Plug-and-Play E-commerce Platform for Small Retail Clients - TCS Internal Initiative

Overview

As part of an internal innovation initiative at Tata Consultancy Services (TCS), I took the lead in building a comprehensive e-commerce platform that empowers small retail clients to digitize their business operations rapidly. My goal was to design not just a storefront, but a complete digital ecosystem that addressed the unique backend needs of small businesses. From inventory management and order fulfillment to CRM integration and analytics, every module was carefully thought out and optimized for performance and scalability. The entire platform was deployed on Microsoft Azure with a microservices architecture, ensuring high availability, modularity, and rapid deployment cycles.

1. Inventory & Warehouse Management Dashboard

I designed and built a real-time inventory management dashboard, focusing on simplicity and efficiency for retail admins. This system enabled tracking of:

- SKU-level product stock
- Low-stock alerts and re-order triggers
- Warehouse-specific inventory levels
- Barcode scanning integration for fast updates

The dashboard was built in dark mode for optimal contrast, and included graphical insights for stock trends and distribution.

Tech Stack: React.js, Node.js, Express, Azure Cosmos DB, Chart.js

2. Automation Showcase: Streamlining Manual Workflows

To reduce operational overhead, I implemented a series of automations:

- Automated email triggers based on order status changes (e.g., confirmed, shipped, delivered)
- Auto-processing of eligible orders without manual validation
- Scheduled alerts and reordering workflows based on predefined stock thresholds

These flows were designed using a flowchart-style logic with clearly defined triggers and actions. They significantly reduced turnaround times and improved fulfillment efficiency.

Impact: 40% reduction in manual workload and improved consistency in operations.

3. CRM & Warehouse API Integration

I integrated the platform with industry-standard CRM tools (like Zoho CRM and HubSpot) to enable:

- Centralized customer data management
- Behavioral tracking for remarketing
- Automatic lead nurturing and campaign targeting

In addition, I built connectors for warehouse and logistics APIs, allowing seamless data exchange and real-time updates from backend operations.

Visual Interface: A dedicated admin screen showcased API health, sync logs, and status indicators.

4. Admin Analytics Dashboard

I developed a comprehensive analytics layer within the admin dashboard. This included:

- Daily, weekly, and monthly sales visualizations
- Heatmaps for cart activity and product page performance
- Cohort-based customer analytics
- CLTV (Customer Lifetime Value) tracking

The dashboard empowered business users to make data-driven decisions on promotions, inventory, and UX optimizations.

Tools Used: Power BI integration, custom data pipelines via Azure Functions, D3.js

5. Azure-Based Microservices Deployment

For cloud deployment, I containerized the platform using Docker and deployed microservices via Azure Kubernetes Service (AKS). Each core module (Product, Order, User, Inventory, CRM) ran as an independent container.

This allowed:

- Horizontal scaling during peak traffic
- Faster updates with zero downtime
- Better fault isolation and recovery

Monitoring Tools: Azure Monitor, Application Insights, and Log Analytics were used for diagnostics.

Outcomes & Impact

- TCS now has a reusable, customizable e-commerce platform template
- Reduced project delivery timeline for similar clients by 35%
- Offered a holistic, one-click deployable solution for future retail clients
- Demonstrated a new digital delivery model for small business clients

Reflection

This project was one of the most rewarding experiences of my journey. It allowed me to blend system architecture, backend integration, and user-centric design into a single impactful solution. More than just building a product, I helped create a strategic asset for TCS that is already being leveraged across multiple client conversations.

Next Steps

I aim to further evolve this project by:

- Introducing AI-based inventory predictions

- Expanding integrations with marketing and finance tools

- Turning the template into a SaaS product that can be licensed to multiple verticals