# Software Requirements Specification (SRS) Template

**Project:** E-commerce Software (Mini Flipkart)  
**Version:** 1.0  
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## Revision History

| Version | Date | Author | Change Summary | Approval |
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## Approvals

| Role | Name | Signature / Email | Date |
| --- | --- | --- | --- |
| Course Coordinator |  |  |  |
|  |  |  |  |

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## 1. Introduction

### 1.1 Purpose

This document is a Software Requirements Specification (SRS) for an E-commerce Software System (Mini Flipkart). It defines the functional and non-functional requirements, interfaces, and criteria for testing an online marketplace platform. The platform allows customers to browse and purchase products, and enables sellers to manage their inventory.

### 1.2 Scope

### The system covers customer interactions including registration, product browsing, cart management, order placement, payment processing, and order tracking. It also includes seller functionalities for product management, inventory control, and order fulfillment. The system will connect with payment gateways, shipping providers, and notification services. Exclusions include internal operations of third-party logistics and implementations of external banking systems.

### 1.3 Audience

Software Engineers, Quality Assurance Engineers, System Architects, Product Managers, Business Analysts, and Academic Evaluators.

### 1.4 Definitions

* **SKU**: Stock Keeping Unit - unique identifier for products
* **API**: Application Programming Interface
* **PCI-DSS**: Payment Card Industry Data Security Standard
* **SSL/TLS**: Secure Sockets Layer/Transport Layer Security
* **MFA**: Multi-Factor Authentication
* **UPI**: Unified Payments Interface
* **OTP**: One-Time Password
* **CDN**: Content Delivery Network

## 2. Overall Description

### 2.1 Product Perspective

### The E-commerce system is a web-based marketplace platform that provides an online shopping experience similar to Flipkart. It includes customer-facing web and mobile applications, a seller dashboard, an admin panel, and backend services that manage order processing, payment, and inventory.

### 2.2 Major Product Functions (Detailed)

* **User Management**: Registration, authentication, profile management
* **Product Catalog**: Browse products, categories, search, filtering
* **Shopping Experience**: Cart management, wishlist, product reviews
* **Order Processing**: Checkout, payment integration, order tracking
* **Seller Operations**: Product listing, inventory management, order fulfillment
* **Administrative Functions**: User management, system monitoring, analytics
* **Notification System**: Email/SMS notifications for orders and updates
* **Security**: Authentication, authorization, data protection
* **Analytics**: Sales reports, user behavior tracking, inventory reports

### 2.3 User Roles and Characteristics (Expanded)

* **Customer**: General consumers with basic internet knowledge, expecting fast loading times and intuitive navigation
* **Seller/Vendor**: Business users managing product listings and orders, requiring efficient management tools
* **Administrator**: System operators with technical knowledge for platform management and monitoring
* **Guest User**: Unregistered visitors with limited browsing capabilities

### 2.4 Operating Environment

* **Frontend**: Web browsers (Chrome, Firefox, Safari, Edge), Mobile apps (iOS, Android)
* **Backend**: Cloud-based servers (AWS/Azure/GCP), Load balancers, CDN
* **Database**: MySQL/PostgreSQL for transactions, MongoDB for product catalogs
* **Infrastructure**: HTTPS encryption, Redis caching, Elasticsearch for search

### 2.5 Constraints

* PCI-DSS compliance for payment processing
* GDPR/Privacy law compliance for user data
* Mobile-responsive design mandatory
* Integration with Indian payment gateways (UPI, Razorpay, PayU)
* Scalability to handle 10,000+ concurrent users

## 3. External Interface Requirements

### 3.1 User Interfaces

* **Primary UI**: A responsive web interface with simple navigation, product grid/list views, and a search bar with autocomplete.
* **Mobile UI**: A touch-optimized interface with gesture support and mobile-specific features.
* **Admin Interface**: A dashboard with analytics, user management, and system monitoring features.
* **Accessibility**: The system must comply with WCAG 2.1 AA, including support for screen readers and keyboard navigation.

### 3.2 Hardware Interfaces

* **Client Devices**: The system will work with desktop computers, laptops, smartphones, and tablets.
* **Server Infrastructure**: The hardware includes cloud servers, load balancers, and storage systems.
* **Network Equipment**: CDN nodes, firewalls, and routers are part of the network infrastructure.

### 3.3 Software Interfaces

* **Payment Gateway APIs**: Razorpay, PayU, Stripe for payment processing
* **Shipping APIs**: Integration with logistics providers (Delhivery, Blue Dart, India Post)
* **Email/SMS Services**: SMTP servers, SMS gateway APIs for notifications
* **Analytics Services**: Google Analytics, internal analytics systems
* **Search Engine**: Elasticsearch for product search and recommendations

### 3.4 Communications

* **Protocol**: HTTPS for all client-server communication
* **API Format**: RESTful APIs with JSON data format
* **Real-time**: WebSocket connections for order status updates
* **Security**: TLS 1.3 encryption, API rate limiting, authentication tokens

## 4. System Features (Detailed)

### 4.1 User Authentication and Registration

**Description**: Secure user registration and authentication system supporting multiple verification methods.

| Req ID | Requirement | Type | Priority | Source/Stakeholder | Acceptance Criteria / Test Case Ref | Comments |
| --- | --- | --- | --- | --- | --- | --- |
| ECO-F-001 | The system shall allow users to register using email or phone number with OTP verification | Functional | High | Security/UX | Valid email/phone with OTP leads to account creation. Test: TC-Auth-01 | Integration with OTP service required |
| ECO-F-002 | The system shall authenticate users via email/password or social login (Google, Facebook) | Functional | High | User Experience | Successful login redirects to dashboard. Test: TC-Auth-02 | OAuth integration needed |
| ECO-F-003 | The system shall implement session management with automatic timeout after 30 minutes of inactivity | Functional | High | Security | Session expires after timeout, user redirected to login. Test: TC-Auth-03 | Security requirement |

### 4.2 Product Catalog Management

**Description**: Comprehensive product catalog with categories, search, and filtering capabilities.

| Req ID | Requirement | Type | Priority | Source/Stakeholder | Acceptance Criteria / Test Case Ref | Comments |
| --- | --- | --- | --- | --- | --- | --- |
| ECO-F-004 | The system shall display products in hierarchical categories and subcategories | Functional | High | Business | Products organized in logical category tree. Test: TC-Cat-01 | Database design critical |
| ECO-F-005 | The system shall provide advanced search with filters for price, brand, rating, availability | Functional | High | User Experience | Search returns relevant results with applied filters. Test: TC-Search-01 | Elasticsearch integration |
| ECO-F-006 | The system shall display product details including images, specifications, price, and reviews | Functional | High | Business | Complete product information displayed. Test: TC-Product-01 | Image optimization needed |

### 4.3 Shopping Cart and Wishlist

**Description**: Shopping cart management and wishlist functionality for enhanced user experience.

| Req ID | Requirement | Type | Priority | Source/Stakeholder | Acceptance Criteria / Test Case Ref | Comments |
| --- | --- | --- | --- | --- | --- | --- |
| ECO-F-007 | The system shall allow users to add/remove/update quantities of products in shopping cart | Functional | High | User Experience | Cart operations reflect immediately. Test: TC-Cart-01 | Session persistence required |
| ECO-F-008 | The system shall persist cart items for registered users across sessions | Functional | Medium | User Experience | Cart items available after re-login. Test: TC-Cart-02 | Database storage needed |
| ECO-F-009 | The system shall provide wishlist functionality to save products for later | Functional | Medium | User Experience | Users can save/remove wishlist items. Test: TC-Wish-01 | User-specific storage |

### 4.4 Order Management and Payment

**Description**: Secure order processing with multiple payment options and order tracking.

| Req ID | Requirement | Type | Priority | Source/Stakeholder | Acceptance Criteria / Test Case Ref | Comments |
| --- | --- | --- | --- | --- | --- | --- |
| ECO-F-010 | The system shall support multiple payment methods (Credit/Debit cards, UPI, Wallets, COD) | Functional | High | Business | All payment methods process successfully. Test: TC-Pay-01 | Payment gateway integration |
| ECO-F-011 | The system shall generate unique order IDs and send confirmation emails | Functional | High | Business | Order confirmation with tracking ID sent. Test: TC-Order-01 | Email service integration |
| ECO-F-012 | The system shall provide real-time order tracking with status updates | Functional | High | User Experience | Order status visible to customers. Test: TC-Track-01 | Logistics integration |

### 4.5 Seller and Admin Management

**Description**: Multi-vendor support with seller dashboards and administrative controls.

| Req ID | Requirement | Type | Priority | Source/Stakeholder | Acceptance Criteria / Test Case Ref | Comments |
| --- | --- | --- | --- | --- | --- | --- |
| ECO-F-013 | The system shall provide seller registration and verification process | Functional | Medium | Business | Sellers can register and get verified. Test: TC-Seller-01 | Document verification needed |
| ECO-F-014 | The system shall provide seller dashboard for product and inventory management | Functional | High | Business Operations | Sellers can manage their products. Test: TC-Seller-02 | Role-based access control |
| ECO-F-015 | The system shall provide admin panel for user management and system monitoring | Functional | High | Administration | Admins can manage users and monitor system. Test: TC-Admin-01 | Administrative privileges |

## 5. Non-functional Requirements (Detailed)

| Req ID | Requirement | Category | Priority | Acceptance Criteria / Measurement |
| --- | --- | --- | --- | --- |
| ECO-NF-001 | System shall respond to user requests within 3 seconds for 95% of transactions under normal load | Performance | High | 95th percentile ≤ 3s in load testing. Test: TC-Perf-01 |
| ECO-NF-002 | System shall maintain 99.9% availability monthly excluding scheduled maintenance | Reliability | High | Uptime monitoring reports ≥99.9% monthly. Test: TC-Rel-01 |
| ECO-NF-003 | System shall support up to 10,000 concurrent users during peak shopping periods | Scalability | High | Load testing with 10K concurrent users. Test: TC-Scale-01 |
| ECO-NF-004 | System shall be mobile-responsive and comply with WCAG 2.1 AA accessibility standards | Usability | Medium | Accessibility audit and mobile testing pass. Test: TC-UX-01 |
| ECO-NF-005 | System shall implement PCI-DSS compliant payment processing with SSL/TLS encryption | Security/Compliance | High | PCI-DSS audit checklist and SSL verification. Test: TC-Sec-01 |

## 5.1 Security

### 5.1.1 Security Objectives

**Objective 1: Data Protection**  
Ensure all customer personal information, payment data, and business-sensitive information are protected through encryption, access controls, and secure communication protocols.

**Objective 2: System Integrity**  
Maintain the integrity of the e-commerce platform by preventing unauthorized modifications to product data, orders, and user accounts while ensuring audit trails for all critical operations.

### 5.1.2 Security Requirements

| Req ID | Requirement | Type | Priority | STRIDE Category | Acceptance Criteria |
| --- | --- | --- | --- | --- | --- |
| ECO-SR-001 | System shall implement multi-factor authentication for admin accounts | Security | High | Spoofing | MFA setup required for admin access. Test: TC-Sec-Auth-01 |
| ECO-SR-002 | System shall encrypt all sensitive data in transit and at rest using AES-256 | Security | High | Information Disclosure | Encryption verification in database and network traffic. Test: TC-Sec-Enc-01 |
| ECO-SR-003 | System shall maintain comprehensive audit logs for all user actions | Security | High | Repudiation | All actions logged with timestamp and user ID. Test: TC-Sec-Log-01 |
| ECO-SR-004 | System shall validate and sanitize all user inputs to prevent injection attacks | Security | High | Tampering | Input validation blocks malicious inputs. Test: TC-Sec-Input-01 |
| ECO-SR-005 | System shall implement role-based access control with principle of least privilege | Security | High | Elevation of Privilege | Users access only authorized resources. Test: TC-Sec-RBAC-01 |

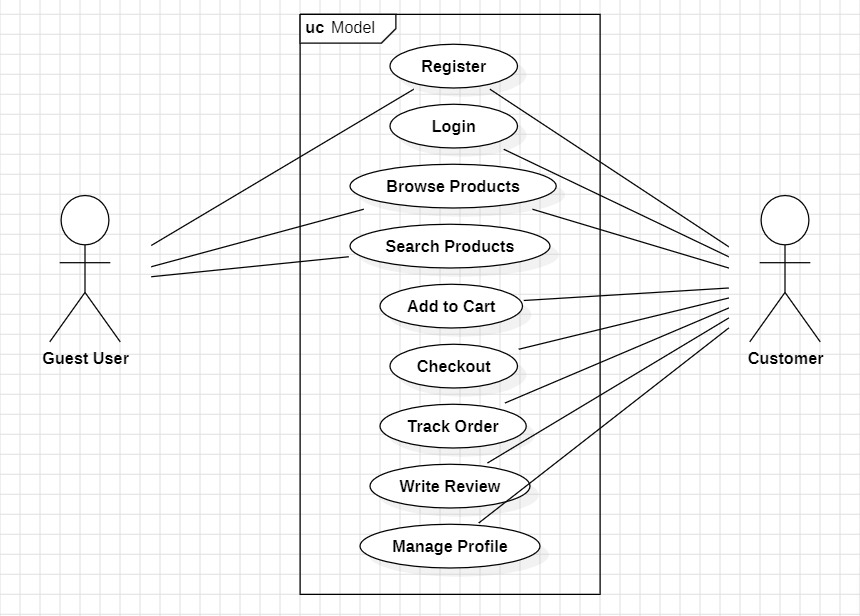
## 6. Quality Attributes & Acceptance Tests

**Exit Criteria for Acceptance:** - All high-priority functional requirements implemented and verified - No critical security vulnerabilities identified - Performance benchmarks met under load testing - 99.9% uptime achieved in pre-production testing - PCI-DSS compliance verification completed - All test cases in RTM marked as passed

**Acceptance Test Suites:** - Authentication and Authorization Tests - Product Catalog and Search Tests  
- Shopping Cart and Checkout Tests - Payment Processing Tests - Order Management Tests - Performance and Load Tests - Security and Penetration Tests - Mobile Responsiveness Tests - Accessibility Compliance Tests

## 7. System Models and Diagrams

### 7.1 UML Use-Case Diagrams



A diagram of a product management system

AI-generated content may be incorrect.

## 8. Requirements Traceability Matrix (RTM)

| Req ID | Requirement Short | Section Ref | Module | Test Case(s) | Status (N/P/A) | Comments |
| --- | --- | --- | --- | --- | --- | --- |
| ECO-F-001 | User Registration | 4.1 | UserModule | TC-Auth-01 | N |  |
| ECO-F-004 | Product Categories | 4.2 | CatalogModule | TC-Cat-01 | N |  |
| ECO-F-007 | Shopping Cart | 4.3 | CartModule | TC-Cart-01 | N |  |
| ECO-F-010 | Payment Integration | 4.4 | PaymentModule | TC-Pay-01 | N |  |
| ECO-NF-001 | Performance | 5 | All Modules | TC-Perf-01 | N |  |
| ECO-SR-001 | MFA Authentication | 5.1.2 | SecurityModule | TC-Sec-Auth-01 | N |  |

## Technology Stack Recommendations

| Component | Technology | Justification |
| --- | --- | --- |
| Frontend Framework | React.js/Angular | Modern, responsive UI with component-based architecture |
| Backend Framework | Node.js/Django/Spring Boot | Scalable server-side development with API support |
| Database | MySQL/PostgreSQL + MongoDB | Relational DB for transactions, NoSQL for product catalogs |
| Payment Gateway | Razorpay/PayU/Stripe | Multiple payment options with Indian payment methods |
| Cloud Platform | AWS/Google Cloud/Azure | Scalable cloud infrastructure with global CDN |
| Web Server | Nginx | High-performance web server with load balancing |
| Caching | Redis | Fast data retrieval and session management |
| Search Engine | Elasticsearch | Advanced search capabilities with filters and suggestions |

## Implementation Guidelines

### Phase 1: Core Development (Weeks 1-4)

* User authentication and registration
* Basic product catalog
* Shopping cart functionality
* Database design and setup

### Phase 2: Advanced Features (Weeks 5-8)

* Payment gateway integration
* Order management system
* Search and filtering
* Admin and seller dashboards

### Phase 3: Enhancement and Testing (Weeks 9-12)

* Performance optimization
* Security implementation
* Mobile responsiveness
* Testing and bug fixes

### Phase 4: Deployment and Monitoring (Weeks 13-14)

* Production deployment
* Monitoring setup
* Documentation completion
* User acceptance testing