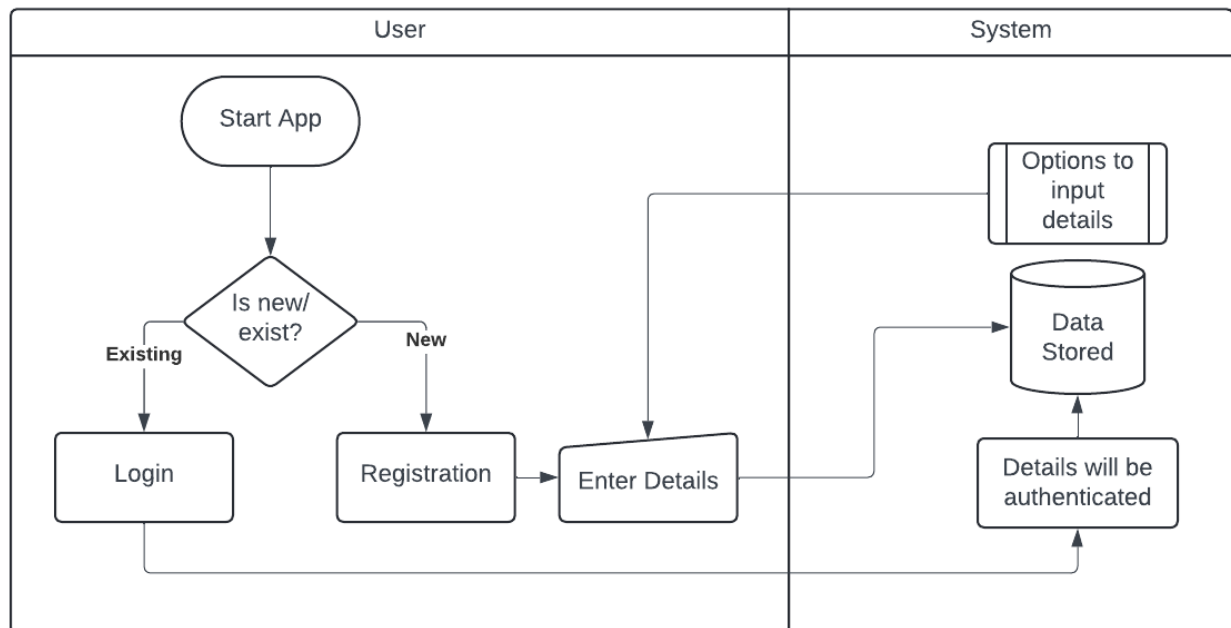
- The application must be responsive for both desktop and mobile
- Users must be able to view products, add to a cart, and purchase the products



## User Registrations/Login and Authentication

- As a new User, must be able to register by providing details (**name, email, password**)
  - Password must comply with the security guidelines
- System must securely store the password using encrypted techniques
- User must be able to log in using the registered credentials i.e. **name, password**
- System must securely store the data in the database
- User must be able to log in via the registered data using **email and password**
- Forget password functionality should allow the user to reset the password via a **link** provided in the **mail**

## Use Case Diagram



## Product Management

The E-commerce application must support comprehensive product management functionalities to ensure ease of use and scalability for administrators.

### Product Creation

- Administrators or authorized vendors must be able to add products, edit, or remove the product from the catalog in a user-friendly manner. The product creation must include the following
  - Product Name
  - SKU (Stock keeping unit)
  - Price
  - Product Colour
    - The system must display the various colour for each product in case available
  - Description
  - Category
    - Product must be categorized into different sections i.e. (Kitchen items, Accessories, etc) for user-friendly search
  - Product images with zoom functionality with good picture quality
  - Product Size
    - The system must support all the required sizes (XS, S, M, L, XL, XXL)
    - Each variant must have its SKU, price, and stock level
    - Must be able to add the images for each product
  - Shipping details
    - Free Shipping or Express Delivery

### Product Upload

- The system must upload products in bulk via CSV, and other standard file formats
- During bulk uploads, the system must validate the data and reject any erroneous entries
- Administrators must be able to update existing products in bulk, including pricing, stock levels, and descriptions, or any offers

### **Search Engine Optimization**

- The system must ensure that SEO data is indexed appropriately

### **Product Status**

- Each product must have a status of either “Stock” or “Out of Stock”
- “Out of Stock” Products should not be displayed in the product list
- Administrators should be able to change the product status at any time

### **Product Reviews and Ratings Management**

- The system must allow users to leave product reviews and ratings
- Administrators must be able to moderate reviews (e.g., approve or reject user-submitted reviews)
- Reviews must be displayed on the product detail page, with an average rating shown prominently

### **Shopping Cart**

The e-commerce application must include a shopping cart functionality that enhances user experience and facilitates the purchasing process.

The key functionalities are given below

#### **Add to cart**

- Users must be able to add products to their shopping cart from the product detail page
- The system must allow users to select specific product variants (e.g., size, color) before adding to the cart
- The system must allow users to edit, and remove the product from the cart
- Users should receive a confirmation message once a product is successfully added to the cart

#### **View Cart**

- Users must have access to view their shopping cart at any time from any page of the application
- The cart view should display:
  - Product images
  - Product names
  - Selected variants
  - Quantities
  - Individual prices
  - Total price
- The cart view should also include a clear "**Checkout**" button

#### **Modify Cart Items**

- Users must be able to change the quantity of each item in the cart
- The system must automatically update the total price based on the quantity selected
- Users must also have the option to remove individual items from the cart

#### **Price Calculation**

- The shopping cart must automatically calculate and display the total price, including applicable taxes, shipping costs, and discounts
- If any promotional codes are applied, the cart should reflect the updated total after applying the discount

### **Product Variants**

- The shopping cart must accurately display the selected variants of each product (e.g., size and color)
- Users must be able to change the variant directly from the cart view if needed

### **Wishlist**

- Users must have the option to **Wishlist** items for later Purchase instead of removing them from the cart
- **Wishlist** items should be stored separately and easily accessible for future consideration

### **Guest Checkout**

- Users must be allowed to add items to their cart and proceed to checkout without creating an account
- Guest users should still be prompted to provide essential information for order processing

### **Clear Cart**

- Users must have the option to remove all items from their shopping cart with a single action
- The system should ask for confirmation before clearing the cart

### **Accessibility**

- The shopping cart interface must comply with accessibility standards to ensure usability for all users, including those with disabilities
- Features like screen reader compatibility and keyboard navigation should be incorporated

### **Mobile Responsiveness**

- The shopping cart functionality must be optimized for mobile devices, ensuring that users can easily add, view, and modify cart items on smartphones and tablets
- The layout should adapt to different screen sizes for a seamless user experience

### **Order Processing**

The Order Processing module must encompass the following functionalities to facilitate a seamless transaction experience for users

#### **Order Creation**

- Users must be able to create an order by reviewing their shopping cart and proceeding to checkout
- The system must validate the items in the cart, ensuring they are available and meet any purchase requirements (e.g., minimum quantity)
- Users should be able to select shipping options during the checkout process

#### **User Authentication**

- The system must prompt users to log in or create an account before finalizing the order
- Guest users must also be able to complete the order process with minimal required information

### **Payment Processing**

- The application must support multiple payment methods (e.g., credit/debit cards, PayPal, etc.)
- The system should securely handle payment information, ensuring compliance with **PCI-DSS** standards

- Users must receive instant confirmation of successful payments or clear error messages if payments fail

## **Order Confirmation**

the system must generate an order confirmation that includes

- Order number
- Order summary (items, quantities, prices)
- Shipping address
- Payment method
- Estimated delivery date

Confirmation should be sent to the user via email and displayed on the order confirmation page

## **Order Fulfilment**

- The system must update the inventory to reflect the items sold immediately after order creation
- Order status should be updated as it progresses through various stages (e.g., processing, shipping, delivery)
- Users must be able to view the status of their order in their account or through a tracking link

## **Shipping Management**

- The application must allow users to choose from available shipping methods during checkout
- The system should calculate and display shipping costs based on the user's location and selected shipping method
- Users should receive notifications regarding the shipping status, including when the order has been shipped, in transit, and is out for delivery

## **Order History**

- Users must have access to their order history within their account, including past orders and their statuses
- The order history should display key details such as order numbers, order dates, and statuses

## **Order Cancellation and Returns**

- The system must provide users the ability to cancel orders before they are processed or shipped
- Users should be able to initiate returns through the application, with clear guidelines on the return process
- The application must handle return requests and update inventory accordingly

## **Customer Support**

- The system should include options for users to contact customer support regarding their orders
- Users must be able to submit inquiries or complaints related to their orders through the application

## **Reporting and Analytics**

- The system should allow administrators to generate reports on orders, including sales data, order fulfilment rates, and return statistics
- This data must be accessible for decision-making and performance analysis

## **User Reviews and Ratings**

The User Reviews and Ratings module must include the following functionalities to enable customers to share their experiences and opinions about products

## **Review Submission**

- Users must have the ability to submit reviews for products they have purchased
- Each review should include the following
  - A star rating (e.g., 1 to 5 stars) representing the user's overall satisfaction
  - A written comment describing the user's experience with the product
  - An option to upload images of the product (if applicable)

### **Rating System**

- The system must aggregate star ratings to provide an average rating for each product, visible on the product detail page
- Ratings must be displayed to help potential buyers make informed decisions

### **Review Management**

- Users should be able to edit or delete their reviews within a specified timeframe after submission
- The system must allow for moderation of reviews, enabling administrators to approve, edit, or remove inappropriate or spam reviews

### **User Authentication**

- Users must be authenticated (logged in) to submit a review to ensure accountability and discourage spam
- Guest users should have the option to create an account or log in to leave a review

### **Review Display**

- Reviews should be displayed in a user-friendly format on the product detail page
  - Reviewer's name (or username)
  - Date of the review
  - Star rating and written comment
  - Optional images uploaded by the reviewer
- The most helpful or recent reviews should be prioritized for display

### **Filtering and Sorting Options**

Users should be able to filter reviews by criteria such as

- Star rating (e.g., 1-star to 5-star)
- Most recent
- Most helpful

The system should allow users to sort reviews to find relevant feedback easily

### **Feedback Mechanism**

- Users should have the option to mark reviews as helpful or not helpful
- The system should analyse user feedback to improve the visibility of helpful reviews

### **Reporting Reviews**

- Users must be able to report inappropriate or offensive reviews, prompting a review by administrators
- The system should track and log reported reviews for further action

### **Review Analytics**

Administrators must have access to analytics regarding reviews

- Total number of reviews per product
- Average rating over time
- Common keywords or sentiments in reviews

This data should help in understanding customer satisfaction and product performance

## Non-Functional Requirements

This outlines the Non-functional requirements that maintain the quality attributes, system performance, usability, and other criteria that the software must meet, apart from the functional requirements. It is important to ensure that the application is reliable, efficient, and user-friendly

### Performance Requirements

- The system must support at least **500 concurrent users** without performance degradation
- The average response time for any user action (e.g., page loading, adding to cart) must be **under 2 seconds**
- The system should be capable of processing an order in less than **5 seconds**
- The database should handle up to **1,000,000 products** and support fast retrieval for product searches
- The application must maintain a **99.9% uptime** to ensure continuous availability

### Security Requirements

- All sensitive data, including user passwords and payment information, must be stored using **encryption techniques**
- The system must implement **two-factor authentication (2FA)** for user accounts to enhance security
- The application should adhere to **OWASP Top Ten** security practices to prevent common vulnerabilities
- User sessions must time out after **15 minutes of inactivity** to protect against unauthorized access
- The system must regularly undergo security audits and penetration testing to identify and fix vulnerabilities

### Usability Requirements

- The system must recover from crashes or failures without data loss and must implement **automatic backups** every **24 hours**
- The application should have a **failover mechanism** in place to ensure availability in case of server failure
- The system must provide detailed logs of user actions and system errors for troubleshooting and analysis

### Scalability Requirements

- The system should be designed to scale horizontally to accommodate increased user traffic or data volume
- The application must support adding new servers without downtime to ensure continuous service

### Software Interfaces

This outlines how the E-commerce application will interact with other software systems, including **APIs, databases, and external services.**

#### User Interfaces

- The application must provide a clean and intuitive **graphical user interface (GUI)** for users to interact with
- The UI must adhere to standard design principles to ensure consistency across all pages and features

#### API Interfaces

- The system must expose **RESTful APIs** for third-party integrations (e.g., payment gateways, and shipping services, email services)
- API documentation must be provided for developers to understand the endpoints, request formats, and response structures

### **Database Interfaces**

- The application must connect to a relational database (e.g., MySQL, PostgreSQL) for data storage and retrieval
- The database schema should be well-defined to ensure data integrity and support for transactions

### **External System Interfaces**

- The application must integrate with external systems
  - **Payment Gateway:** Support for various payment methods (credit/debit cards, PayPal, etc.)
  - **Shipping Services:** Integration with logistics partners for real-time shipping rates and tracking
  - **Email Service Providers:** To send order confirmations, newsletters, and promotional emails

### **Hardware Interfaces**

- The application must be compatible with standard web hosting environments and servers
- The system should support scalability and load balancing to manage increased traffic efficiently