Online Energy Utility Platform – Documentation

1. Conceptual architecture of the online platform

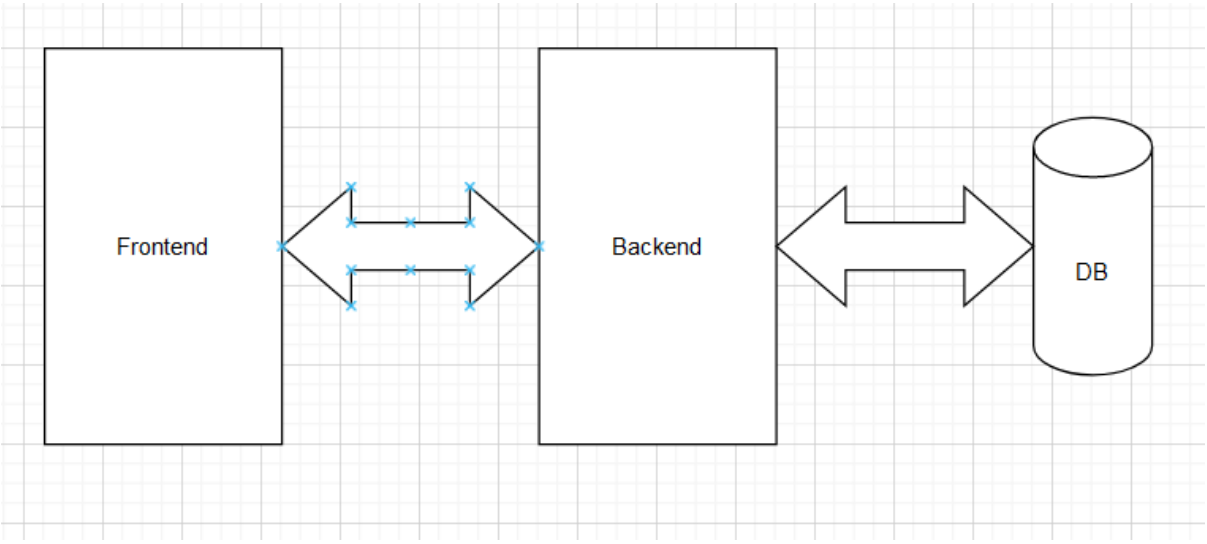
The architecture used for this Online Energy Utility Platform is the Layered Architecture, because it allows us to modify some aspects of the application without breaking the entire project, because we have a separation between layers.

The frontend was developed using Angular, a typescript framework, and a lot of the elements were imported from the package Angular Material. The application has 3 main components:

- The Account management part, where you can find the login, register for regular users, change password, and delete account
- The Your devices page, specific to the regular users, where they can see their devices and the graph for the daily consumption of that device
- The admin part, named Admin Management Portal, where the admin can assign devices to users, the device management page where he can perform CRUD operations on devices, and the create admin page where he can create new admin accounts

The backend was developed using Java Spring Boot, and was structured in 4 layers: controller, service, repository, and db. For the security I chose to use Spring Security with JWT which is send to the client as an HTTP only cookie, in order not to be intercepted and tempered with. The common endpoints require only authentication, while the endpoints for the admin requires authentication with an admin account. At start-up, the application seeds a default admin account and the 2 roles needed for the application: Admin and User roles.

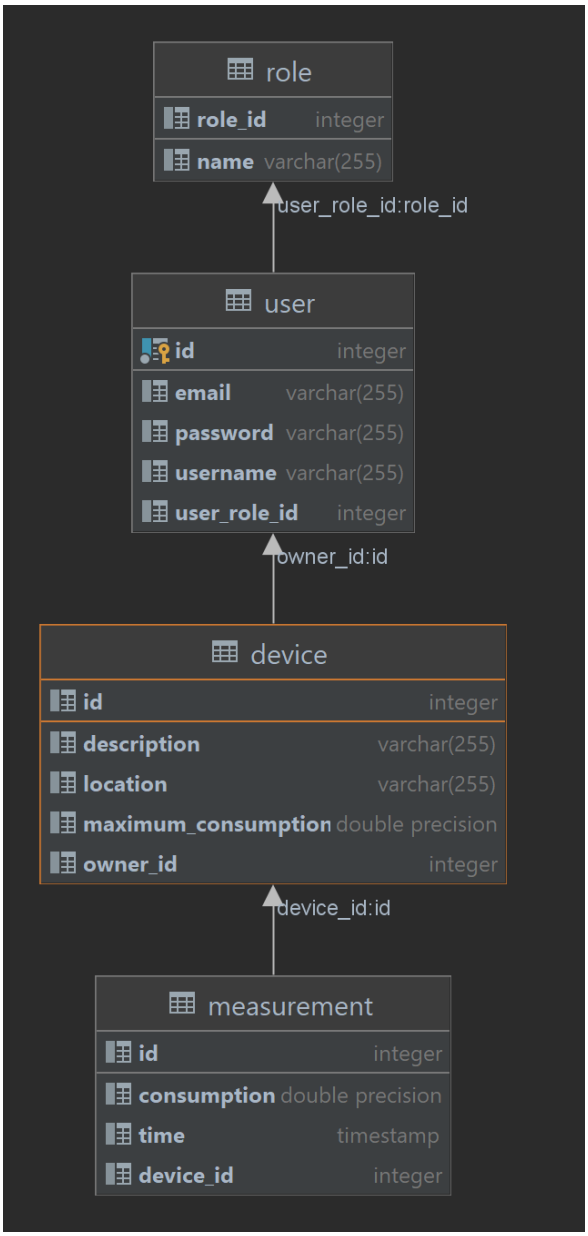
This is the communication diagram



And below you can see the class diagram for the backend.

2. Database Design

The Database Management System used for this project is PostgreSQL. For each model class in the backend I create a table in the database, thus resulting 4 tables: Role, User, Device, Measurement. There is no many to many relationship since I considered that a device could have only one owner.



3. Deployment

The deployment of the Online Energy Utility Platform is done lcoally using docker, each part(front-end, backend, and database) running in a linux container. The user can connect to the front-end using localhost:4200. The frontend and backend each have their own dockerfile with their needed configuration and there is a docker-compose file which links all the containers and create a virtual network shared by those in order for them to communicate.

Deployment diagram