Workshop-2

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Abstract

This document presents the conceptual and structural design of SportGear Online, an e-commerce platform specialized in sports equipment and apparel. The study integrates business and technical perspectives through the use of four key design tools: the Business Model Canvas, which defines the strategic foundations of the platform; User Stories, which translate business objectives into user-centered functionalities; User Story Mapping, which organizes these stories into a cohesive user journey; and CRC Cards (Class–Responsibility–Collaboration), which model the system's internal architecture from an object-oriented perspective. Together, these components provide a comprehensive framework that connects strategic vision with software implementation, ensuring an efficient, scalable, and user-driven digital solution.

1 Class Diagrams

This class diagram outlines the digital backbone of SportGear Online, a specialized e-commerce platform for sports equipment. At its core, the system is built around the customer's journey: a User browses a Product catalog, manages a ShoppingCart, and places an Order which is then processed for Payment and Shipment. To ensure a robust and reliable experience, key design choices are embedded throughout, such as using a dedicated Money class to avoid calculation errors and preserving historical product prices in OrderItem snapshots so that past purchases always reflect what was actually paid.

The model efficiently supports the entire business operation beyond just the customer-facing side. Different employee roles, from Store Admin managing Inventory to the Finance Manager handling Invoice generation, interact with the same cohesive system. The relationships between classes are carefully designed to reflect real-world ownership; for instance, your shopping cart is a natural part of your user account (composition), while product reviews are attached to a product but can exist independently (aggregation). This creates a clear, maintainable blueprint for a fully-functional online store.
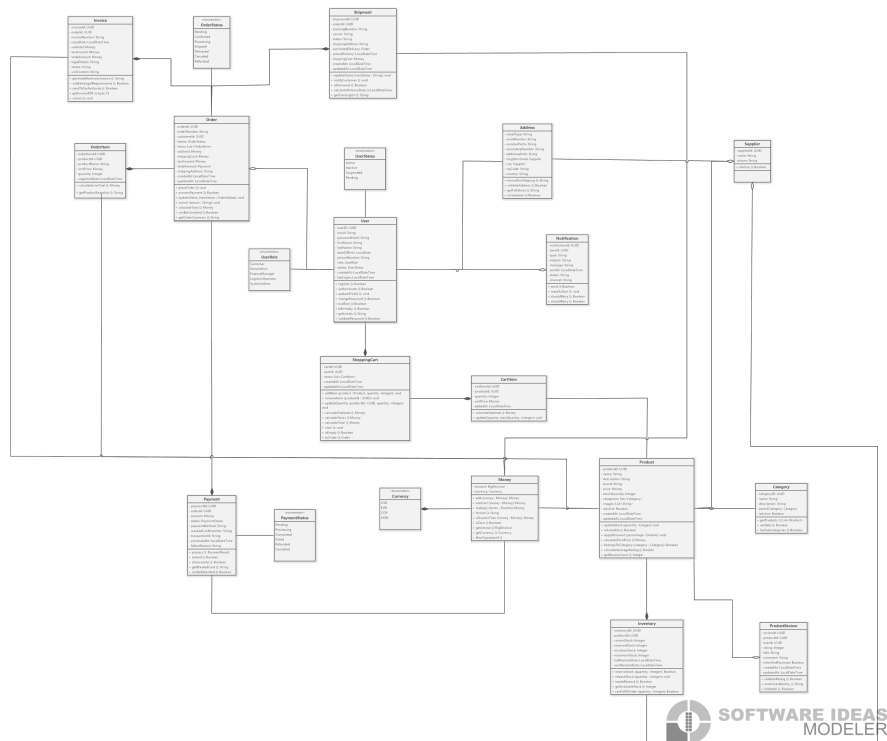
Figure 2: Class Diagram - SportGear Online.

2 Architecture Diagram

The Integration Architecture Diagram of SportGear Online presents how the core modules of the platform and external systems interact to support a secure and efficient e-Commerce ecosystem for sports equipment. At its center, the Application Server (API Gateway) connects internal components such as User Management, Product Catalog, Order Management, Payment Processor, and Customer Support with external services, including payment gateways, logistics providers, vendors, and financial institutions. Communication occurs through secure RESTful APIs and HTTPS protocols, while a dedicated Security and Management Layer ensures data protection, monitoring, and scalability across the entire system.
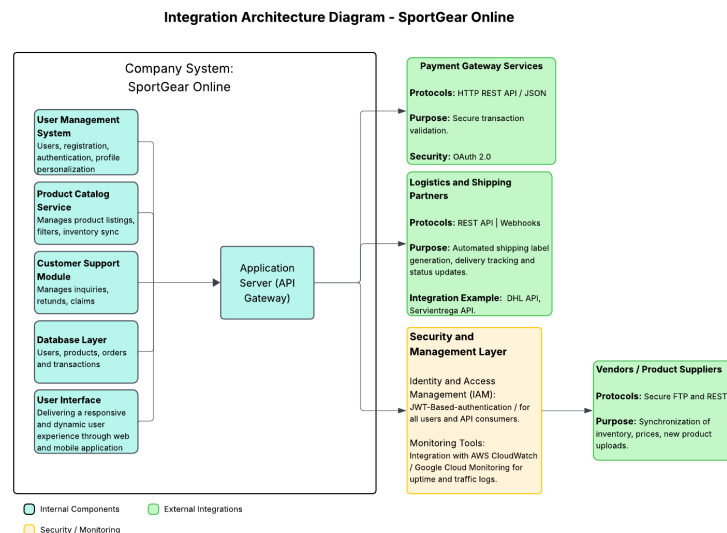

Figure 2: Integration Architecture Diagram - SportGear Online.
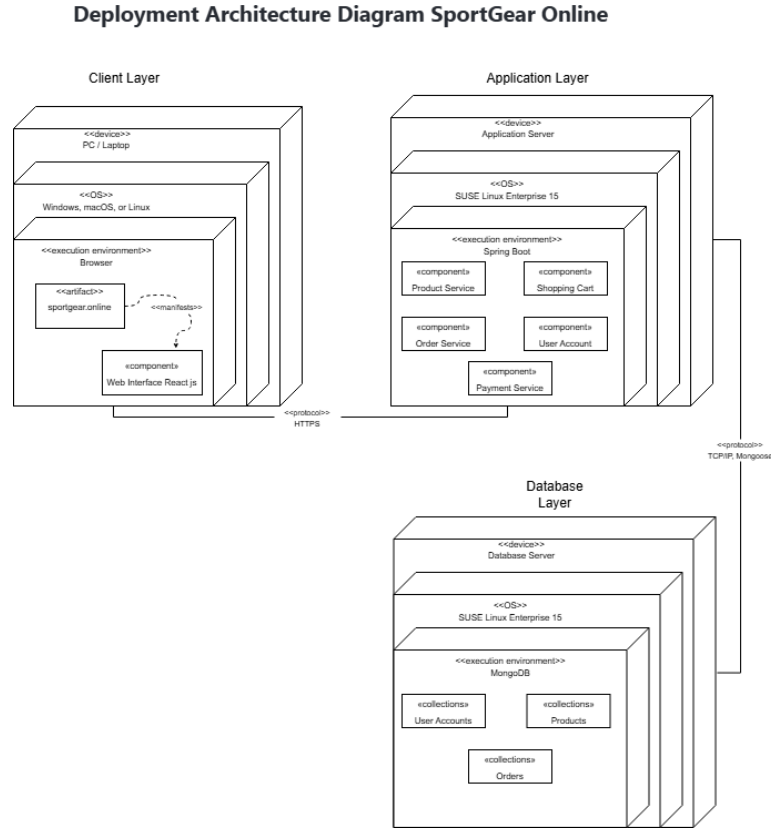
3 Deployment Architecture

Deployment Architecture Diagram SportGear Online

Client Layer

<<device>>
PC / Laptop

<<OS>>
Windows, macOS, or Linux

<<execution environment>>
Browser

<<artifact>>
sportgear.online   <<manifests>>

«component»
Web Interface React js

Application Layer

<<device>>
Application Server

<<OS>>
SUSE Linux Enterprise 15

<<execution environment>>
Spring Boot

«component»	«component»
Product Service	Shopping Cart
«component»	«component»
Order Service	User Account

«component»
Payment Service

<<protocol>>
HTTPS

<<protocol>>
TCP/IP, Mongoose

Database Layer

<<device>>
Database Server

<<OS>>
SUSE Linux Enterprise 15

<<execution environment>>
MongoDB

«collections»	«collections»
User Accounts	Products

«collections»
Orders

Figure 3: Deployment Architecture Diagram SportGear Online.

4 Business Model Processes

The SportGear Online e-commerce business model follows a cyclical flow that integrates three essential dimensions: frontstage (customer experience with attraction, conversion, and retention), backstage (internal operations of inventory management, order processing, and logistics), and technology platform (digital infrastructure that connects and automates processes). This model generates value through direct online sales, optimizes costs through automation, and creates a sustainable ecosystem where customer satisfaction drives growth through data and loyalty strategies. The diagrams below present activities of this business model.
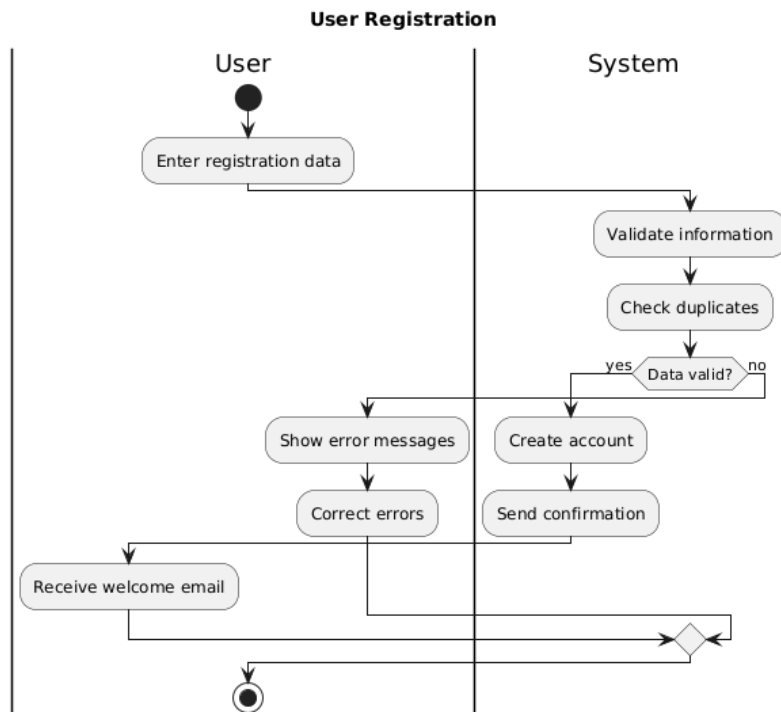
- **User Registration**

Figure 1: User Registration Process

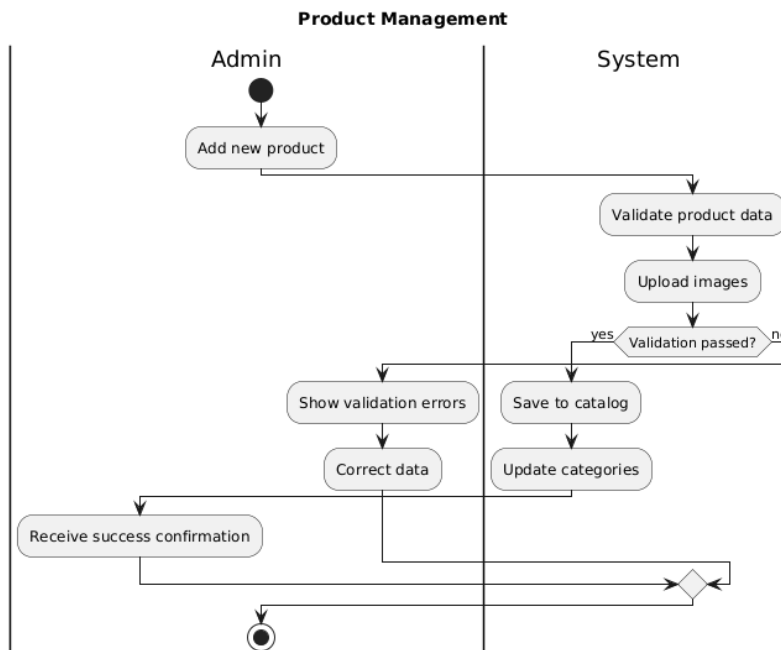- **Product Management**

Figure 2: Product Management Process
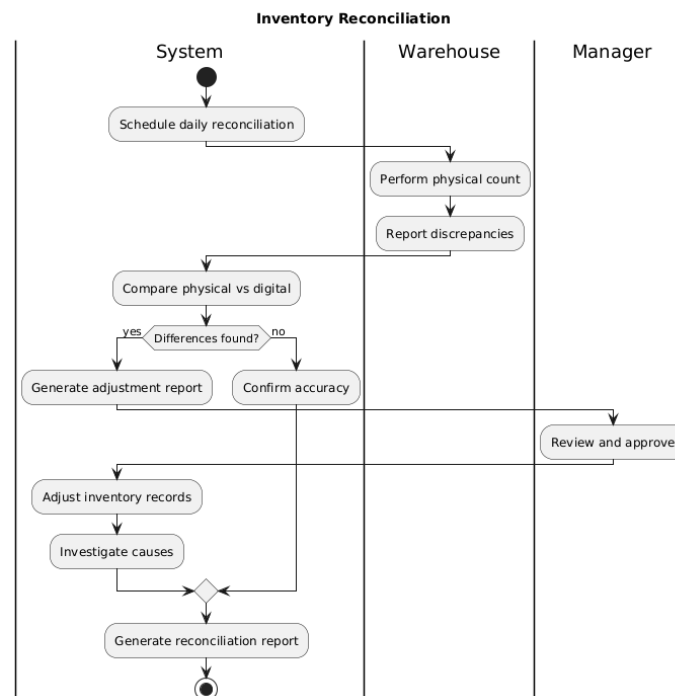
- **Inventory Reconciliation**

Figure 3: Inventory Reconciliation Process
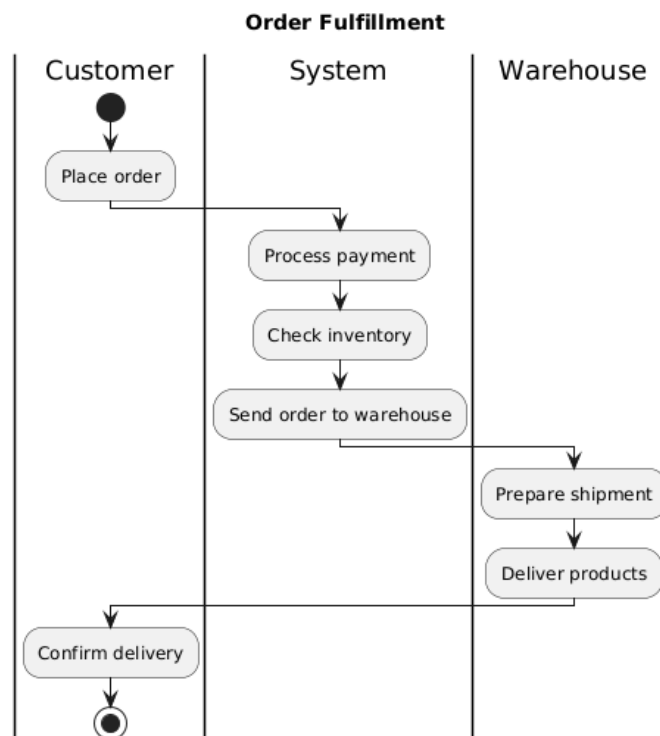
- **Order Fulfillment**

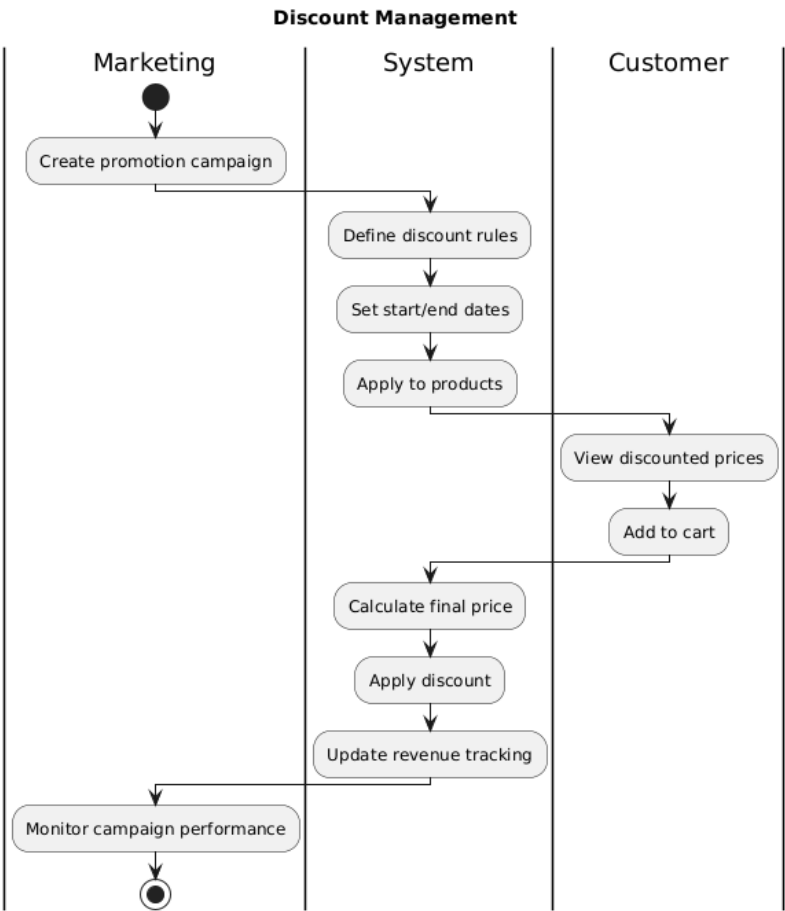Figure 4: Order Fulfillment Process

- **Discount Management**

Figure 5: Discount Management Process

5 Web UI Progress

The SportGear Online mockups showcase a modern, user-friendly e-commerce platform designed specifically for sports equipment shopping. The interface follows a clean, athletic-inspired design language with intuitive navigation and responsive layouts.
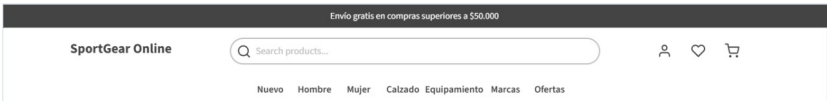
- **Home Page**

Figure 6: Navigation Bar

Figure 7: Hero Banner

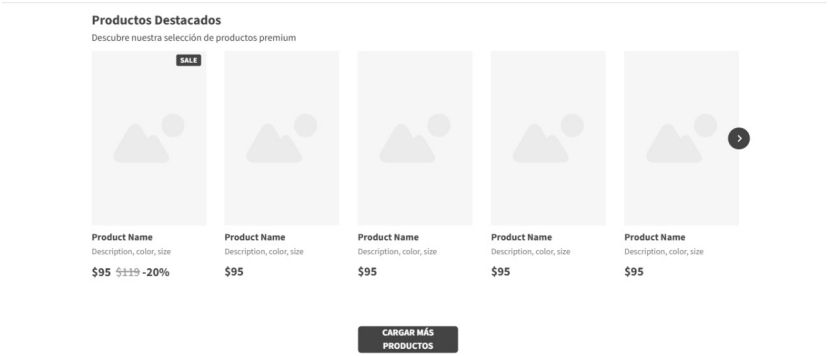Figure 8: Popular Categories

Figure 9: Featured Products
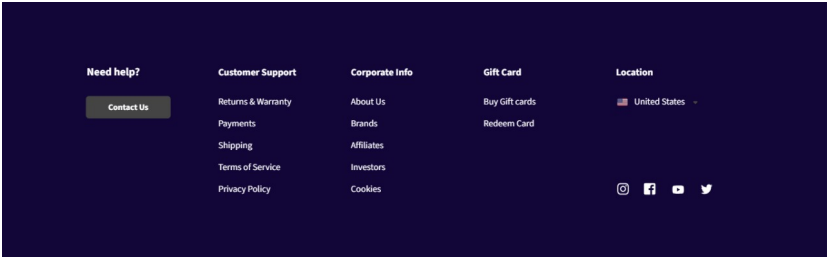

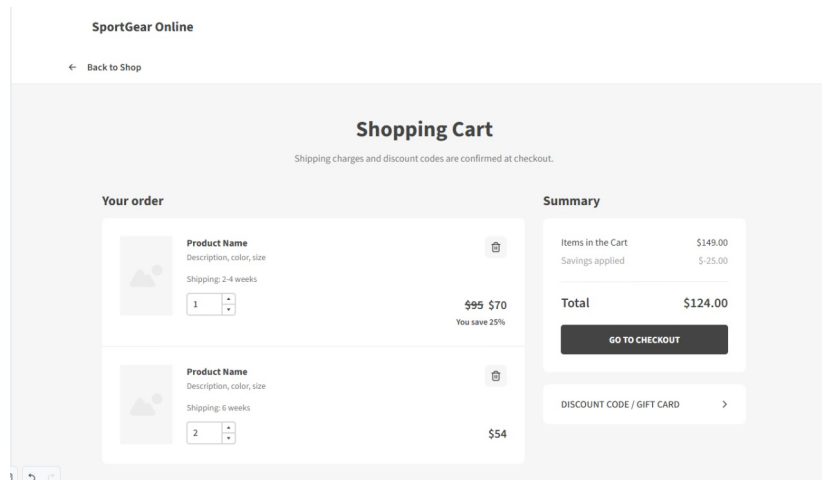Figure 10: Information Section

Figure 11: Page Footer

Figure 12: Shopping Cart

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