DATABASES II

FINAL DELIVERY

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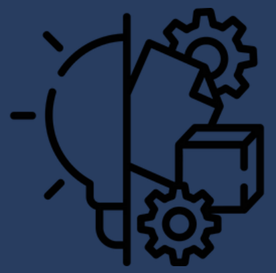
INTRODUCTION

This project seeks to develop a software solution in the context of e-commerce. The system supports multiple user roles: customers, vendors and administrators.



THE PROBLEM

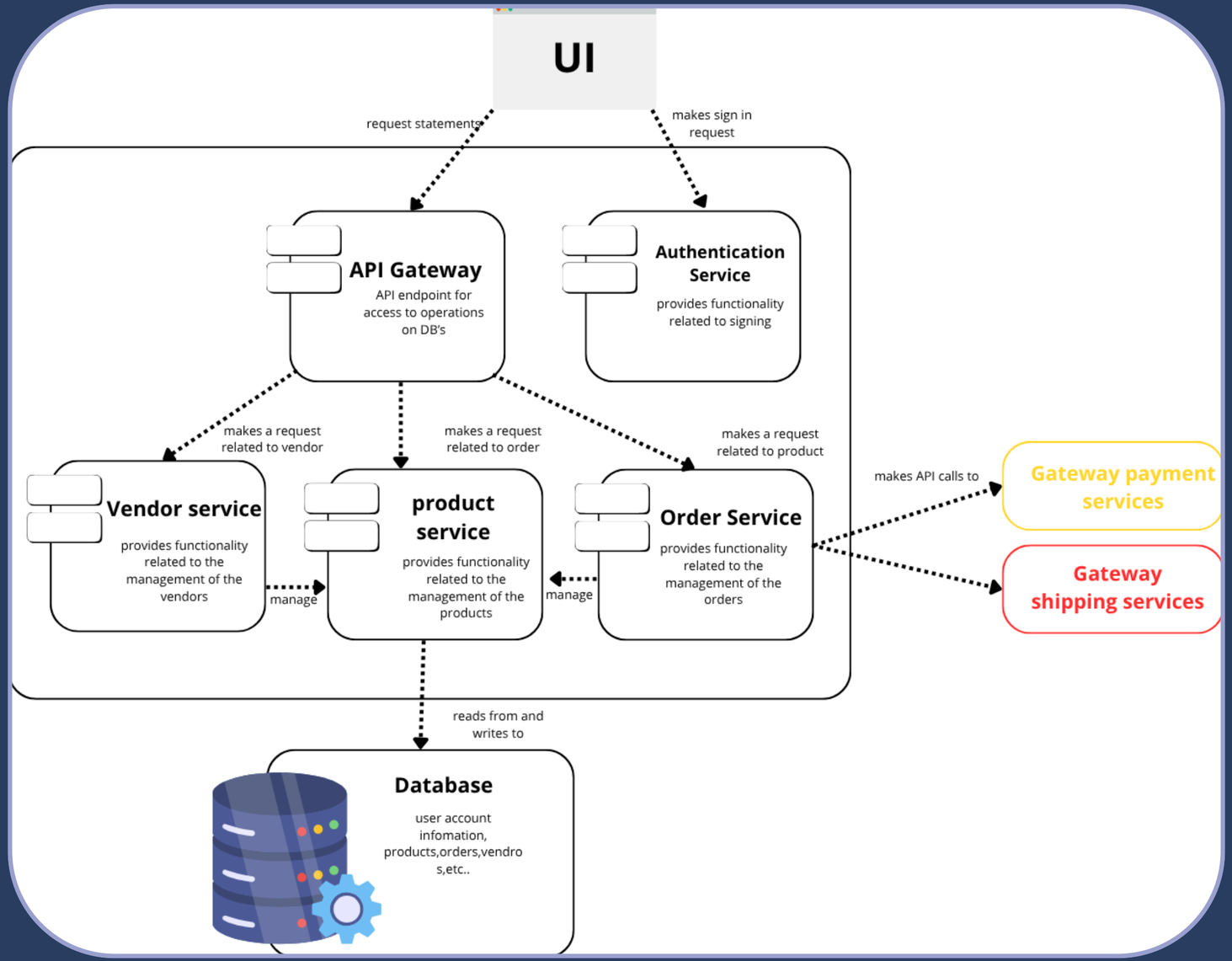
• MAIN

Design an e-commerce platform architecture that can handle a high volume of requests.

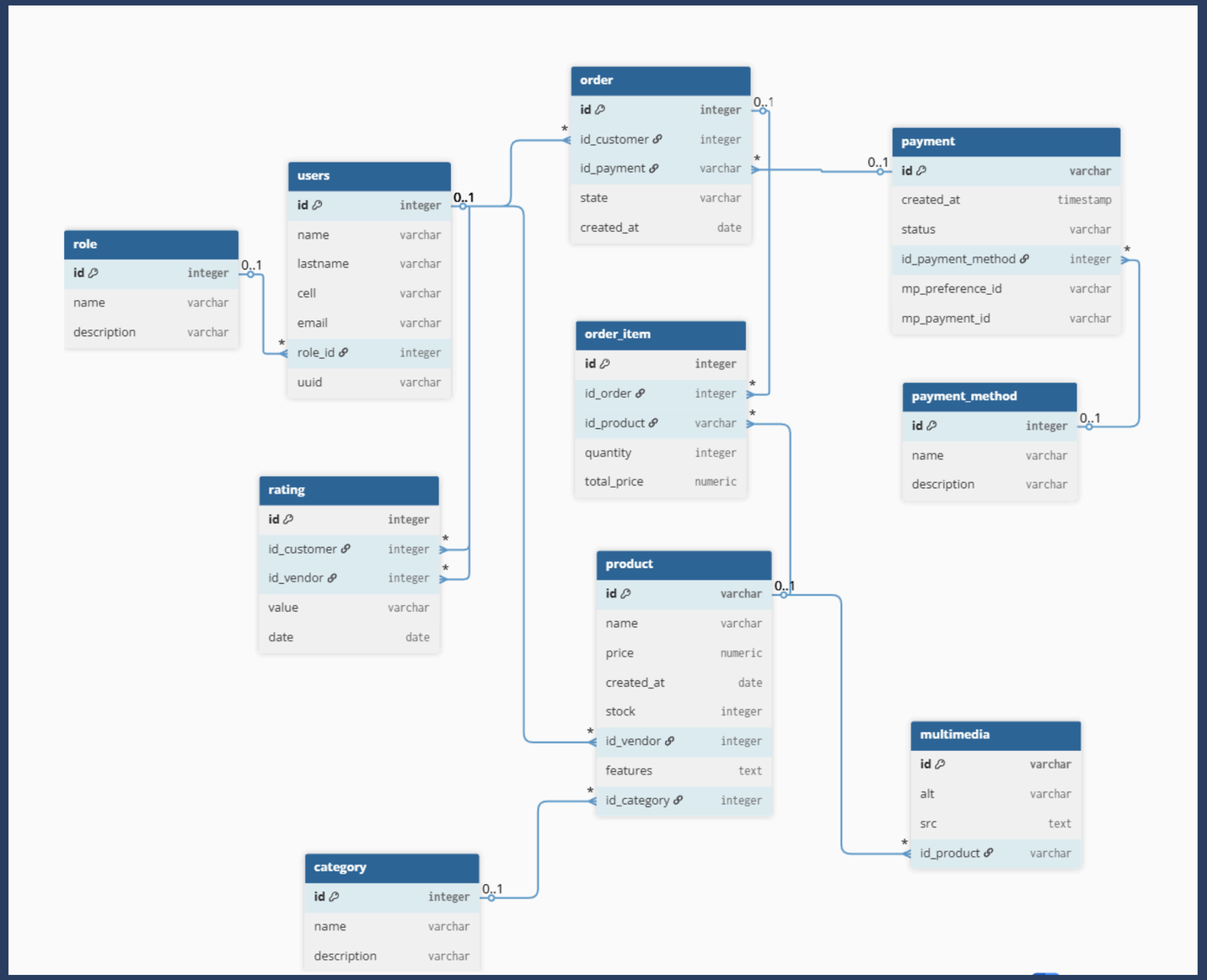
• WE NEED TO

- Identify the core of an e-commerce business model.
- Identify the main requirements/needs to be met by users.
- Determine the tools to be used for development.

THE ARCHITECTURE



DATABASA PROPOSAL



TECHNOLOGIES

The tecnlogies that we are using are:

01 **SUPABASE: DB hosting, S3 hosting and BaaS**

02 **POSTGRESQL: Relational Database**

03 **REACT-VITE: Fast and continous development**

04 **Vercel: Frontend Deployment**

RESULTS

Security

- Secure end-to-end workflow: authentication, checkout, and payment confirmation operate without inconsistencies.
- Atomic order and stock operations prevent overselling and maintain data integrity.
- Strong enforcement of database constraints ensures reliable and tamper-proof transactions.

RESULTS

- System supports large product catalogs (250k+ items) within Supabase limits.
- Architecture remains stable under synthetic high-volume workloads.
- Modular cloud-based design allows seamless growth and feature expansion.

Scalable

RESULTS

- Core backend functions execute quickly and consistently, validated through unit testing.
- Performance tests show millisecond-level response times for order queries and stable execution of analytical operations.
- Materialized views improve dashboard speed and reduce database workload.

Efinciency

CONCLUSSIONS

- Goal Achieved: The project successfully validated a lightweight, BaaS-driven architecture (React + Supabase) for the local fashion ecosystem.
- Feasibility: Confirmed that the 3-layer modular structure provides a coherent and feasible foundation for early-stage digital commerce in Bogotá.

- Next Steps: Future work will target enhanced analytics, recommender systems, and migration to high-capacity infrastructure.

CONCLUSSIONS

- Transactional Integrity: Unit tests (e.g., fn_create_order) confirmed full ACID guarantees for critical operations like inventory management.
- Performance: Synthetic workload tests demonstrated stable latency for order retrieval and sales aggregation.
- Integration: Verified seamless end-to-end execution: Auth $\rightarrow$ Checkout $\rightarrow$ Payment $\rightarrow$ Stock Updates.

CONCLUSSIONS

- Scalability: The system supports catalog sizes significantly larger than typical SMB requirements, even under Free-Tier constraints.
- Impact: Establishes a cost-effective technical foundation for local vendors.