Software Requirement Specifications :

An E-commerce application

Introduction –

Purpose : The purpose of this SRS document is to outline requirements for the development of an E-commerce Application . This document serves as a comprehensive guide for stakeholders involved in the development , design , and testing phases of the project . By clearly defining the functional and non-functional requirements , the SRS aims to ensure a common understanding among all parties and provide a basis for system design , development and validation.

Scope : The scope of this E-commerce application encompasses the development of a robust and user-friendly platform that facilitates online buying and selling of products . The application will provide functionalities for both customers and administrators , enabling users to browse products , add items to their cart , view cart . The application will be accessible via web browsers and also through mobile applications.

Operating Environment : The operating environment for an online ecommerce shopping website encompasses the various technologies, platforms, and systems that enable the website to function, interact with users, and carry out its operations. The website needs to be hosted on a web server that serves web pages to users. The DBMS stores and manages data related to products, users, orders, and more. Backend logic and server-side scripting are often implemented using programming languages like Java, Python, Ruby, PHP, or Node.js. HTML, CSS, and JavaScript are essential for creating the user interface and enabling dynamic and interactive web pages.

Functional Requirements –

1 .User Registration and Authentication :

1.1 User Registration :

- Users should be able to register for an account by providing necessary details such s name , email address , password .
- Registration form validation to ensure completeness and correctness of user-provided information .

1.2 User Authentication :

- Registered Users should be able to log in securely using their email address and password .
- Password hashing for secure storage of user credentials
- “Forgot Password” functionality to allow users to rest their passwords via email or OTP verification .

1.3 Social Media Authentication (optional) :

- Integration with social media platforms to allow users to log in using their social media accounts.

2. Product Browsing ad Searching –

2.1 Product Catalog :

- Display of products in a categorized manner for easy browsing.
- Featured products section on the homepage for highlighting popular items or promotions.

2.2 Product Sorting :

- Filtering options based on categories , price range , brand , size , color ,etc

- Sorting options to arrange products by relevance , price , popularity , etc.

2.3 Product Search :

- Search bar functionality allowing users to search for products by keywords.
- Auto-suggestion feature to provide relevant search suggestions as user type .

2.4 Product Details :

- Detailed product pages with images , descriptions , specifications , pricing and availability .
- Product reviews and ratings if available .

3. Cart Management –

3.1 Adding and Removing items :

- Users should be able to add products to their shopping cart from product listings or product detail pages .
- Option to adjust product quantities or remove items from the cart
- Real-time updates of cart contents without page refresh

3.2 Viewing and Editing Cart :

- Cart icon displaying the number of items in the user's cart.
- Cart summary page displaying all items in the cart with details such as quantity , price and subtotal.

3.3 Checkout Process:

- Seamless transition from cart to checkout process.
- Secure checkout page where users can enter shipping details , select shipping methods and provide payment information .
- Option for guest checkout or login for registered users .

Non-Functional Requirements :

1. Performance Requirements :

- **Response time :** The application should respond to user interactions within 2 sec under normal load conditions .

- **Throughput :** The system should handle a minimum of 100 concurrent users without significant degradation in performances

2.Reliability Requirements :

- **Availability :** Aim for a minimum uptime 99.9%(excluding scheduled maintenance) .
- **Fault tolerance :** Implement redundancy and failover mechanisms to minimize downtime in case of server failures.

3. Security Requirements :

- Authentication
- Authorization
- Data Encryption
- Protection against Attacks

4. Compatibility Requirements :

- Browser Compatibility
- Device Compatibility

5. Legal and Regulatory Requirements:

- Compilance with E-commerce laws
- **Privacy Policy** : Provide a clear and comprehensive privacy policy outlining how user data is collected , stored and used

6. Documentation Requirements :

- **User Manuals :** Provide user manuals or guides explaining how to use E-commerce application
- **Help Guides :** Create help guides or FAQs to address common issues and provide troubleshooting tips
- **Developer Documentation :** Document APIs , integrations and technical specifications for developers.

External Interface Requirements :

1. User Interfaces :

- The E-commerce application will feature a user-friendly web interface accessible via standard web browsers .
- Responsive design to ensure a optimal viewing and usability across various devices , including desktops , laptops , tablets & smartphones.
- Intuitive navigation with clearly labelled menus , search bars and interactive elements for browsing products , managing accounts and completing transactions.

2. Hardware Interfaces:

2.1 Server Hardware :

- Physical servers or VM hosting the E-commerce application and its associated software components .
- Load balancers may be used to distribute incoming traffic across multiple server instances for improved performance and fault tolerance .

2.2 Storage Infrastructure:

- Storage devices (e.g. , HDD , SSD) used for stroing application data , including

product information , user accounts , transaction records , etc.

- RAID configurations or NAS solutions may be employed for data redundancy & high availability .

2.3 Scalability and Expansion :

- Scalable hardware architecture allows E-commerce platform to accommodate growth in user traffic and data volume over time .
- Modular hardware designs and capacity planning strategies enable seamless expansion of computing resources based on business needs .

2.4 Database Servers :

- Dedicated database servers hosting the RDBMS (MySQL,PostgreSQL) used for storing and manging structured data related to products , orders ,users and transactions.
- Database server hardware specifications(RAM ,disk I/O performance) influence application's ability to handle concurrent database operations efficiently .

2.5 Backup and Disaster Recovery Systems:

- Backup storage system ensure data integrity and business continuity in case of hardware failures , data corruption .
- Backup hardware(tape drives , redundant storage arrays) and offsite backup facilities may be utilized to mitigate risks and facilitate data recovery.

3. Communication Protocols :

3.1 HTTP/HTTPS:

- **Interface :** HTTP and HTTPS are fundamental protocols for communication between clients(web browsers) and the E-commerce application servers .
- **Purpose :** HTTP is used for transmitting hypertext documents like HTML pages , while HTTP adds a layer of encryption to secure data transmission especially for payment details.
- **Role :** Enables web browsing , form submissions and RESTful API interface over the internet.

3.2 RESTful APIs:

- **Interface :** RESTful APIs provide a standardized approach for exposing application functionalities and data resources as web services.
- **Purpose :** Enables interoperability and integration with external systems , services and third party applications.
- **Role :** Allows clients to perform CRUD operations on resources using HTTP methods.

3.3 JSON and XML:

- **Interface :** JSON and XML are data interchange formats used in RESTful APIs to structure and transmit data between clients and servers.
- **Purpose :** Facilitates data serialization and deserialization , providing a common format for exchanging structured data .
- **Role :** JSON is lightweight and widely used for API payloads , while XML is more verbose and supports complex document structures.

3.4 SMTP :

- **Interface :** SMTP is used for sending outgoing emails from the E-commerce

application to users(e.g order confirmations)

- **Purpose :** Facilitates transactional and marketing email communications.
- **Role :** Ensures reliable delivery of email messages through designated SMTP servers.

3.5 TCP/IP :

- **Interface** : TCP/IP is the foundational protocol suite for internet communication , providing end-to-end connectivity and data transmission .
- **Purpose :** Enables reliable and connection-oriented communication between devices and across networks .
- **Role :** Handles packet routing , error detection , and flow control for data transmitted over the internet .

Technical Specification –

1. Performance Constraints :

1.1 Response Time Constraints : The E-commerce application shall ensure that the average page load time for product listing pages is less than 2 seconds under normal operating conditions .

1.2 **Throughput Constraints :** The E-commerce should support a minimum of 100 concurrent user requests or transactions within a specified time frame .

1.3 **Scalability Constraints :** The application architecture must support horizontal scalability to accommodate a 50% increase in user traffic within the next 12 months without significant degradation in performance.

1.4 **Concurrency Constraints :** The E-commerce platform should handle up to 500 concurrent user sessions during peak hours .

1.5 **User Experience constraints :** The application shall maintain a visual responsiveness rating of at least 80% based on user feedback surveys conducted quarterly.

1.6 **Third-party service Constraints :** The E-commerce application must adhere to third-party API usage limits and ensure that API calls to payment gateways are processed within 3 seconds .

2. Memory Requirements :

1. Server Memory(RAM) :

- Define the minimum and recommended RAM specifications for hosting the application servers (web servers , database servers)
- Ex : “Each application server instance should be provisioned with a minimum of 4GB RAM for optimal performance during peak load conditions”.

2. Client-side Memory(Browser):

- Specify memory requirements for end-user devices accessing the E-commerce application through web browsers.
- Ex : “The application should be designed to minimize client-side memory usage to ensure compatibility with low-memory devices.

3. OS Requirements :

1. Server OS:

- Specify the preferred operating system for hosting the application servers based on compatibility , security and performance considerations .
- Ex : “The application servers should be deployed on Linux-based distributions to leverage stability , security and cost-effectiveness.”

2.**Client OS:**

- Identity supported client operating systems(Windows,macOS,IOS,Android) for accessing the E-commerce application via web browsers or native mobile apps.
- Ex : " The E-commerce website should be compatible with major web browsers running on windows , macOS , IOS and Android platforms."

4.Hardware Requirements:

1. Server Hardware :

- Define hardware specifications(CPU , disk storage , network interfaces) for deploying application servers , database servers and load balancers.
- Ex : "The database server should be equipped with a multi-core CPU , SSD storage for database files and redundant network interfaces for high availability."

2.Network Infrastructure :

- Specify networking equipment requirements to support reliable and secure communication between application components and external services .

- Ex : “ The network infrastructure should include redundant switches with VLAN support and firewall appliances to enforce access control policies.”