



POLITECNICO
MILANO 1863

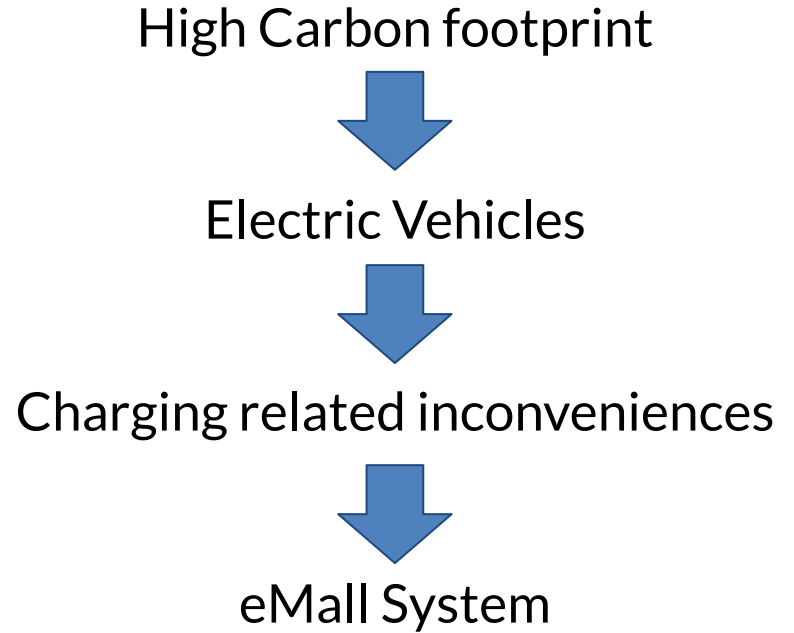
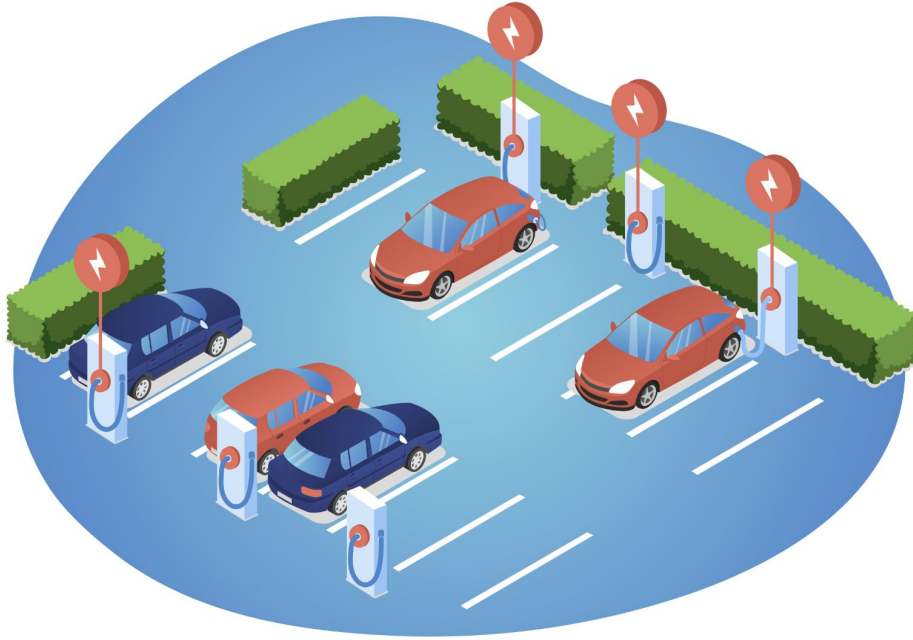
eMall – e-Mobility for All

Requirement Engineering and Design Project

A.Y. 2022-2023 Software Engineering 2

Giulia Huang, Zheng Maria Yu, Linda Zhu

RASD - Problem



RASD - Goals

General user goals

[G1] to know the location and the status of charging stations

Driver goals

[G2] book for a charge

[G3] charge the vehicle

[G4] pay for the service

[G5] suggest the driver to charge

Operator goals

[G6] decide the energy source for charging

[G7] modify prices and add offers

[G8] acquire energy from DSOs



RASD - Mapping Goal, Domain Assumption, Requirement

Driver case: [G3] - [D2] - [D8] - [R6] - [R28] - [R22]

Goal

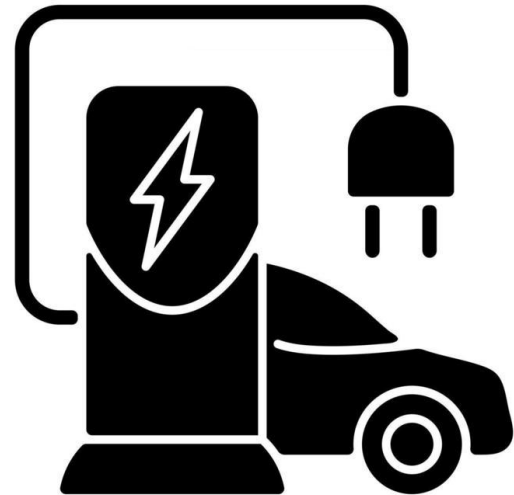
- [G3] The system allows the driver to charge the vehicle

Domain Assumptions:

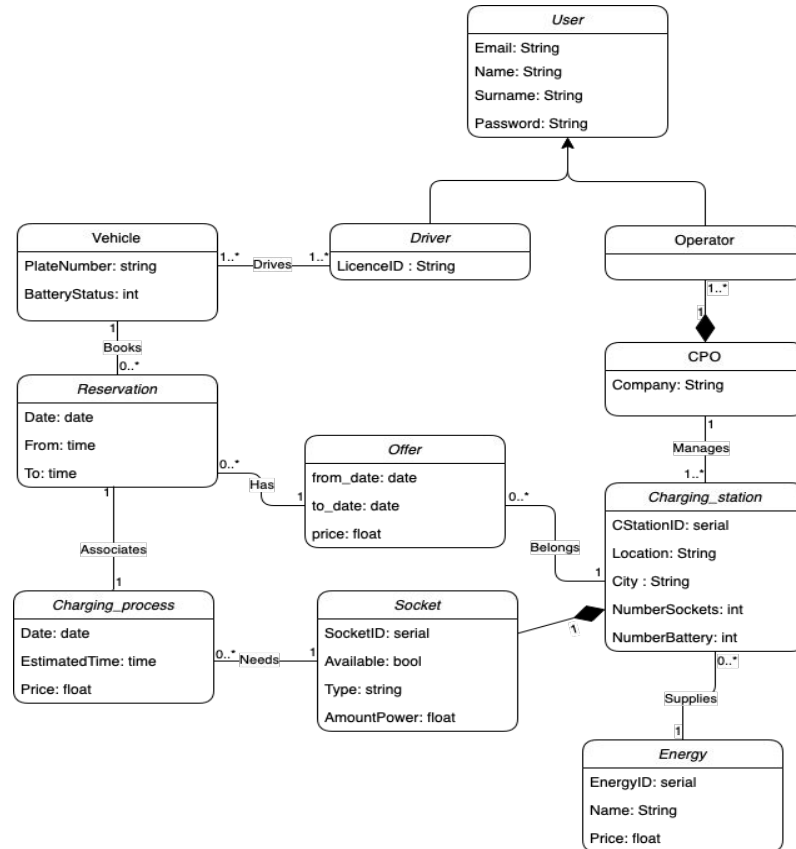
- [D2] Drivers will go to charge his vehicle according to their reservation
- [D8] The charging stations work correctly

Requirements:

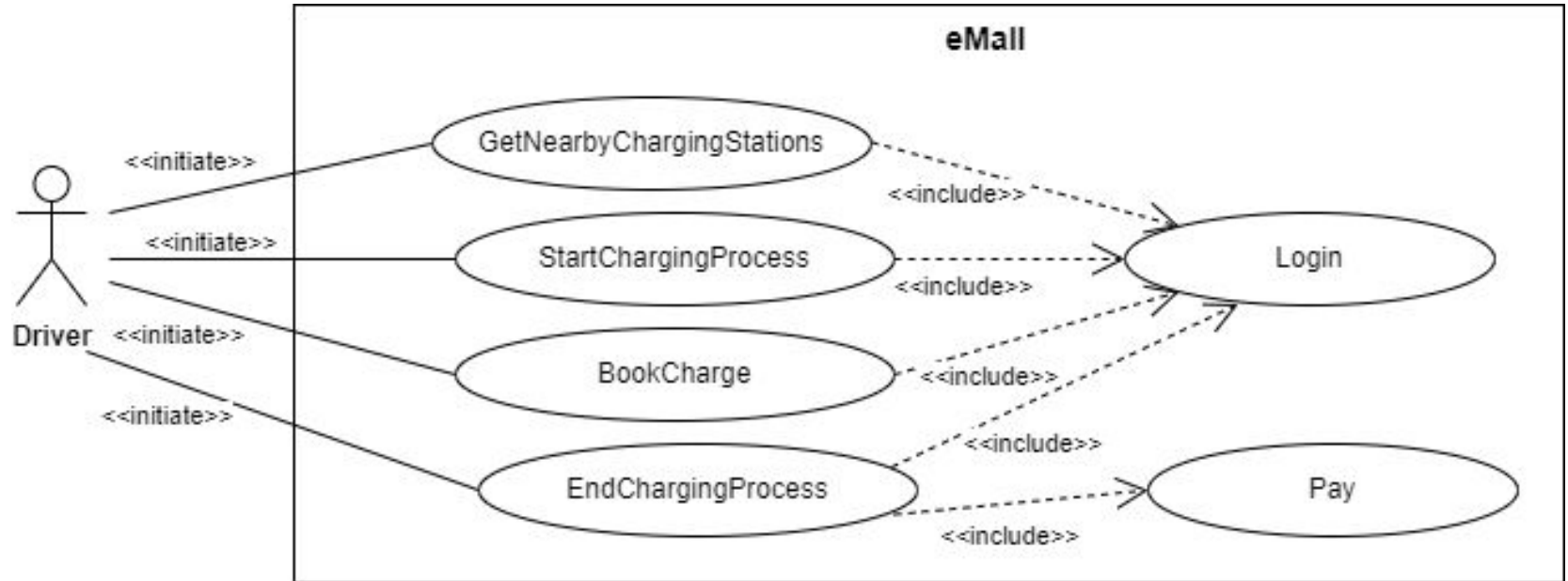
- [R6] The system allows the Driver to book for a charge in a charging station
- [R28] The system allows the Driver to start his charge
- [R22] The system notifies the Driver when the charging process starts



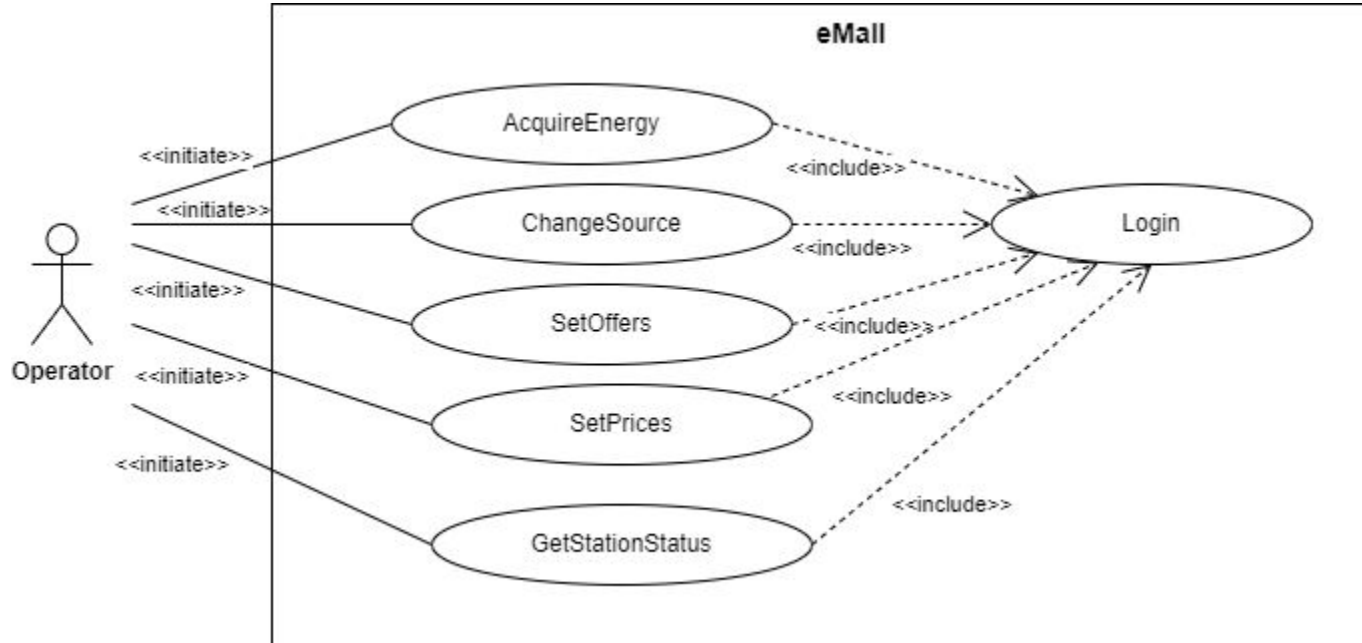
RASD - Class Diagram



RASD - Driver Use Case Diagram

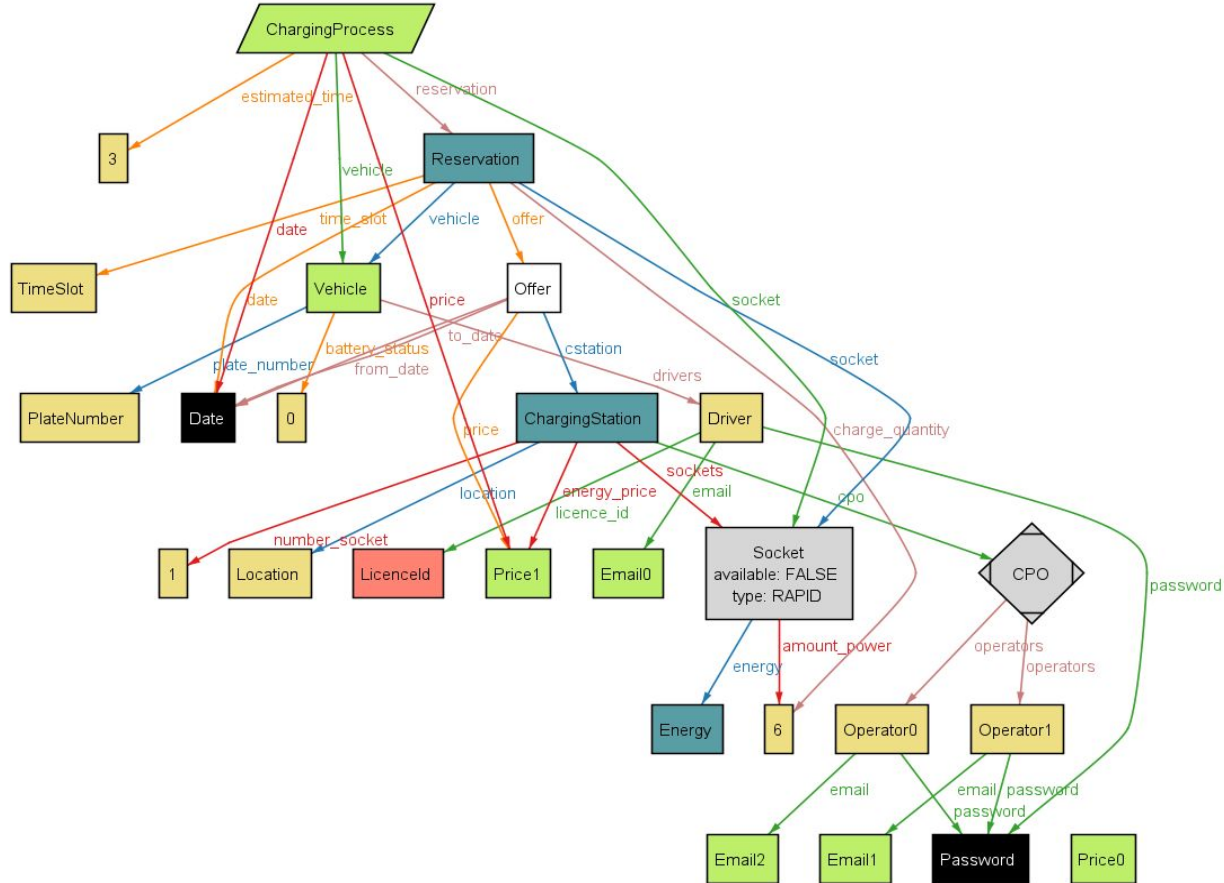


RASD - Operator Use Case Diagram

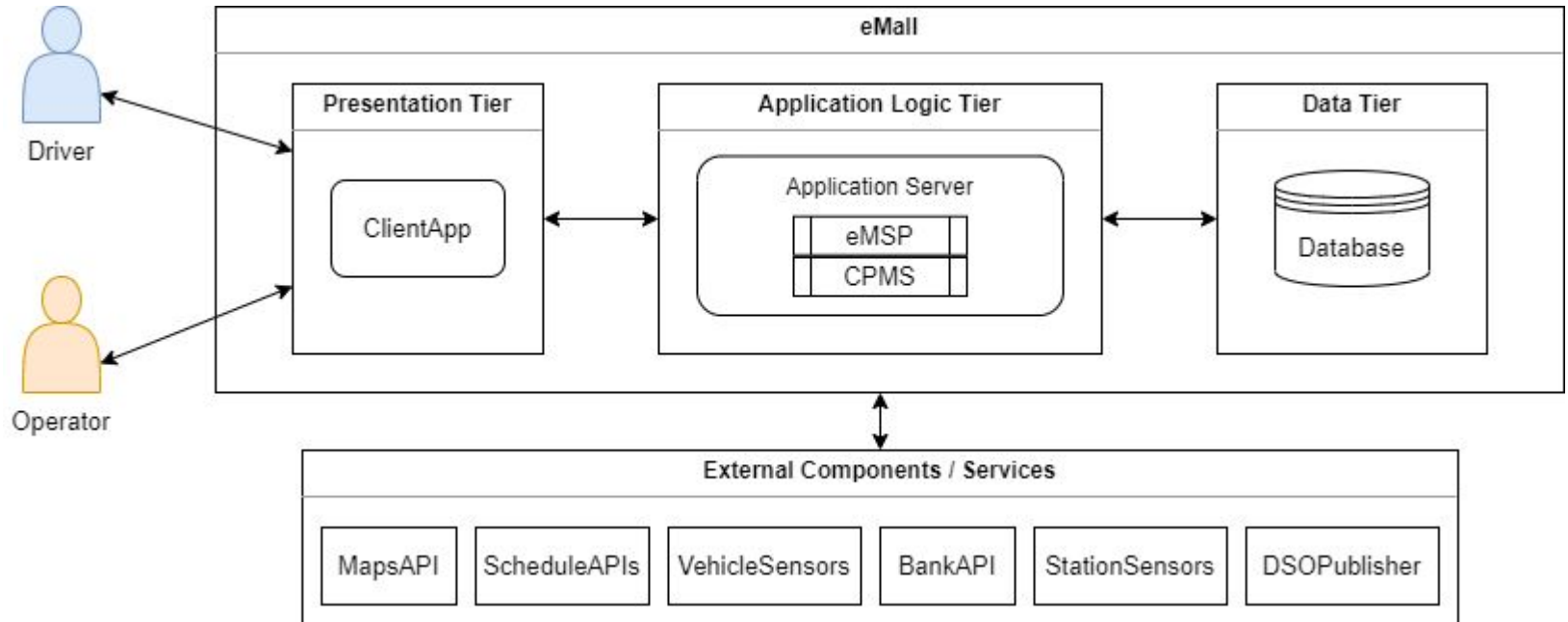


RASD - Formal Analysis

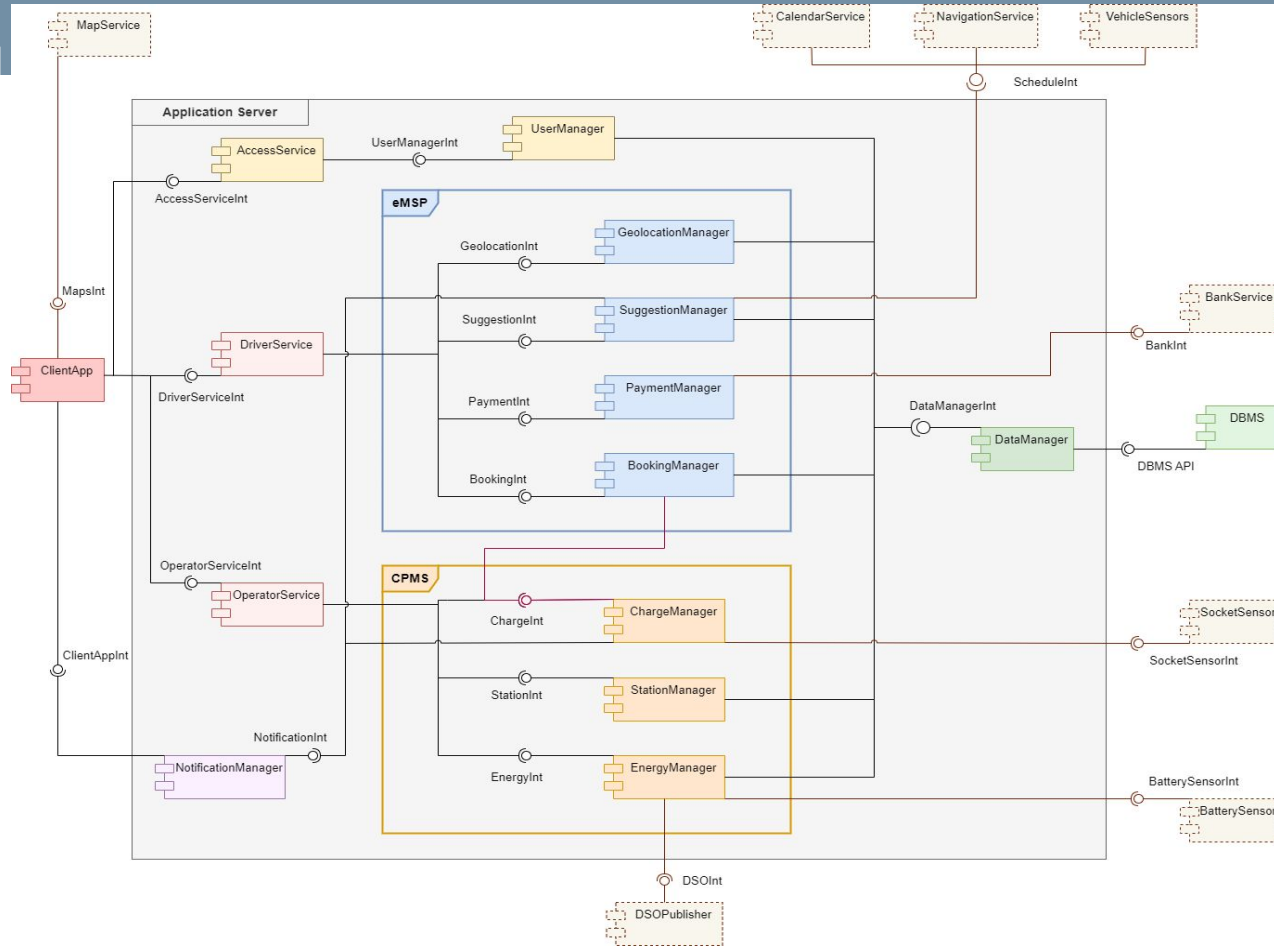
amount_power: 1
battery_status: 1
charge_quantity: 1
cpo: 1
cstation: 1
date: 1
date: 1
drivers: 1
email: 3
energy: 1
energy_price: 1
estimated_time: 1
from_date: 1
licence_id: 1
location: 1
number_socket: 1
offer: 1
operators: 2
password: 3
plate_number: 1
price: 1
price: 1
reservation: 1
socket: 1
socket: 1
sockets: 1
time_slot: 1
to_date: 1
vehicle: 1
vehicle: 1



DD - System Overview



DD - Component View



DD - Design Choices

❑ Three-tier architecture

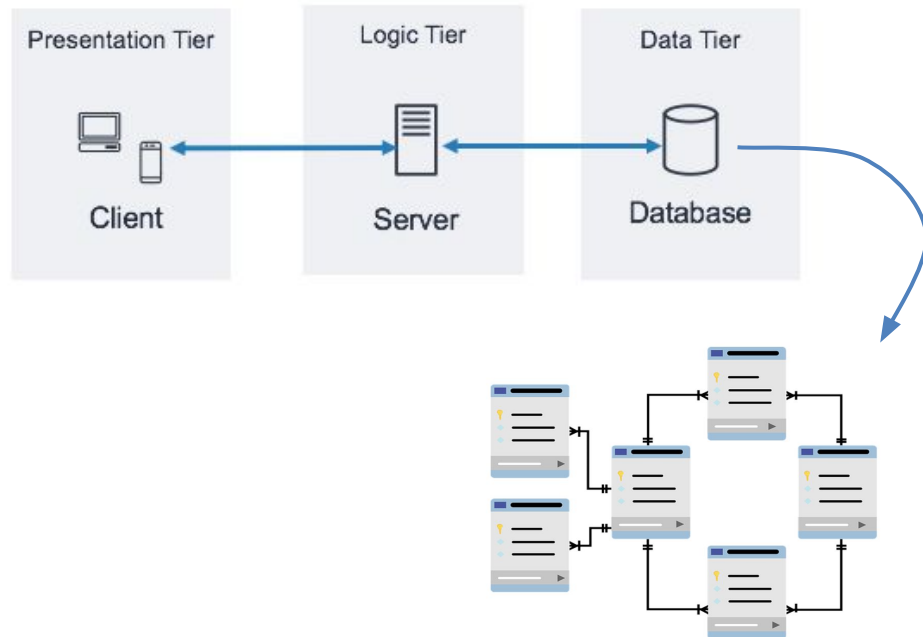
- ❑ Separation of concerns
- ❑ Security
- ❑ Re-use of data

❑ Relational Database

- ❑ ACID properties of transactions
- ❑ Data integrity and security

❑ Stateless application

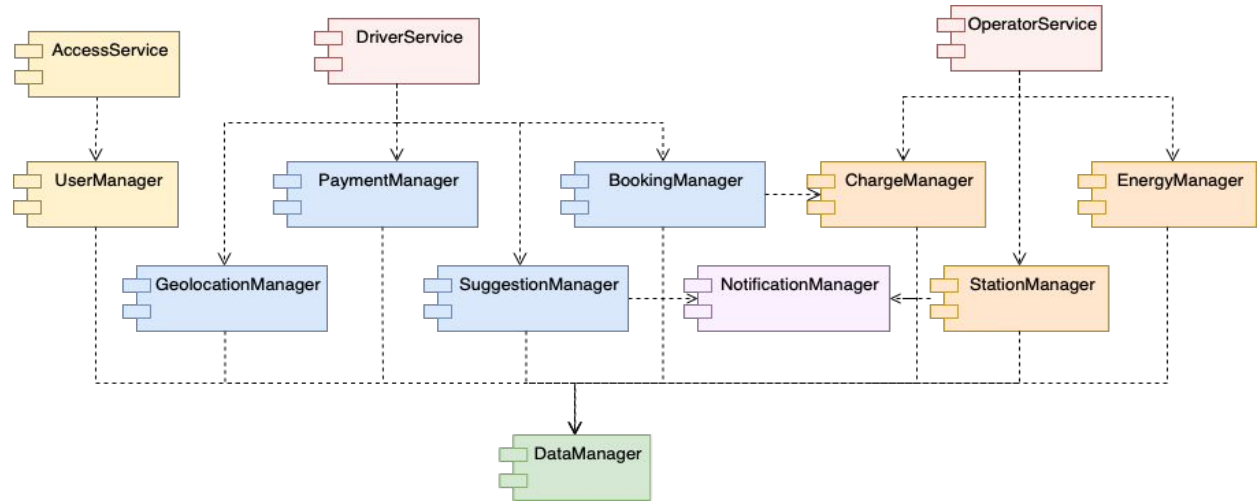
- ❑ REST web services
- ❑ Scalability, less server-side storage



DD - Implementation Plan

Implementation of Application Server

- ❑ Bottom-up approach
- ❑ completed incrementally
- ❑ tested in parallel

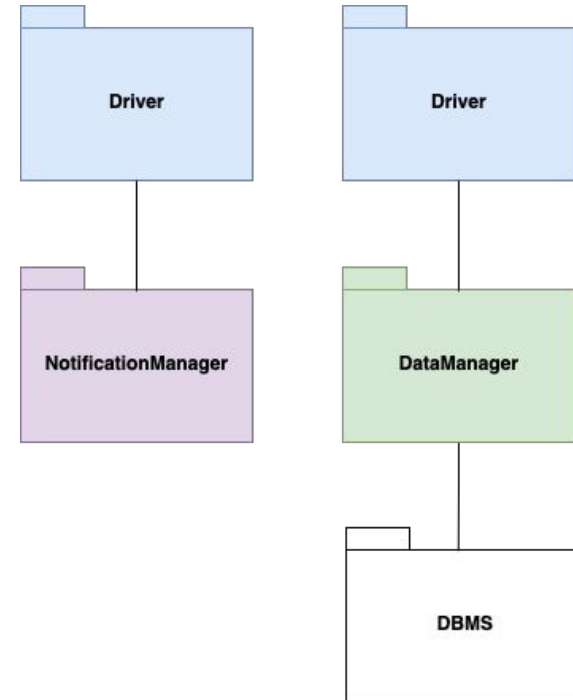


DD - Integration and Testing Plan

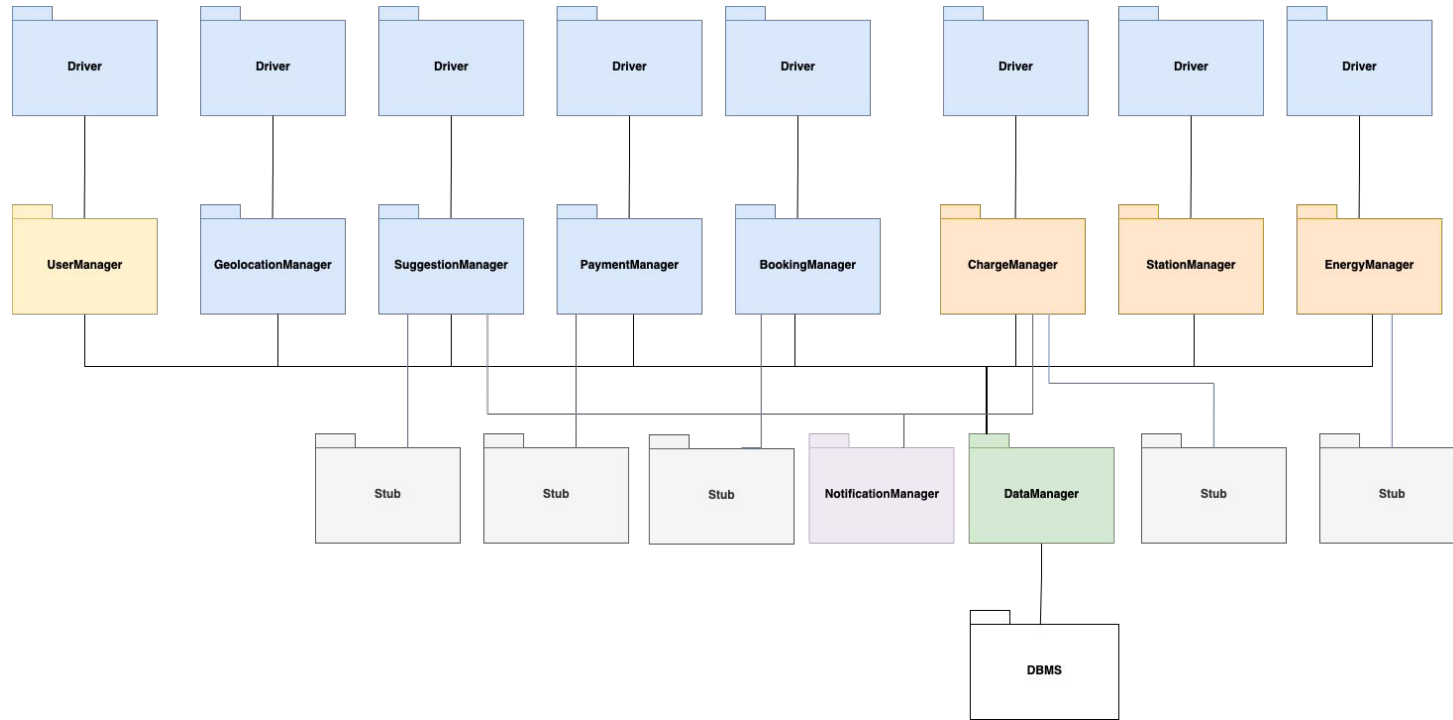
Integration Process

Mix of Bottom-up and Top-down strategies:

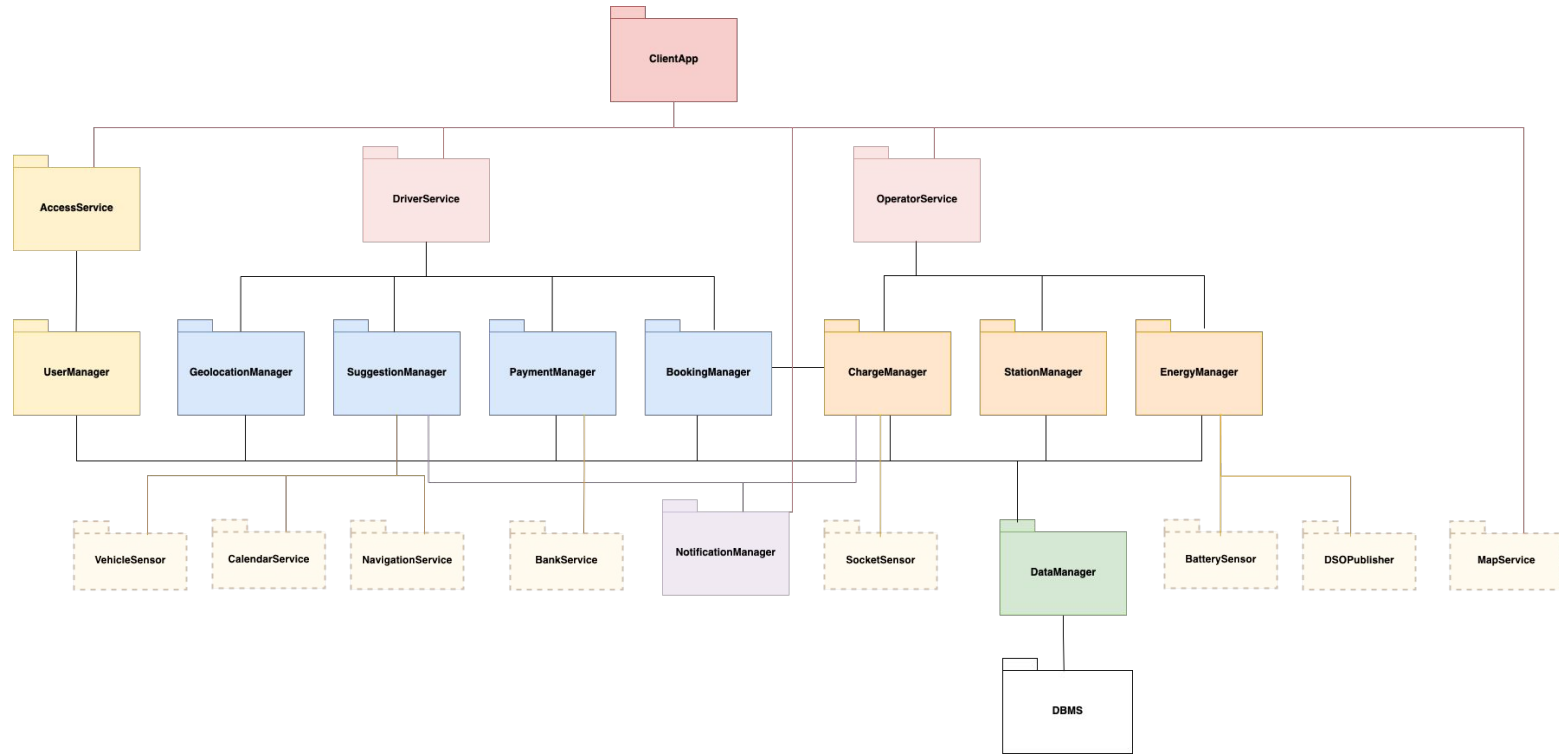
- ❑ **Bottom-up:** for components which do not interact with external systems
- ❑ **Top-down:** for the components which need to acquire information from external systems



DD - Integration and Testing Plan



DD - Integration and Testing Plan





Thank you for your attention!