



# **Project of AAA Furnitures**

## **Software Requirement Specification**

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Proposed by:  
**Andreandhiki Riyanta Putra**  
**Andrian Danar Perdana**  
**M. Argya Vityasy**

Instructor  
**Khabib Mustofa**



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## Revision History

Name	Date	Reason For Changes	Version
21	22	23	24
31	32	33	34



# CHAPTER **1**

## Introduction

### **1.1 PURPOSE**

The purpose of this document is to present a detailed description of the functional and non-functional requirements for the Furniture Selling Web Based Application. It will also explain the app constraints, interface, and interactions with each services. This document is intended for both the stakeholders and the developers for a reference of developing the first version of the application.

### **1.2 PROJECT SCOPE**

AAA Furnitures is a web-based application that allows the customers of AAA Furnitures to purchase furnitures online. The application will allow the customers to browse the available furnitures, add them to the cart, make secure payments, and track the delivery of the purchased items. The application will also allow the admin to manage the products displayed on the website and the orders made by the customers. The system will consist of multiple microservices, including the auth service, product service, the order service, the payment service, and the delivery service.



### 1.3 DEFINITIONS, ACRONYMS, AND ABBREVIATIONS

Term	Definition
User	A registered customer who can browse, add to cart, and place orders.
Admin	A user with special privileges to manage products, orders, and the contact for users.
Cart	A temporary collection of items selected by a user for purchase.
Order	A confirmed request for purchasing one or more items.
JWT	JSON Web Token, used for authentication and authorization. Used for the user login, logout[1]
API	Application Programming Interface, allows different services to communicate with each other.[2]
REST	Representational State Transfer, an architectural style for designing APIs that use stateless communication over HTTP.[3]
Session	A temporary authentication state that maintains user login status.
SQL	Structured Query Language, used for managing relational databases by defining, querying, and modifying data.[4]
Microservice	An architectural style that structures an application as a collection of small, independent, and loosely coupled services.[5]
Message Queueing	A communication method where messages are sent and stored in a queue, ensuring asynchronous processing between microservices such as order, delivery, and payment services.[6]

Table 1.1: Definitions, Acronyms, and Abbreviations

### 1.4 REFERENCES

- [1] M. B. Jones, J. Bradley, and N. Sakimura, *JSON Web Token (JWT)*, RFC 7519, May 2015. DOI: 10.17487/RFC7519. [Online]. Available: <https://www.rfc-editor.org/info/rfc7519>.
- [2] J. Ofoeda, R. Boateng, and J. Effah, “Application programming interface (api) research: A review of the past to inform the future,” *International Journal of Enterprise Information Systems*, vol. 15, pp. 76–95, Jul. 2019. DOI: 10.4018/IJEIS.2019070105.
- [3] N. Patel, “Representational state transfer (rest) application program interface (api),” Jun. 2018.
- [4] Y. Silva, I. Almeida, and M. Queiroz, “Sql: From traditional databases to big data,” Feb. 2016, pp. 413–418. DOI: 10.1145/2839509.2844560.
- [5] G. Liu, B. Huang, Z. Liang, M. Qin, H. Zhou, and Z. Li, “Microservices: Architecture, container, and challenges,” in *2020 IEEE 20th International Conference on Software Quality, Reliability and Security Companion (QRS-C)*, 2020, pp. 629–635. DOI: 10.1109/QRS-C51114.2020.00107.

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- [6] S. Bouchenak and N. de Palma, "Message queuing systems," in *Encyclopedia of Database Systems*, L. LIU and M. T. ÖZSU, Eds. Boston, MA: Springer US, 2009, pp. 1716–1717, ISBN: 978-0-387-39940-9. DOI: 10.1007/978-0-387-39940-9\_1548. [Online]. Available: [https://doi.org/10.1007/978-0-387-39940-9\\_1548](https://doi.org/10.1007/978-0-387-39940-9_1548).



# CHAPTER 2

## Overall Description

### 2.1 PRODUCT PERSPECTIVE

This product is a new e-commerce platform designed as a microservices-based system. It aims to provide a comprehensive online shopping experience with user authentication, product browsing, order management, payment processing, and delivery tracking capabilities. The system is self-contained but designed with a modular architecture to allow for future expansion and integration with third-party services such as payment gateways and shipping providers. The microservices architecture ensures that each component can be developed, deployed, and scaled independently. The following figure 2.1 illustrates the high-level architecture of the system:

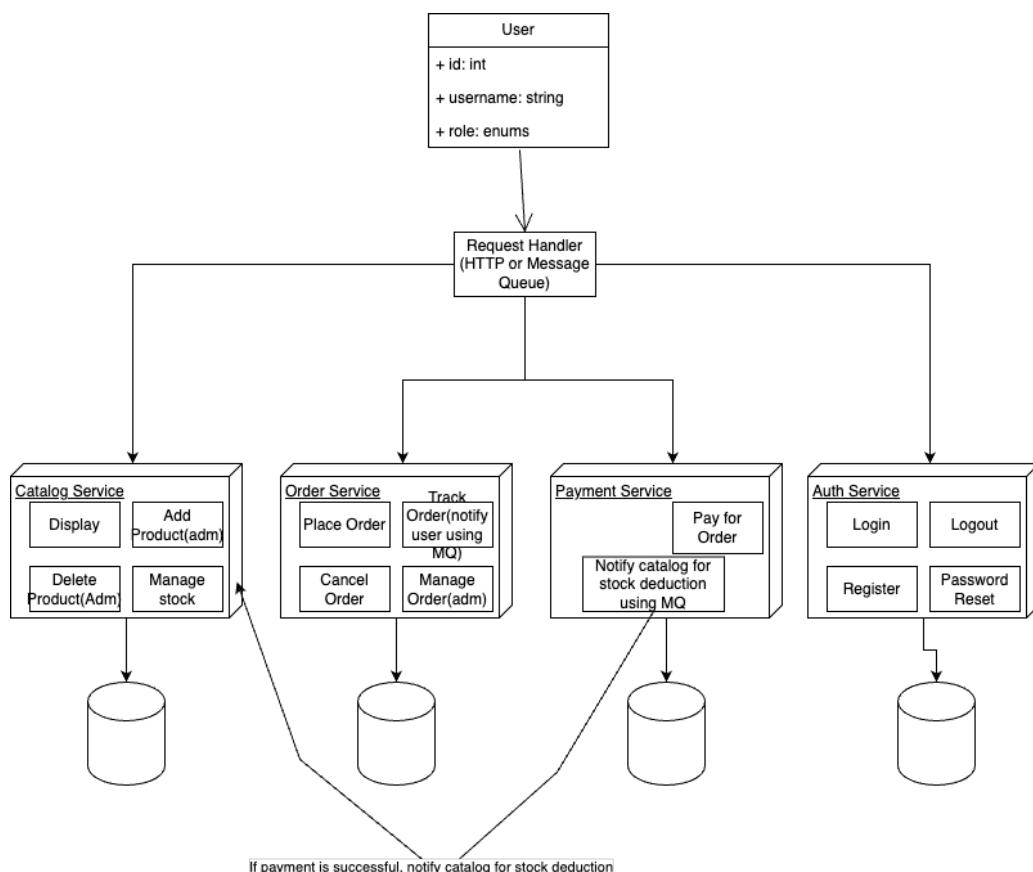


Figure 2.1: System Architecture Diagram



## 2.2 PRODUCT FUNCTIONS

The e-commerce platform will perform the following major functions:

- User Authentication and Account Management
  - Register new user accounts
  - Login and logout functionality
  - Password reset capabilities
- Product Catalog Management
  - Browse and display product information
  - Add new products (administrator function)
  - Delete products (administrator function)
  - Manage product inventory
- Order Processing
  - Add products to shopping cart
  - Place and confirm orders
  - Cancel existing orders
  - Track order status and delivery
- Payment Processing
  - Process secure payments for orders
  - Notify catalog service for inventory updates
- Delivery Management
  - Arrange delivery for completed orders
  - Track delivery status

Figure 2.2 illustrates the use case for this application:

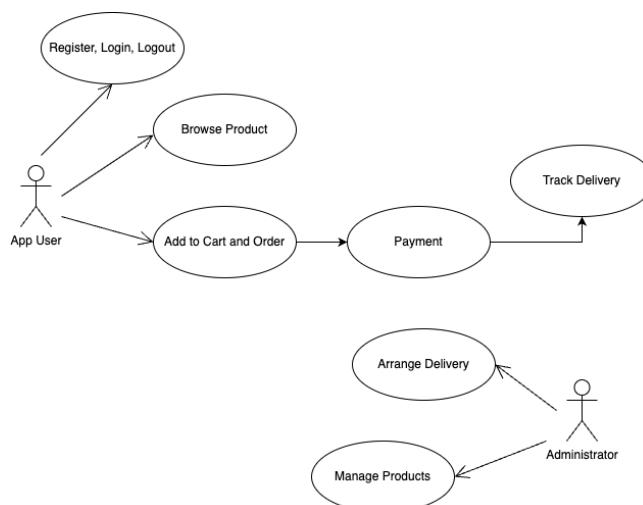


Figure 2.2: Use Case Diagram



### 2.3 USER CLASSES AND CHARACTERISTICS

The system will serve the following user classes:

- Regular App Users
  - Frequency: Regular, potentially daily use
  - Functions: Browse products, manage cart, place orders, track deliveries
  - Technical expertise: Minimal, should be able to navigate standard e-commerce interfaces
  - Priority: High - primary user class
- Administrators
  - Frequency: Regular, primarily during business hours
  - Functions: Manage product catalog, arrange deliveries, handle order issues
  - Technical expertise: Moderate, trained on system administration
  - Security level: High, with access to user data and system configuration
  - Priority: Medium - essential for system operation but smaller user base
- Guest Users
  - Frequency: Occasional to one-time use
  - Functions: Browse products only, limited functionality until registration
  - Technical expertise: Minimal
  - Priority: Low - encourage conversion to registered users

### 2.4 OPERATING ENVIRONMENT

The software will operate in the following environment:

- Server Environment
  - Containerized microservices using Docker
  - Kubernetes for orchestration
  - Linux-based operating systems
  - Scalable cloud infrastructure (AWS, Google Cloud, or Azure)
- Client Environment
  - Web browser support: Chrome, Firefox, Safari, Edge (latest versions)
  - Responsive design for various screen sizes
- Database Environment
  - Dedicated database for each microservice as shown in the architecture diagram



- Support for SQL and NoSQL databases depending on service requirements
- Network Environment
  - HTTP/HTTPS protocols for client-server communication
  - Message Queue (MQ) for asynchronous inter-service communication

## 2.5 DESIGN AND IMPLEMENTATION CONSTRAINTS

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The following constraints will affect the design and implementation of the system:

- Architectural Constraints
  - Microservices architecture as depicted in the diagram
  - RESTful API design principles for service interfaces
  - Message Queue for asynchronous communication between services
- Security Constraints
  - Compliance with PCI DSS for payment processing
  - Secure user authentication and authorization
  - Data encryption for sensitive information
  - Safe payment for user
  - Regular security audits and penetration testing
- Integration Constraints
  - Compatible with standard payment gateways
  - API-based integration with shipping and delivery services
- Performance Constraints
  - Response time for user interactions under 2 seconds
  - System capable of handling at least 1000 concurrent users
  - Scalability to accommodate peak shopping seasons
- Development Constraints
  - Coding standards and style guides for consistency
  - Comprehensive unit and integration testing
  - CI/CD pipeline for automated testing and deployment



## 2.6 ASSUMPTIONS AND DEPENDENCIES

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The following assumptions and dependencies apply to the project:

- Assumptions
  - Users have access to stable internet connections
  - Peak usage will occur during promotional events and holidays
  - Most users will access the system via mobile devices
  - Inventory data will be updated in near real-time
- Dependencies
  - Reliable third-party payment processing services
  - Shipping and delivery partner APIs
  - Cloud infrastructure provider's uptime and service level agreements
  - Message Queue service for inter-service communication
  - Database management systems for each service's data storage
- Risks
  - Integration challenges with third-party services
  - Scalability issues during peak usage periods
  - Security vulnerabilities in payment processing
  - Data consistency across microservices



# CHAPTER **3**

## External Interface Requirements

### **3.1 USER INTERFACES**

<Describe the logical characteristics of each interface between the software product and the users. This may include sample screen images, any GUI standards or product family style guides that are to be followed, screen layout constraints, standard buttons and functions (e.g., help) that will appear on every screen, keyboard shortcuts, error message display standards, and so on. Define the software components for which a user interface is needed. Details of the user interface design should be documented in a separate user interface specification.>

### **3.2 HARDWARE INTERFACES**

<Describe the logical and physical characteristics of each interface between the software product and the hardware components of the system. This may include the supported device types, the nature of the data and control interactions between the software and the hardware, and communication protocols to be used.>

### **3.3 SOFTWARE INTERFACES**

<Describe the connections between this product and other specific software components (name and version), including databases, operating systems, tools, libraries, and integrated commercial components. Identify the data items or messages coming into the system and going out and describe the purpose of each. Describe the services needed and the nature of communications. Refer to documents that describe detailed application programming interface protocols. Identify data that will be shared across software components. If the data sharing mechanism must be implemented in a specific way (for example, use of a global data area in a multitasking operating system), specify this as an implementation constraint.>

### **3.4 COMMUNICATIONS INTERFACES**

<Describe the requirements associated with any communications functions required by this product, including e-mail, web browser, network server communications protocols, electronic forms, and so on. Define any pertinent message formatting. Identify any communication standards

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that will be used, such as FTP or HTTP. Specify any communication security or encryption issues, data transfer rates, and synchronization mechanisms.>



# CHAPTER **4**

## System Features

<This template illustrates organizing the functional requirements for the product by system features, the major services provided by the product. You may prefer to organize this section by use case, mode of operation, user class, object class, functional hierarchy, or combinations of these, whatever makes the most logical sense for your product.>

### **4.1 SYSTEM FEATURE 1**

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<Don't really say "System Feature 1." State the feature name in just a few words.>

#### **4.1.1 Description and Priority**

<Provide a short description of the feature and indicate whether it is of High, Medium, or Low priority. You could also include specific priority component ratings, such as benefit, penalty, cost, and risk (each rated on a relative scale from a low of 1 to a high of 9).>

#### **4.1.2 Stimulus/Response Sequences**

<List the sequences of user actions and system responses that stimulate the behavior defined for this feature. These will correspond to the dialog elements associated with use cases.>

#### **4.1.3 Functional Requirements**

<Itemize the detailed functional requirements associated with this feature. These are the software capabilities that must be present in order for the user to carry out the services provided by the feature, or to execute the use case. Include how the product should respond to anticipated error conditions or invalid inputs. Requirements should be concise, complete, unambiguous, verifiable, and necessary. Use "TBD" as a placeholder to indicate when necessary information is not yet available.>

<Each requirement should be uniquely identified with a sequence number or a meaningful tag of some kind.>

REQ-1: REQ-2:

### **4.2 SYSTEM FEATURE 2 (AND SO ON)**

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# CHAPTER **5**

## Other Nonfunctional Requirements

### **5.1 PERFORMANCE REQUIREMENTS**

<If there are performance requirements for the product under various circumstances, state them here and explain their rationale, to help the developers understand the intent and make suitable design choices. Specify the timing relationships for real time systems. Make such requirements as specific as possible. You may need to state performance requirements for individual functional requirements or features.>

### **5.2 SAFETY REQUIREMENTS**

<Specify those requirements that are concerned with possible loss, damage, or harm that could result from the use of the product. Define any safeguards or actions that must be taken, as well as actions that must be prevented. Refer to any external policies or regulations that state safety issues that affect the product's design or use. Define any safety certifications that must be satisfied.>

### **5.3 SECURITY REQUIREMENTS**

<Specify any requirements regarding security or privacy issues surrounding use of the product or protection of the data used or created by the product. Define any user identity authentication requirements. Refer to any external policies or regulations containing security issues that affect the product. Define any security or privacy certifications that must be satisfied.>

### **5.4 SOFTWARE QUALITY ATTRIBUTES**

<Specify any additional quality characteristics for the product that will be important to either the customers or the developers. Some to consider are: adaptability, availability, correctness, flexibility, interoperability, maintainability, portability, reliability, reusability, robustness, testability, and usability. Write these to be specific, quantitative, and verifiable when possible. At the least, clarify the relative preferences for various attributes, such as ease of use over ease of learning.>



## **5.5 BUSINESS RULES**

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<List any operating principles about the product, such as which individuals or roles can perform which functions under specific circumstances. These are not functional requirements in themselves, but they may imply certain functional requirements to enforce the rules.>



# CHAPTER 6

## Other Requirements

<Define any other requirements not covered elsewhere in the SRS. This might include database requirements, internationalization requirements, legal requirements, reuse objectives for the project, and so on. Add any new sections that are pertinent to the project.>



## CHAPTER **7**

# Appendices

### **7.1 APPENDIX A: GLOSSARY**

<Define all the terms necessary to properly interpret the SRS, including acronyms and abbreviations. You may wish to build a separate glossary that spans multiple projects or the entire organization, and just include terms specific to a single project in each SRS.>

### **7.2 APPENDIX B: ANALYSIS MODELS**

<Optionally, include any pertinent analysis models, such as data flow diagrams, class diagrams, state-transition diagrams, or entity-relationship diagrams.>

### **7.3 APPENDIX C: TO BE DETERMINED LIST**

<Collect a numbered list of the TBD (to be determined) references that remain in the SRS so they can be tracked to closure.>