



DataBases II - Mercado Libre Clone

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Introduction

E-commerce platforms like Mercado Libre and Amazon face ever-growing challenges that demand fast, secure, and personalized solutions to serve millions of users in real time. These platforms must ensure scalability, availability, and robustness. This project proposes the design of an educational e-commerce database system inspired by Mercado Libre, focusing on modularity, scalability, and alignment with user needs through a structured and relational model.

Goal

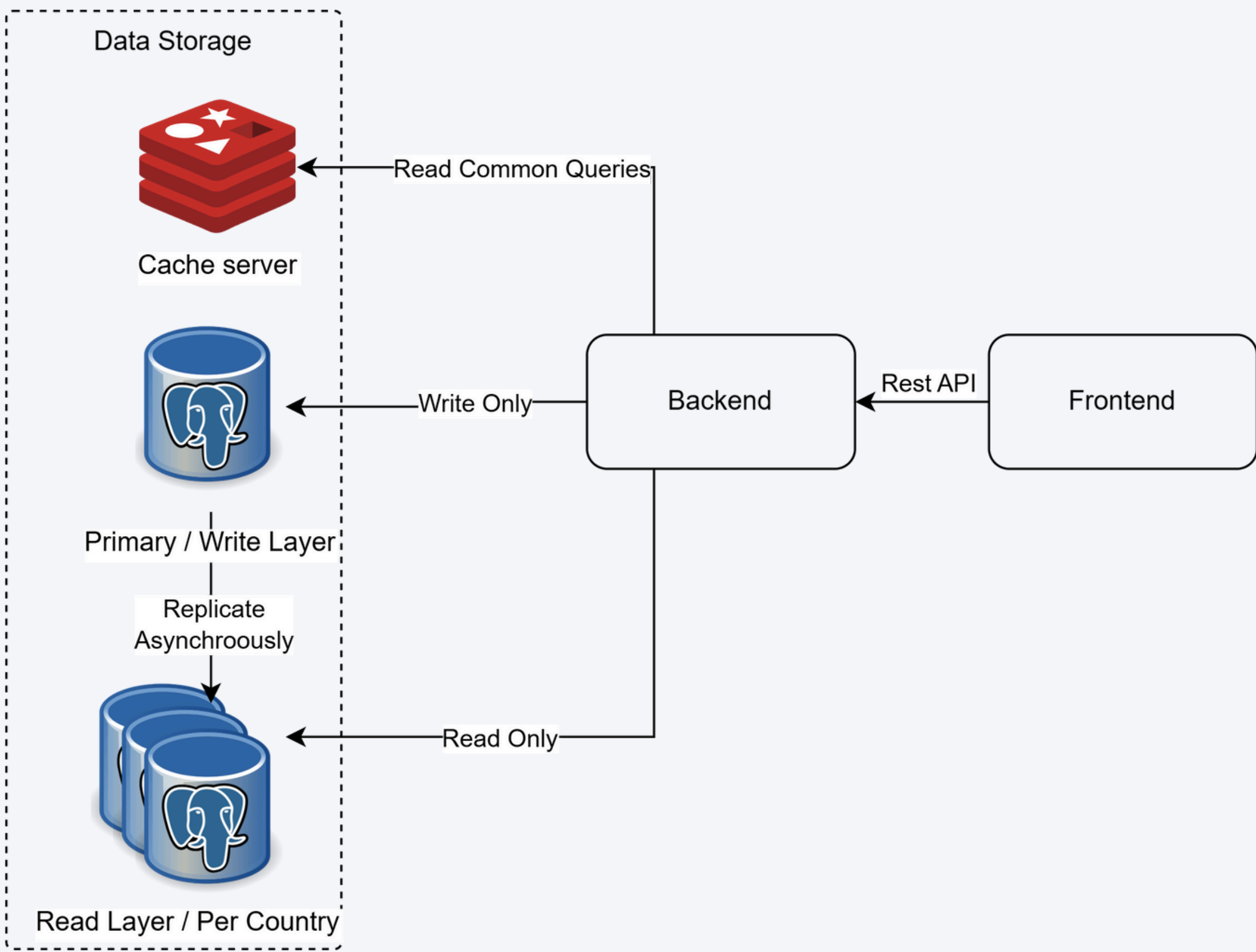
To design and implement a robust, scalable e-commerce database system inspired by Mercado Libre. The aim is to model its features conceptually and functionally using a modular, relational architecture adapted to the real requirements of end users.

Proposed Solution

The solution is based on a modular relational model supported by PostgreSQL and Redis. It is organized into three layers:

- **Write Layer:** Handles inserts, updates, and deletes ensuring transactional consistency.
- **Read Layer:** Supports scalability through replicated instances for query optimization.
- **Cache Layer:** Reduces latency by storing frequently accessed data.

The system also supports data partitioning by geographic criteria to improve performance and regulatory compliance.

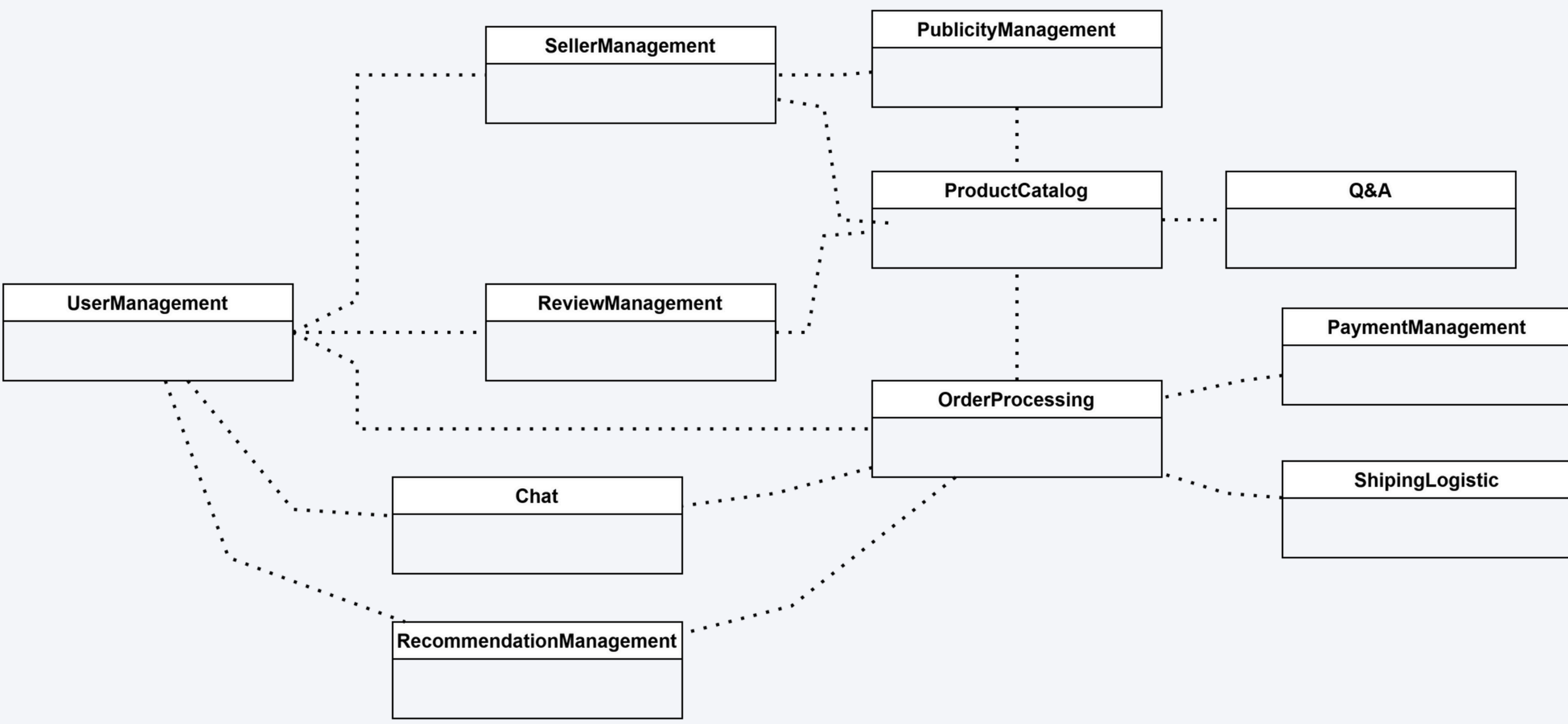


Experiments

We defined a complete set of requirements to simulate a realistic e-commerce environment:

- **7 roles:** User, Seller, DBA, Admin, Platform Manager, BI Analyst, Marketing Specialist.
- **31 functional requirements:** Registration, product publication, payment, recommendations, delivery, moderation, campaigns.
- **12 non-functional requirements:** Scalability, low-latency, disaster recovery, secure access.

The database was designed with 25 entities distributed among 10 components including UserManagement, ProductCatalog, OrderProcessing, and others. Each requirement was mapped to specific entities and relationships.



Results

Conclusions