HoS Fandom Marketplace – Comprehensive Technical Development Document

1. Executive Summary

The HoS Fandom Marketplace is a global e-commerce platform designed to connect fans with authentic, licensed fandom merchandise.
It serves both B2C and B2B models, supporting multi-seller operations, multi-language, and multi-currency experiences.
The platform is architected for scalability, modularity, and future extensibility through a microservices-driven, cloud-based approach.

2. System Architecture Overview

The architecture is structured into logical layers that promote modular development, fault isolation, and performance scalability.

Client Layer:
- Responsive Web Application (cross-device compatibility)
- Progressive Web App (PWA) for offline access
- Admin Management Portal
- Future roadmap includes native mobile apps for iOS and Android

Edge Layer:
- CDN for static assets, media, and theme files
- Load Balancer for global traffic distribution
- WAF for security protection against malicious access

API Gateway Layer:
- Centralized routing, JWT authentication, API version control, and rate limiting
- Multi-language and multi-currency headers processed at this layer

Microservices Layer (core business domains):
- Authentication and User Management
- Seller Management
- Product Catalog and Inventory
- Order and Fulfilment
- Payment and Financials
- Discount and Promotions

- Logistics and Returns
- Seller Dashboard and Analytics
- Theme and Personalization
- Localization and Currency
- Admin and Reporting

Core Infrastructure:
- Message Broker for asynchronous event handling
- Object Storage for media and documents
- Cache Layer (Redis) for high-performance reads
- Search Engine for full-text and localized search

Data Layer:
- SQL Database for structured data (transactions, users, orders)
- NoSQL for unstructured or semi-structured data (product metadata, sessions)
- Data Warehouse for analytics and reporting
- Blob Storage for media files

Integration Layer:
- Payment Gateways (multi-provider setup)
- Logistics APIs (DHL, FedEx, regional partners)
- ERP and BI Systems
- Translation and Currency Exchange APIs

3. Data Schema Overview

The system uses a hybrid database model combining relational (SQL) and document-oriented (NoSQL) storage for optimal performance.
Below is a summary of the core entities and their relationships.

Users
Stores authentication details, preferences, and GDPR consent data. Includes MFA, language, and currency preferences.

Sellers
Details about distributors, including type (B2C/B2B), verification status, and profile information.

Products
Contains product details, base pricing, SKU codes, categories, and references to sellers. Supports localized translations.

Inventory

Tracks stock across fulfillment centers, country-specific pricing, and real-time synchronization.

Fulfillment Centers

Maintains locations, operational status, and stock distribution per region.

Orders

Captures order details, items, fulfillment mapping, multi-currency totals, and return references.

Payments

Tracks transaction status, currency, gateway used, and settlement data for sellers.

Discounts

Defines discount type, value, scope (SKU/category/seller), validity period, and conditions.

Returns

Manages return requests, reasons, time windows, and status updates.

Themes

Contains available themes, their types (fandom, seasonal, promotional), and user associations.

Languages & Currencies

Stores supported locales, languages, exchange rates, and formatting rules.

Key Relationships:
- One-to-Many: Users to Orders, Sellers to Products, Orders to Payments
- Many-to-Many: Products to Inventory (via fulfillment centers)
- One-to-One: Orders to Returns (optional)
Indexes: Applied on user emails, SKU codes, order status, and last sync timestamps.
Sensitive data such as passwords and payment information are encrypted.

4. Module-Wise Specifications

User & Authentication Service

Manages user registration, login, MFA, and profile updates. Implements OAuth2.0 authentication and GDPR-compliant guest checkouts.

Seller Management Service

Handles seller onboarding, approval workflows, verification, and performance metrics. Supports B2C and wholesale seller segmentation.

Product & Inventory Management

Manages SKUs, product translations, and pricing models. Enables real-time stock updates from multiple fulfillment centers.

Order & Fulfilment Service

Handles global order routing, split-order processing, and delivery tracking. Integrates shipping providers dynamically.

Financials & Payment Service

Processes multi-currency payments, applies platform fees, manages settlements, and ensures tax compliance per region.

Discount & Promotion Engine

Supports configurable discount rules and promotional campaigns. Integrates loyalty program and coupon validation.

Logistics & Delivery Service

Integrates global carriers for dynamic shipping cost computation, delivery tracking, and reverse logistics.

Seller Dashboard Service

Provides detailed analytics, stock overviews, and settlement history. Includes BI-driven insights for sellers.

Platform Theming & Personalization

Enables theme switching for different user segments (B2C/B2B/Seasonal). Includes runtime customization using CSS variables.

Localization & Currency Service

Handles language translations, real-time exchange rates, and locale-specific rules for content and pricing.

Admin Management & Analytics

Provides admin control over users, approvals, products, and transactions. Offers comprehensive BI dashboards.

5. Theming and Homepage Customization

The platform supports dynamic homepage theming and layout customization through a centralized Theme Engine.
Themes can be fandom-specific, promotional, or seasonal. Each theme defines color schemes, layouts, and visual assets.
User preferences are stored in profiles to maintain continuity across sessions. Admins can preview, activate, or schedule themes.

6. Security, Compliance & Governance

Security is enforced at multiple levels with OAuth2.0, MFA, and RBAC. Data encryption is implemented at rest and in transit.
Compliance follows GDPR for user data and PCI-DSS for financial transactions. Audit logs capture all admin activities.
Data residency rules ensure compliance with regional regulations.

7. Implementation Phases

Phase 1 – Core Platform: Authentication, Product Catalog, Orders, Payments, and Localization (3 languages, 5 currencies)
Phase 2 – Advanced Features: Multi-location fulfillment, Discount engine, Seller analytics
Phase 3 – Scale & Optimization: AI-driven recommendations, performance tuning, BI dashboards
Phase 4 – Expansion & Innovation: Mobile apps, Auctions, AR/VR integration, Loyalty programs, Tax automation

8. Monitoring, Analytics & Performance

Comprehensive monitoring with real-time dashboards for system health, transaction volume, and localization analytics.
Distributed tracing identifies performance bottlenecks. Caching layers (Redis, CDN) and search indexing optimize performance.

9. Future Roadmap

- AI-based product recommendations
- AR/VR product previews for immersive shopping
- Advanced loyalty and referral programs
- Cross-border tax automation
- Secondary marketplace for auctions or damaged stock
- Third-party API integrations for extended reach