

**<E-Bidding  
Project: TrustSphere> Software  
Requirements Specification For  
<E-bidding>**

**Version <1.0>**

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# Software Requirements Specification

## 1. Introduction

This Software Requirements Specification (SRS) outlines the requirements for the development of a system that facilitates business transactions between different types of users. It acts as a reference for the design, development and testing phases of the project, delivering a clear framework of how the system will operate and interact with its users. The document is organized to establish a thorough understanding of the system's goals and requirements. As an introduction, we will discuss the purpose and scope of the SRS, followed by definitions, acronyms, and abbreviations that will be used throughout in order to ensure clarity and understanding. Furthermore, relevant references are included to guide the reader to external resources and related documents. Finally, the overview provides a brief summary of the sections that follow, offering a roadmap for navigating the following sections.

### 1.1 Purpose

The purpose of this Software Requirements Specification (SRS) is to provide a comprehensive and structured description of the secure business transaction system being developed. This document specifies the system's functional and non-functional requirements, including user interactions, key features, and behaviors. It serves as a detailed guide for developers, testers, and stakeholders, ensuring that all external behaviors, design constraints, and performance expectations are clearly defined. By doing so, the SRS ensures that the system meets its intended goals for secure, efficient, and user-friendly transactions.

### 1.2 Scope

This Software Requirements Specification (SRS) applies specifically to the business transaction system, which facilitates secure transactions of goods and services between different types of users: visitors (V), users (U), and super-users (S). The system includes key functionalities such as item listing, bidding, account management, user ratings, and complaint handling. It also incorporates user-specific features, such as the VIP status for high-performing users and a creative feature to enhance engagement. This document outlines the system's interactions with its users, defining use-case models like applying for user status, bidding on items, and managing financial transactions. The SRS covers the boundaries of the system and is associated with various use-case models, such as applying for user status, conducting transactions, and handling user disputes. Additionally, this document influences the system's design, implementation, and testing, ensuring that all required components are developed according to the specified requirements.

### 1.3 Definitions, Acronyms, and Abbreviations

V: (Visitor) A user-type with limited system access including the ability to browse listings and provide comments, but requiring an application for the user role to gain more privileges.

U: (User) A user-type with privileges related to listing, bidding, managing items/services, managing account balance (through deposits and withdrawals), and performing transactions.

S: (Super-User) A user-type with administrative privileges, including managing user suspensions, approving visitors requesting to become users, and handling complaints.

VIP: (Very Important Person) A user with an account balance exceeding \$5,000, more than 5 successful transactions, and zero complaints. A VIP maintains the privileges of regular users and receives a 10% discount on transactions as long as they do not violate the previous two conditions listed.

Bid: An offer made by a user, specified by a price or range they are willing to pay, to purchase or rent an item or service listed by another user.

Transaction: The completion of a sale or agreement to rent an item between a user and the listing owner, resulting in the exchange of funds and items/services between the purchaser and the listing owner.

Rating: The ability for both the listing owner and buyer to anonymously rate one another on a numerical scale of 1-5 after a transaction has been completed.

Suspension: The temporary removal of a user's privileges due to receiving a rating less than 2 from at least three users, having an average rating less than 2, or an average rating greater than 4 (too-generous).

Suspended users regain access by paying a \$50 fine or through reactivation by a Super-User.

GUI: (Graphical User Interface) The user interface where users interact with the system. The GUI is personalized for each user, displaying information on previous activities, account balances, bids, and transactions.

## **1.4 References**

This Software Requirements Specification references the document: “CCNY CS32200 Fall 2024 project requirements A mini e-bidding system” authored by the CCNY 32200 Fall 2024 class (including Professor Jie Wei) with contributions from Carlos Rodriguez, and Ivan Chen. The document referenced was published by the City College of New York, Computer Science Department in the Fall of 2024. If necessary, the document may be obtained from Professor Jie Wei or via the course website.

## **1.5 Overview**

The remainder of this Software Requirements Specification provides a comprehensive overview of the project purpose and scope, including essential functional and non-functional requirements, use cases, and key terminology and dependencies that are critical to the development of the mini e-bidding system. The document is organized in the following manner: introduction, overall description, specific requirements, and supporting information. Section 1 (introduction) presents the purpose and scope of the project while introducing key definitions/terminology, identifying documents referenced in the project specification, and offering an overview of the Software Requirements Specification. Section 2 (overall description) provides a high-level overview of the system, including major functionalities, user roles, assumptions, dependencies, and an outline of use cases presented through a use-case modeling survey. Section 3 (specific requirements) outlines an in-depth description of the functional and non-functional requirements for the execution of the mini e-bidding system and exemplifies use cases through use case reports, discussing privileges based on user roles, customized GUIs depending on the user, transaction processes, suspension processes, and more. Section 4 (supporting information) provides any supporting documentation which may aid in the understanding of this Software Requirements Specification, such as an index, appendices, use-case storyboards, or user-interface prototypes.

## **2. Overall Description**

The E-bidding website is designed to facilitate a marketplace for buying, selling, or renting items and services. It operates with three main roles: visitors, users, and superusers, each with distinct capabilities and responsibilities.

Product Perspective: The platform serves as an online marketplace where registered users can list and bid on items or services. Visitors can browse listings and interact by providing comments. Superusers act as moderators and manage user complaints, approvals, and suspensions.

Role Characteristics:

Visitors (V): Individuals interested in viewing listings, but without full access to features until they are verified and approved as users.

Users (U): Verified individuals who actively participate in transactions by listing items or bidding on them.

Superusers (S): Administrators responsible for managing the user base and ensuring platform rules are followed.

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## 2.1 Use-Case Model Survey

In this mini e-bidding system, the use-case model captures the interactions between actors (users, visitors, superusers) and the system, focusing on key actions like listing items, bidding, managing user roles, and processing transactions.

### Actors:

- **Visitor (V):** A non-registered user who can browse listings and comment but cannot participate in transactions until approved by a superuser.
- **User (U):** A registered user with privileges to list items, bid, manage funds, and complete transactions.
- **Superuser (S):** An administrator with responsibilities to approve users, manage complaints, suspend users, and oversee the platform's health.
- **VIP (VIP):** A special designation for users with a high balance and positive transaction history, providing additional benefits like a transaction discount.

### Use Cases:

1. **Browse Listings (Visitor):** Visitors can view all active listings. This includes filters for price, category, and availability.
2. **Comment on Listings (Visitor):** Visitors can comment on any listing. Comments are timestamped and linked to the visitor ID.
3. **Apply to Become a User (Visitor):** Visitors can apply for user status by solving a CAPTCHA-style question, which is submitted for review by a superuser.
4. **List Item for Sale/Rent (User):** Users can post items or services for sale or rent, including descriptions, deadlines, and prices.
5. **Place Bid (User):** Users can place a bid on any listing. The system checks that the user has enough funds in their account to cover the bid.
6. **Complete Transaction (User):** When a bid is accepted, the transaction is processed by transferring funds from the buyer's account to the seller.
7. **Rate Transaction (User):** Both buyer and seller can rate each other anonymously after a transaction is completed.
8. **Manage Complaints (Superuser):** Superusers handle complaints about users, reviewing transaction history and applying sanctions like suspensions if necessary.
9. **Suspend User (Superuser):** Based on complaints and ratings, superusers can suspend users, restricting their access until they pay a fine or request reactivation.

**Diagrams:** The use-case diagrams will illustrate the interactions between the actors and system processes, showing how visitors, users, and superusers interact with the platform, particularly around the listing, bidding, and complaint management functions.

## 2.2 Assumptions and Dependencies

### Assumptions:

- All users (visitors, users, VIPs, and super-users) will have stable internet access and compatible devices to interact with the system.
- The system will be available 24/7 except for scheduled maintenance periods.
- Users can interact with the system without significant performance issues.
- Third-party payment gateways will be used to handle transactions such as deposits and withdrawals securely, requiring external integration.
- Users will generally follow the rules and guidelines of the system, with disputes or issues handled by the super-users.

- VIP users will receive a 10% discount on transactions based on their status. The system will accurately track the user's transaction history and account balances to maintain this feature.
- User growth will be manageable within the infrastructure's capacity. Future scaling needs might require additional infrastructure and cloud service optimizations.

Dependencies:

- The system is dependent on external payment subsystems for handling transactions. Issues with third-party services may affect the system's ability to manage funds.
- The project will rely on MongoDB to manage user data, transaction history, ratings, and item listings. Downtime or performance degradation in the database will directly impact system availability.
- The project must adhere to financial and data protection regulations given the nature of user transactions and personal information.
- Availability of super-users to approve user registrations, handling complaints, and resolving issues.

### 3. Specific Requirements

#### 1. Visitors (V) Requirements

- Browse Listings: Visitors can view all publicly listed items and services without the need for registration.
- Comment on Listings: Visitors can provide comments on listings. Each comment should be stored with a timestamp and linked to the visitor's ID.
- Apply to Become a User: Visitors can apply to become registered users by answering a CAPTCHA-style question. The system should generate random arithmetic questions to prevent bots from applying. This application will be submitted to superusers for approval.
- Captcha System: Implement a verification system for visitors where arithmetic-based CAPTCHA questions are randomly generated and require a correct answer

#### 2. Users (U) Requirements:

- Users must register by providing a username, password, email, and address.
- Users can deposit and withdraw money from their platform account. The system must ensure that users have sufficient balance for withdrawals and bids.
- VIP status is assigned based on predefined criteria (e.g., account balance > \$5,000, more than 5 transactions, no complaints).
- VIPs receive a 10% discount on transactions. VIP status is revoked if the criteria are no longer met.
- Users can list items or services for sale or rent. Each listing must include a description, asking price, and deadline.
- Users can place bids on any listed item or service. The bid should include the amount and deadline, and the system must verify the user's account balance to ensure they can cover the bid.
- When a transaction is completed (i.e., the owner accepts the bid), the item is removed from the listings, and the system automatically transfers the bid amount from the buyer's account to the seller's account.
- Both parties (owner and buyer/renter) can rate each other after the transaction. The system should ensure that ratings are anonymous.
- Users rate each other on a scale of 1 (worst) to 5 (best). A user with an average rating below 2, based on at least three ratings, will be suspended. Suspended users can either pay a \$50 fine or request reactivation from a superuser. The system must automatically track suspension counts.
- Any user suspended three times will be permanently removed from the system.
- Users with an average rating below 2 or above 4 may be flagged for review due to being too lenient or harsh.
- Users can file complaints about other users through the system. Each complaint must include the product bought/rented description.

#### Superusers (S) Requirements:

- **Approve User Applications:** Superusers must review and approve visitor applications to become users. The approval process involves checking if the visitor correctly answered the CAPTCHA question.
- **Manage Complaints:** Superusers review user complaints and decide on appropriate actions, including suspensions or reactivations.
- **Suspensions and Reactivations:** Superusers can suspend or reactivate users based on complaints and ratings. Superusers must ensure that a user is suspended after receiving a certain number of poor ratings and complaints.
- **Monitor User Activity:** Superusers must keep track of user activity, such as transaction history, number of complaints, and ratings, to identify any users who need intervention.

### 3.1 Use-Case Reports

For each use case identified in the model, the following reports detail the specific functional requirements:

1. **Browse Listings (Visitor):**
  - **Description:** Visitors can browse all listings on the platform. They can apply filters (price, availability, category) but cannot make bids or complete transactions.
  - **Precondition:** The visitor must have stable internet access.
  - **Postcondition:** The visitor is shown a list of items, but no interaction beyond viewing is permitted.
2. **Apply to Become a User (Visitor):**
  - **Description:** A visitor can apply for user status by answering an arithmetic-based CAPTCHA. The application is sent to a superuser for approval.
  - **Precondition:** The visitor must correctly answer the CAPTCHA.
  - **Postcondition:** The visitor's application is submitted for approval.
3. **List Item for Sale/Rent (User):**
  - **Description:** Registered users can list items or services for sale or rent. The listing must include a description, price, and deadline.
  - **Precondition:** The user must be logged in with sufficient privileges.
  - **Postcondition:** The item is visible in the listings for other users and visitors to view.
4. **Place Bid (User):**
  - **Description:** Users can place bids on items. The system verifies the user's balance before allowing the bid.
  - **Precondition:** The user must be logged in and have a sufficient account balance.
  - **Postcondition:** The bid is submitted and linked to the item.
5. **Complete Transaction (User):**
  - **Description:** Once a bid is accepted, the system automatically transfers the bid amount from the buyer's account to the seller's account, and the listing is removed.
  - **Precondition:** The bid must be accepted, and the user must have sufficient funds.
  - **Postcondition:** The transaction is completed, and both buyer and seller can rate each other.
6. **Rate Transaction (User):**
  - **Description:** After a transaction, both buyer and seller can rate each other anonymously on a scale of 1-5.
  - **Precondition:** A completed transaction must exist between the two users.
  - **Postcondition:** The rating is recorded and affects the user's profile rating.
7. **Manage Complaints (Superuser):**
  - **Description:** Superusers review complaints about users and can apply penalties or suspend accounts as necessary.
  - **Precondition:** A complaint must be filed by a user.
  - **Postcondition:** Superusers take action, which may include suspension or a warning.
8. **Suspend User (Superuser):**
  - **Description:** Based on complaints or low ratings, superusers can suspend users. Suspended users cannot access their accounts until they pay a fine or are reactivated by the superuser.
  - **Precondition:** The user must meet the criteria for suspension (low rating or multiple complaints).
  - **Postcondition:** The user is suspended and notified of the suspension.



- Each of these reports ensures that the system functions as expected and adheres to the functional requirements specified in the use-case model.

### 3.2 Supplementary Requirements

- The system must be able to handle many concurrent users without performance degradation.
- Page loading, transactions, item listing and other interactions should be processed quickly.
- The system must be able to scale as required to accommodate an increasing number of users and transactions.
- All sensitive data such as user account details, card information, and passwords must be encrypted.
- Role-based access control (RBAC) will be implemented to restrict user actions based on their role.
- Each transaction must be securely logged and traceable to avoid any tampering or disputes.
- Visitors applying to become users must complete a CAPTCHA to verify they are human and not an automated bot.
- Each user based on their roles will have a personalized dashboard displaying relevant information.
- Regular backups must be taken in order to ensure data recovery in the event of a system failure.

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## Appendices:

### Appendix A:

#### 1. Glossary of Terms:

- Visitor (V): Non-registered user; can browse listings and comment but not make transactions.
- User (U): Registered individual; can list items, place bids, and complete transactions.
- Superuser (S): User with admin privileges; can approve registrations, suspend users, and handle complaints.
- VIP (Very Important Person): Special user status with enhanced privileges like discounts.
- Bid: Offer to purchase or rent an item on the platform.
- Transaction: Process of transferring ownership or access to an item/service for money.
- Rating: Score given by both buyer and seller after a transaction, impacting user reputation.
- Suspension: Temporary restriction of a user's account due to poor ratings or complaints.
- CAPTCHA: System to verify human users via tests.

#### 2. Non-Functional Requirements:

##### Requirements to be adhered to:

- Performance: Support many concurrent users without significant performance drops.
- Scalability: Ability to scale with user growth through infrastructure optimizations like cloud services.
- Security: Encryption and secure storage of sensitive data (passwords, transactions, payment info).
- Backup: Regular backups of user data and transactions for data recovery in case of failure.

#### 3. Data Privacy and Compliance:

##### Compliance with local and international data protection regulations:

- GDPR: Ensure user consent for data usage and provide control over personal information.
- Data Encryption: Encrypt all user data during transmission and storage.
- User Data Deletion: Allow users to request data deletion, processed within a specified timeframe.

#### 4. User Roles and Access Control

##### Roles-based access control (RBAC) for different access levels:

- Visitors: Browse listings, apply to become users.
- Users: List items, place bids, complete transactions.
- Superusers: Manage user registrations, handle complaints, suspend users.
- VIP Users: Special privileges like transaction discounts.

#### 5. System Maintenance:

##### Regular maintenance including:

- Scheduled Downtime: Periodic maintenance windows for updates or fixes.
- Error handling: Log all system errors; notify administrators of critical errors immediately.
- System Monitoring: Continuous monitoring of performance, transaction logs, and security.

#### 6. Third-Party services:

##### Integration with third party services for:

- Payment processing: Secure handling of user transactions via payment gateways.
- Email notifications: Send transaction alerts, account updates, and complaint status to users.

Appendix B: Requirements Traceability Matrix (RTM)

Requirement ID	Requirement Description	Test Cases	Test Case Description	Status
RI-001	Users must be able to register an account	TC-001	Test user registration	Not Started
RI-002	Users must be able to log in	TC-002	Test user login	Not Started
RI-003	Users can list item for bidding	TC-003	Test item listing	Not Started
RI-004	Users can place bids on items	TC-004	Test bid placement	Not Started
RI-005	Superusers can manage user accounts	TC-005	Test account suspension	Not Started
RI-006	Users can rate transactions	TC-006	Test rating system	Not Started
RI-007	System must encrypt user passwords	TC-007	Test encryption mechanism	Not Started
RI-008	The system must allow data backup	TC-008	Test data backup	Not Started