SPORTGEAR ONLINE E-COMMERCE

Authors
Juan Esteban Carrillo Garcia - 20212020147
Alejandro Sebastian Gonzalez T - 20191020143
Miguel Angel Babativa Niño - 20191020069

UNIVERSIDAD DISTRITAL
FRANCISCO JOSÉ DE CALDAS

BACKGROUND

SportGear Online is a specialized e-commerce platform for sports equipment designed using modern software engineering practices.
Across the workshops, the project evolved from conceptual modeling using Business Model Canvas, User Stories, User Story Mapping, CRC Cards, and UML diagrams to a complete multi-service implementation. The system follows a distributed architecture with two backends (Spring Boot for authentication and FastAPI for business logic), a React frontend, and containerized deployment using Docker and Docker Compose. This foundation supports scalability, modular development, and reliable integration of core business processes.
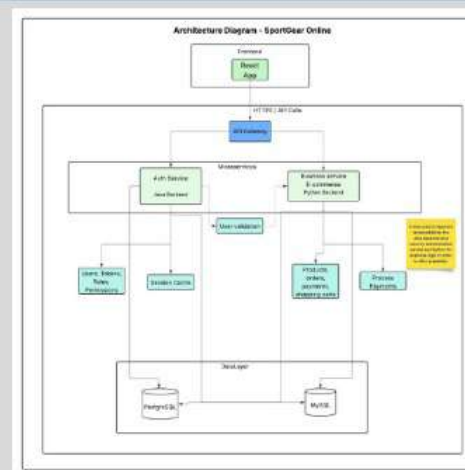
GOAL

Architectural Scalability and Modularity: Design and implement a flexible, distributed architecture composed of a Spring Boot authentication backend, a FastAPI business logic backend, and a React frontend. This separation of concerns ensures maintainability, scalability, and efficient component integration.

High-Quality Engineering and Automation Practices: Apply industry-standard development methodologies including containerization (Docker), automated builds and testing (CI/CD with GitHub Actions), REST API integration, acceptance testing (Cucumber), and stress testing (JMeter) to ensure reliability and production readiness.

PROPOSED SOLUTION

SportGear Online employs a distributed microservices architecture with Java Spring Boot for authentication services connected to MySQL, and Python Flask for business logic with PostgreSQL. The React frontend communicates via REST APIs with both backends. Key technical considerations include containerization with Docker, CI/CD pipeline with GitHub Actions, comprehensive testing with JUnit/pytest/Cucumber/JMeter, and secure payment processing integration.

Architecture Diagram - SportGear Online

RESULTS

- TBoth backends and the frontend were successfully containerized and deployed.
- Acceptance tests validated key user scenarios, ensuring compliance with business requirements.
- Stress testing confirmed stability and performance under high load.
- The CI/CD pipeline automated test execution and Docker image generation.
- The architecture proved modular, scalable, and maintainable, supporting independent component upgrades and simplified debugging.
- The final Web UI prototypes demonstrated intuitive navigation and a modern design tailored to sports e-commerce.

CONCLUSION

The SportGear Online project effectively integrates modern software engineering principles to deliver a fully functional, scalable, and domain-specific e-commerce platform. By combining rigorous conceptual design, a dual-backend architecture, comprehensive testing strategies, and containerized deployment, the system addresses both technical scalability and user-centered operational needs.
The platform demonstrates how distributed architectures supported by CI/CD, Docker, and RESTful communication enable reliable and maintainable solutions for real-world e-commerce environments.

BIBLIOGRAPHY

- Kiani, M. S. (2023). Development the Strategies of Sports Products Online Sales. Alzahra University Business Journal.

- Mahmoud, A. B. (2024). Digital Marketing Analytics in Sports.

- Talatala, R. R. (2025). Spring Commerce: Building a Resilient E-commerce

- The Role of Microservices in eCommerce" (2023). Ignitiv. Ignitiv