🏗️ HBnB – Technical Architecture Documentation

📘 Introduction

The HBnB project is a simplified re-implementation of the AirBnB platform. It involves user account management, place listing creation, review submission, and search/filter functionalities. This document presents the technical design blueprint of the application and is intended as a reference throughout the development process.

It compiles:
- A high-level architectural overview of the system
- A detailed class diagram for the business logic layer
- Four sequence diagrams representing key API interactions

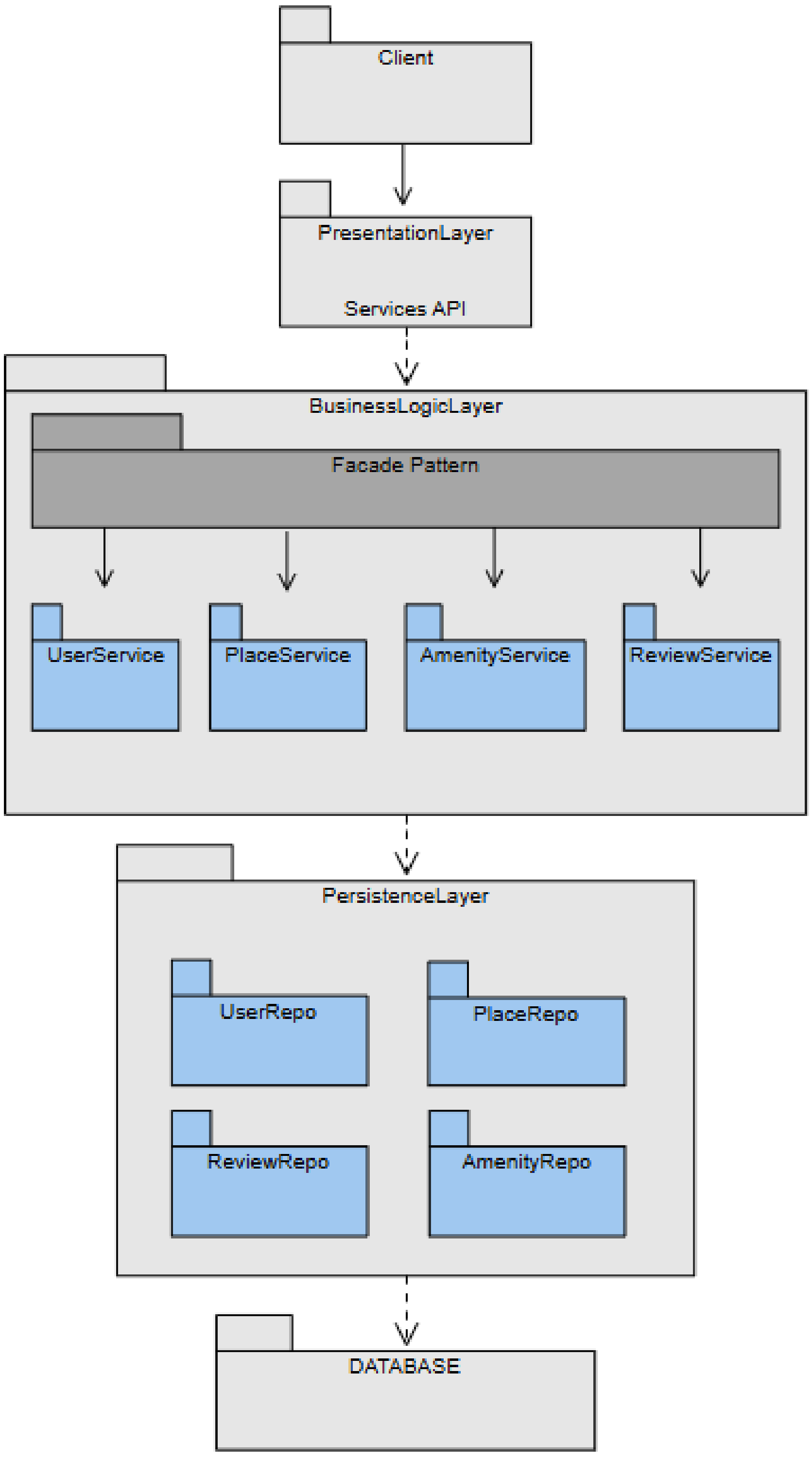
🧱 High-Level Architecture

🔹 Overview

The HBnB system is built using a 3-layer architecture:
- Presentation Layer (API): Handles incoming client requests
- Business Logic Layer (Service): Processes application logic and enforces rules
- Persistence Layer (Repository): Manages interaction with the database

The architecture uses the Facade Pattern to simplify the connection between the API and business logic.

◆ Diagram


Client
PresentationLayer
Services API
BusinessLogicLayer
Facade Pattern
UserService
PlaceService
AmenityService
ReviewService
PersistenceLayer
UserRepo
PlaceRepo
ReviewRepo
AmenityRepo
DATABASE

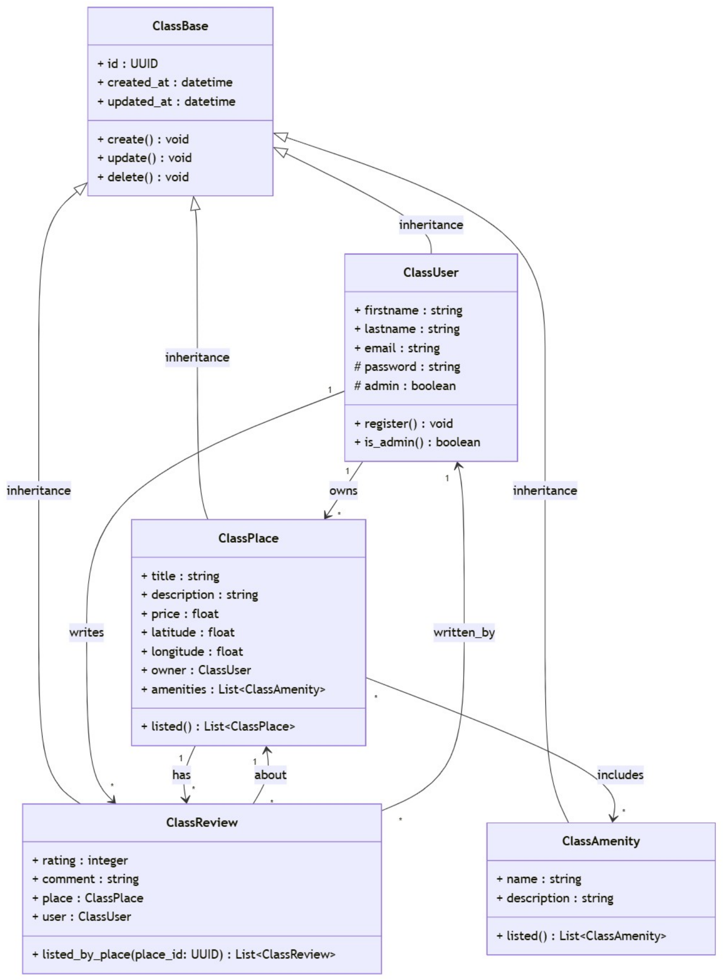
- Services like UserService, PlaceService, and ReviewService act as facades to the business logic.
- Repositories isolate data access from the business layer.

🔸 Notes

- Each layer is decoupled, allowing for isolated testing and maintenance.
- API communicates only with Services, never directly with Repositories.

📐 Business Logic Layer – Class Diagram

🔹 Diagram



◆ Overview

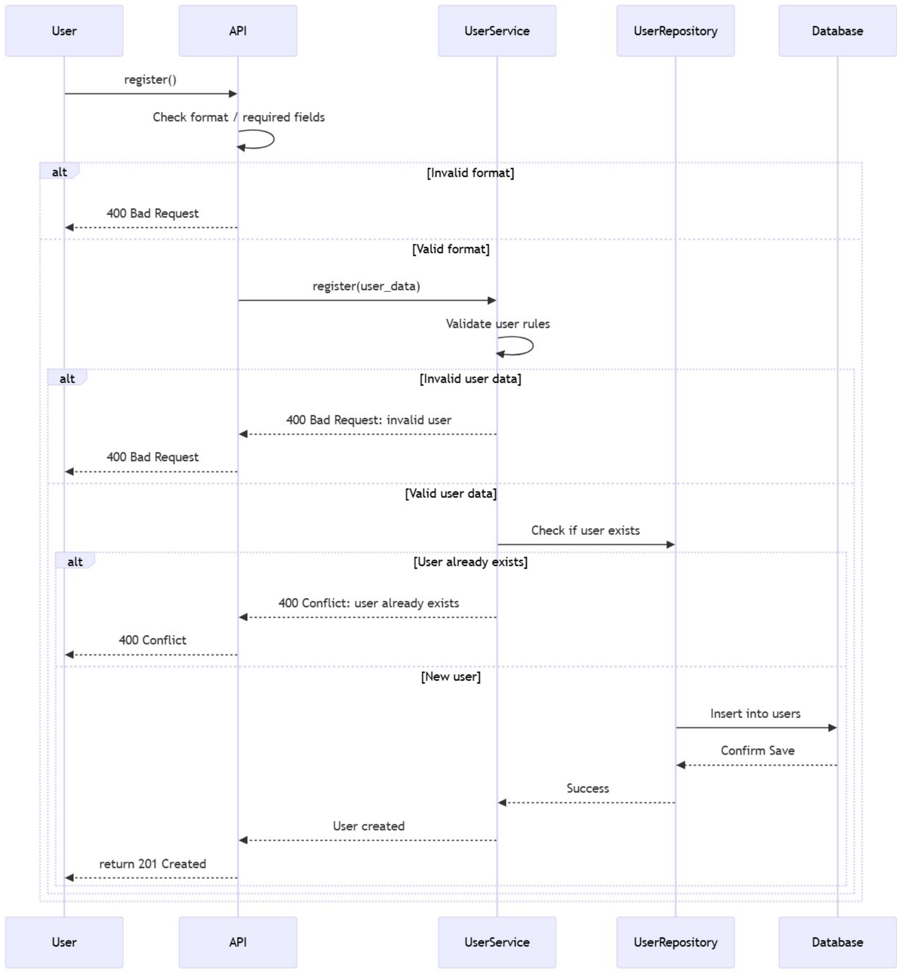
The class diagram defines the core entities:
- User: has a register() method and owns Places and Reviews
- Place: linked to a User (owner), has a listed() method, includes Amenities
- Review: linked to both a User and Place, includes rating, comment
- Amenity: features associated with a Place
- Base: abstract class with shared attributes/methods like create(), update()

◆ Relationships

- User 1 → * Place
- Place 1 → * Review
- Place * ↔ * Amenity
- Review * → 1 Place
- Review * → 1 User

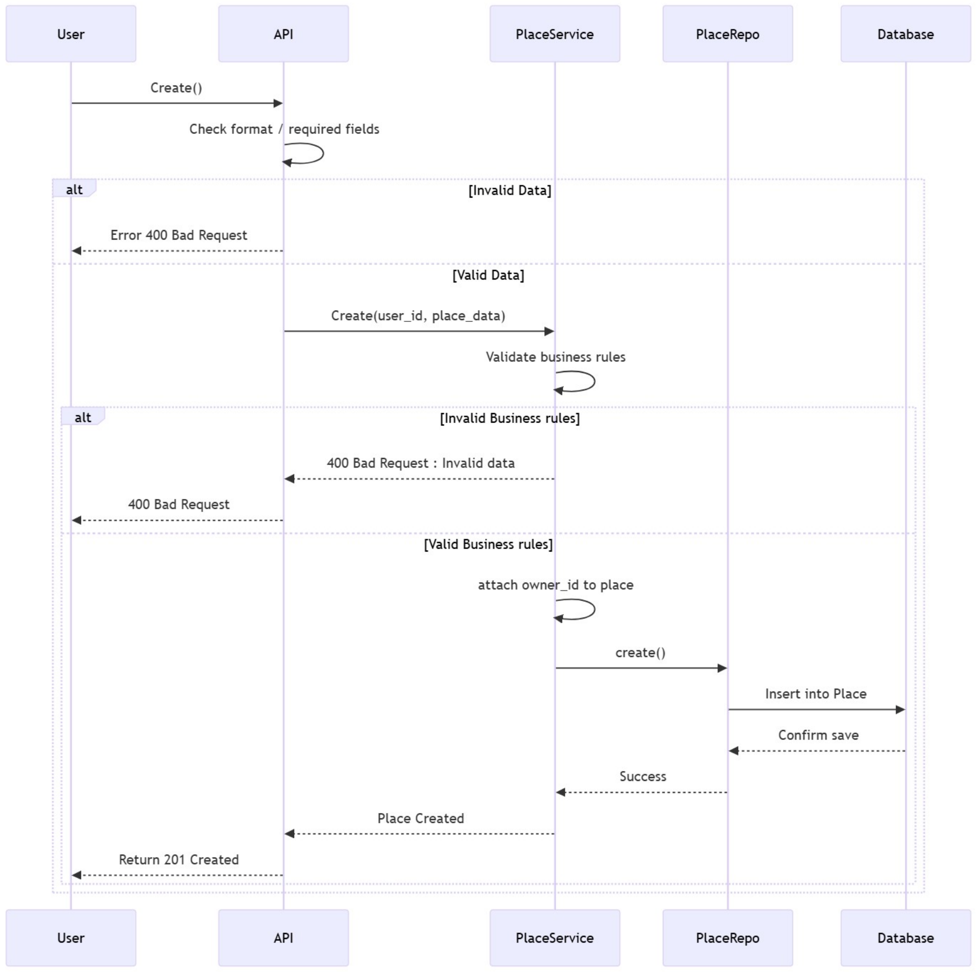
🔁 API Interaction Flow – Sequence Diagrams

🧍 User Registration



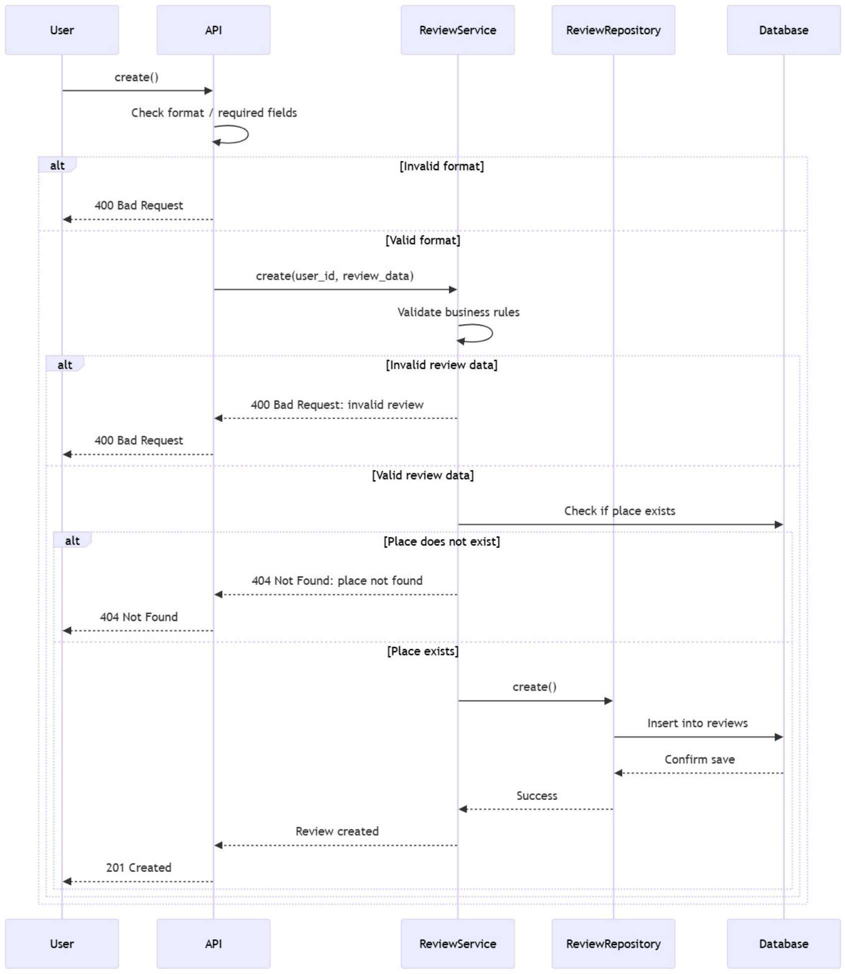
- The user registers through API → UserService → UserRepository
- Validations include format checks, rule enforcement, and email uniqueness
- Errors: 400 Bad Request, 409 Conflict
- Success: 201 Created

🏠 Place Creation



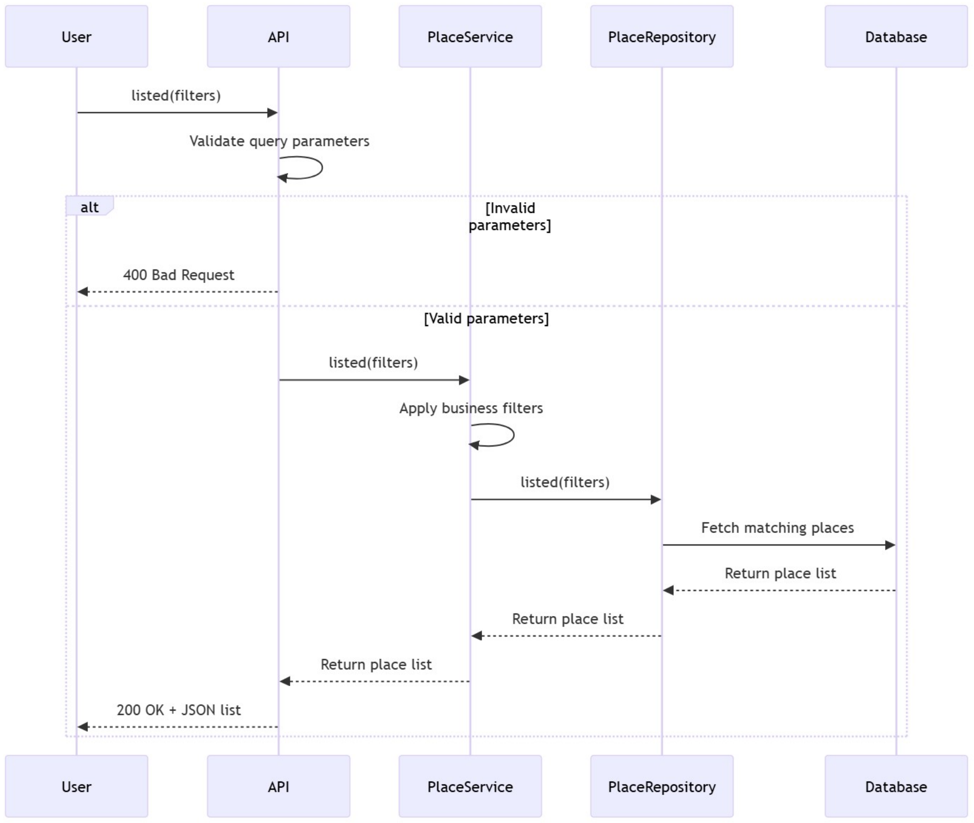
- The user creates a listing with user_id and place_data
- Business rules are applied (e.g., price must be positive)
- PlaceRepository handles persistence
- Success: 201 Created, Error: 400

📝 Review Submission



- The user submits a review for an existing Place
- Validation includes rating bounds, place existence
- May return: 400, 404, or 201 Created

🏠 Fetching a List of Places



- The user queries places using filters
- Service applies optional business filters
- Repository returns matching results
- Response: 200 OK + JSON

✅ Summary

This document compiles the complete technical foundation for HBnB, structured across architecture, class modeling, and runtime interactions. It ensures a clean, modular, and testable base for implementing the full functionality.