

Case Study

E-commerce Platform Design

- You are the lead architect for "**GlobalMart**," a rapidly growing e-commerce company.
- The company currently uses a **monolithic** application architecture that is struggling to keep up with the following demands:
 - **Scalability:** During peak sales seasons (*like Black Friday*), the **system often slows** down because the **entire application** (*including slow parts like the reporting module*) **has to be scaled together**, which is **expensive** and **inefficient**.
 - **Agility & Technology Diversity:** The **entire system** is **built** on **one technology stack**, making it **slow** to **adopt new, specialized technologies** (*e.g., a modern AI-powered recommendation engine*) and **slowing down feature development** because all teams must work in the same large codebase.
 - **Resilience:** A **failure** in **one critical component** (*e.g., the third-party payment gateway*) **causes** the **entire order processing system** to **crash** or **become unresponsive**, leading to significant revenue loss and customer frustration.
 - **Real-Time Responsiveness:** The **system needs** to be **highly responsive** to **state changes**. For example, **when** a **customer places** an **order**, the **Inventory service must be updated**, the **Shipping service must be notified**, and the **Customer Notification service must send an email**—all quickly and without blocking the main order process.

The Assignment

Given **GlobalMart's** need for independent scalability, technology diversity, improved fault isolation, and real-time responsiveness, do the following:

1. **Choose architectural styles** to replace the monolith. Explain *which specific problem(s)* it resolves and *why* it's a good fit for GlobalMart.
2. **Choose architectural pattern** and explain how it addresses a specific challenge in the system, detailing how it improves stability, resilience, or performance

3. **Provide a final architectural recommendation** — a concise picture/summary of the proposed architecture that ties the chosen styles and pattern together and explains how they jointly meet GlobalMart's requirements.

Present your choices with well-explained justifications linked to each problem statement, and wrap up with a clear, concise final architecture overview accompanied by a high-level diagram.