Software Requirements Specification

For System Architecture Version 1.0

April 02, 2025

1. Purpose

This document defines the System Architecture for a platform designed to enhance product search and data management capabilities. The primary goal is to provide a robust, scalable, and secure system that delivers optimized search results and supports evolving business needs. This system will provide business value by improving user experience, increasing conversion rates, and ensuring compliance with industry regulations.

2. Scope

- **Included Features:** The system encompasses product search functionality with filtering and optimization, user profile management, content management, data indexing, tracking and reporting, and integration with external systems.
- **Excluded Features:** This document does not cover the detailed design of individual components or specific implementation technologies. It also excludes the development of new external systems.
- **System Boundaries:** The system interacts with user interfaces, external data sources, and internal data storage. It is bounded by the need to comply with PCI DSS and GDPR regulations.

3. Stakeholders

- **Users:** End-users who interact with the platform to search for products. *Responsibility:* Provide feedback on usability and search relevance.
- **Business Owners:** Define business requirements and objectives. *Responsibility:* Prioritize features and ensure alignment with business goals.
- **Development Team:** Responsible for designing, developing, and maintaining the system. *Responsibility:* Implement the system according to the requirements and architecture.
- **Operations Team:** Responsible for deploying, monitoring, and managing the system infrastructure. *Responsibility:* Ensure system availability, performance, and security.
- **Compliance Team:** Ensure the system complies with relevant regulations. *Responsibility:* Define and enforce compliance policies.

4. Features

- **Search Optimization:** Provides advanced search capabilities with filtering, sorting, and relevance ranking.

- **Data Management:** Securely stores and manages product data, user profiles, and content.
- **Integration:** Enables seamless data exchange with external systems, such as payment gateways and CRM.
- **Reporting & Analytics:** Tracks search queries, click-through rates, and other relevant metrics to provide insights into user behavior.
- **Scalability:** Designed to handle increasing user traffic and data volume.

5. Functional Requirements Section

- [FR-01]: The system shall provide search capabilities with options to optimize and filter results. [High]
- [FR-02]: The system shall provide integration capabilities with other systems. [Medium]
- [FR-03]: The system shall implement an inverted index with real-time updates for product search. [High]
- [FR-04]: The system shall implement an alternative approach to user profile management. [Medium]
- [FR-05]: The system shall implement a custom data indexing and search optimization solution. [High]
- [FR-06]: The system shall implement tracking and reporting mechanisms to capture search queries, click-through rates, and other relevant metrics. [Medium]
- [FR-07]: The system shall implement an alternative approach to content management system (CMS). [Medium]
- [FR-08]: The system shall adhere to user-centered design principles and undergo thorough usability testing. [High]

6. Non-Functional Requirements Section

- [NFR-01]: The system shall ensure data security. [High]
- [NFR-02]: The system shall maintain optimal performance under high user concurrency and data volume conditions. [High]
- [NFR-03]: The system shall ensure robust performance. [High]
- [NFR-04]: The system shall be scalable. [High]
- [NFR-05]: The system design shall accommodate future scalability, feature extensions, and evolving business needs. [High]
- [NFR-06]: The system shall comply with industry-specific regulations (PCI DSS and GDPR). [High]
- [NFR-07]: The system shall implement an active-passive setup with automatic failover to a secondary data center. [High]
- [NFR-08]: The system shall retain user search history data for 90 days. [Medium]
- [NFR-09]: The system shall be deployed using a hybrid model combining cloud and on-premise resources. [Medium]

7. Security Requirements Section

- [SR-01]: The system shall protect sensitive data (e.g., user credentials, payment information) using encryption at rest and in transit. [High]
- [SR-02]: The system shall implement access controls to restrict access to sensitive data and functionality based on user roles. [High]
- [SR-03]: The system shall be protected against common web vulnerabilities, such as SQL injection and cross-site scripting (XSS). [High]
- [SR-04]: The system shall undergo regular security audits and penetration testing to identify and address potential vulnerabilities. [High]
- [SR-05]: The system shall comply with PCI DSS requirements for handling payment information. [High]
- [SR-06]: The system shall comply with GDPR requirements for handling user data. [High]

8. Constraints Section

- **Technical Limitations:** The system must integrate with existing legacy systems, which may have limited API capabilities.
- **Business Rules:** User search history data must be retained for 90 days for personalization purposes.
- **Regulatory Requirements:** The system must comply with PCI DSS and GDPR regulations.
- **Budgetary Constraints:** The system development and deployment must adhere to a predefined budget.
- **Hybrid Deployment:** The system must be deployed using a hybrid model, combining cloud and on-premise resources.

9. Priorities Section (MoSCoW)

- **Must Have:**
  - Search functionality with filtering and optimization.
  - Data security.
  - Compliance with PCI DSS and GDPR.
  - Robust performance.
  - Scalability.
- **Should Have:**
  - Integration capabilities with other systems.
  - Tracking and reporting mechanisms.
  - Active-passive setup with automatic failover.
- **Could Have:**
  - Alternative approach to user profile management.
  - Alternative approach to content management system (CMS).
- **Won't Have:**
  - Features not directly related to search, data management, or compliance.

10. Additional Section

- The system should be designed to accommodate future integration with machine learning models for personalized search recommendations.
- The system should be monitored for performance and availability, with alerts triggered for any anomalies.
- The system should be designed to support multiple languages and currencies in the future.
- The system should be designed to support A/B testing of search algorithms and user interface elements.