

Project: ShopSphere – Omnichannel Retail Inventory & Customer Engagement System

1. Introduction

ShopSphere is designed for retail chains and e-commerce businesses to manage inventory across multiple channels, optimize stock levels, and enhance customer engagement. The platform integrates real-time inventory tracking, order fulfillment, and personalized marketing campaigns. It supports in-store and online sales, provides dashboards for demand forecasting, and enables loyalty program management. ShopSphere improves operational efficiency, reduces stockouts, and boosts customer retention through data-driven insights.

Supports backend development using **Java (Spring Boot)** and **.NET (ASP.NET Core)**.

2. Module Overview

- 2.1 Product Catalog & Inventory Management Module
- 2.2 Order Processing & Fulfillment Module
- 2.3 Customer Loyalty & Engagement Module
- 2.4 Demand Forecasting & Analytics Module
- 2.5 Marketing Campaign & Reporting Module

3. Architecture Overview

- **Frontend:** Angular/React for customer and admin dashboards
- **Backend:** REST APIs for inventory and order workflows
- **Database:** MySQL/SQL Server for structured product and customer data

4. Module-Wise Design

4.1 Product Catalog & Inventory Management Module

Features:

- Maintain product catalog with pricing and stock details
- Track inventory across warehouses and stores
- Enable low-stock alerts

Entities:

Product

- ProductID
- Name
- Category

- Price
- StockQuantity

4.2 Order Processing & Fulfillment Module

Features:

- Process online and in-store orders
- Manage shipping and delivery status
- Integrate with payment gateways

Entities:

Order

- OrderID
- CustomerID
- ProductID
- Quantity
- Status (PLACED, SHIPPED, DELIVERED)

4.3 Customer Loyalty & Engagement Module

Features:

- Manage loyalty points and rewards
- Track purchase history
- Enable personalized offers

Entities:

Customer

- CustomerID
- Name
- ContactInfo
- LoyaltyPoints
- Preferences

4.4 Demand Forecasting & Analytics Module

Features:

- Predict demand using historical sales data
- Optimize stock replenishment
- Provide dashboards for sales trends

Entities:

SalesAnalytics

- AnalyticsID
- Metrics (SalesVolume, DemandTrend)
- GeneratedDate

4.5 Marketing Campaign & Reporting Module

Features:

- Launch targeted campaigns
- Track campaign performance
- Generate ROI reports

Entities:

Campaign

- CampaignID
- TargetAudience
- Budget
- StartDate
- EndDate

5. Deployment Strategy

- **Local:** Developer machines with sample product and order data
- **Production:** Cloud deployment with secure APIs and dashboards

6. Database Design

Tables: Product → Order → Customer → SalesAnalytics → Campaign

7. User Interface Design

Wireframes:

- **Customer Portal:** Browse products, place orders, view loyalty points
- **Admin Dashboard:** Manage inventory, monitor campaigns, analyze sales

8. Non-Functional Requirements

- **Performance:** Handle 500,000 transactions per day
- **Security:** Encrypted data, compliance with PCI DSS standards
- **Scalability:** Support multiple stores and global e-commerce operations

9. Assumptions & Constraints

- Integration with third-party logistics and payment gateways
- Initial rollout for fashion and apparel category only