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DISTRIBUTED SYSTEMS
Assignment 1

Request-Reply Communication

Requirements
Develop an Energy Management System that consists of a frontend and two microservices designed to manage users and their associated smart energy metering devices. The system can be accessed by two types of users after a login process: administrator (manager), and clients. The administrator can perform CRUD (Create-Read-Update-Delete) operations on user accounts (defined by ID, name, role: admin/client), smart energy metering devices (defined by ID, description, address, maximum hourly energy consumption), and on the mapping of users to devices (each user can own one or more smart devices in different locations).

Functional requirements
➢ Users log in. Users are redirected to the page corresponding to their role.
➢ Administrator/Manager Role: o CRUD operations on users o CRUD operations on devices - Create mapping user-device.
➢ User/Client Role - A client can view on his/her page all the devices.

Implementation technologies
➢ Use the following technologies: REST for microservices (Java Spring REST API) and JavaScript-based frameworks for client applications (ReactJS).

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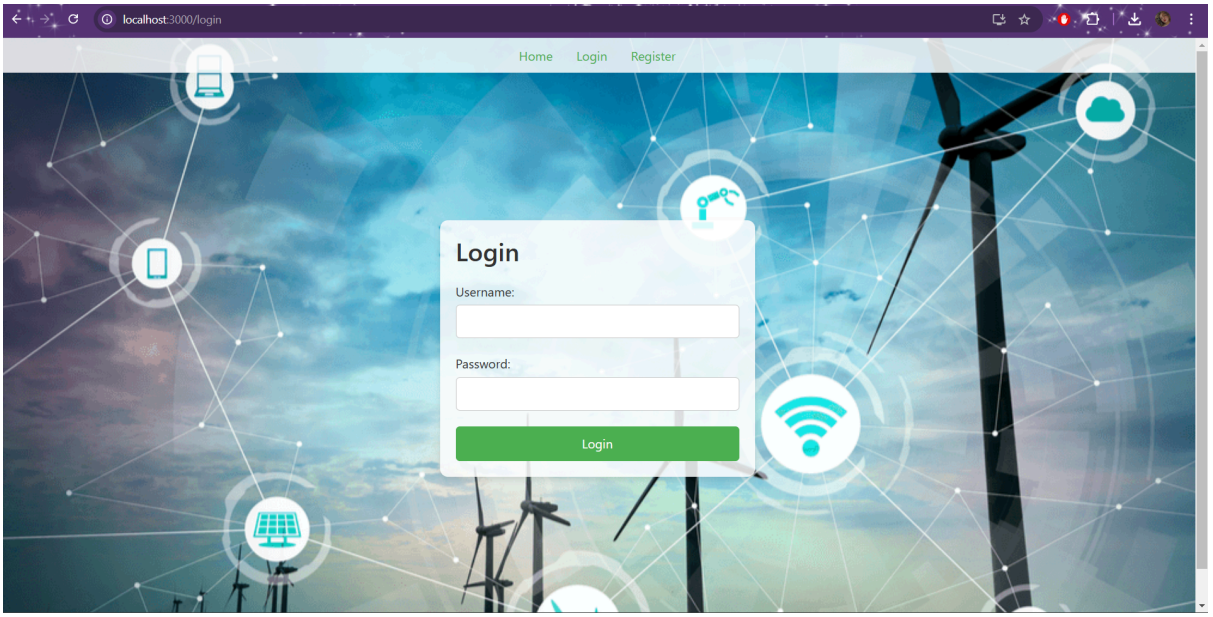
Login Page

The login page is the entry point for all users of the EMS. It provides fields for username and password, validating user credentials through the backend API.

Upon successful login, the system verifies the user's role (Administrator or Client) and directs them to the appropriate dashboard.



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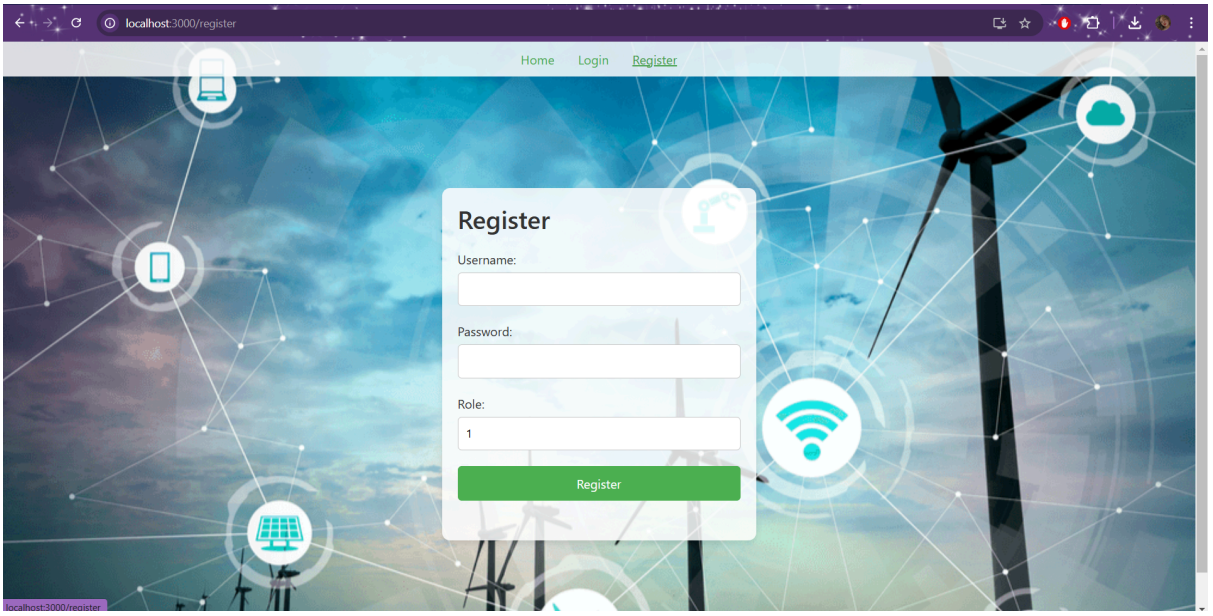
Register Page

The register page allows registering new users to the system by creating an account for them.
It includes fields for setting the username, password, and user role (Client or Admin).
After submitting, the registration form interacts with the User Management microservice, where it securely stores user details in the database.
New users added via the register page can log in immediately, with role-based access to specific pages.



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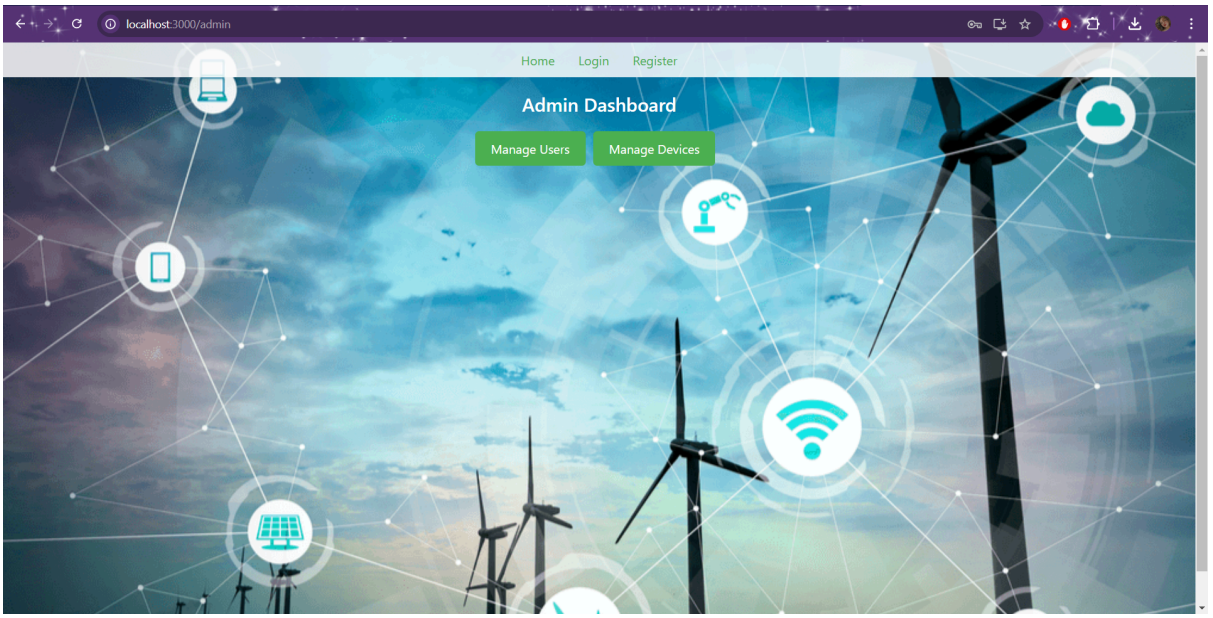
Admin Dashboard

The admin dashboard is the central interface for administrators, giving them full access to manage users and devices.
It includes quick links to the User Management and Device Management pages.



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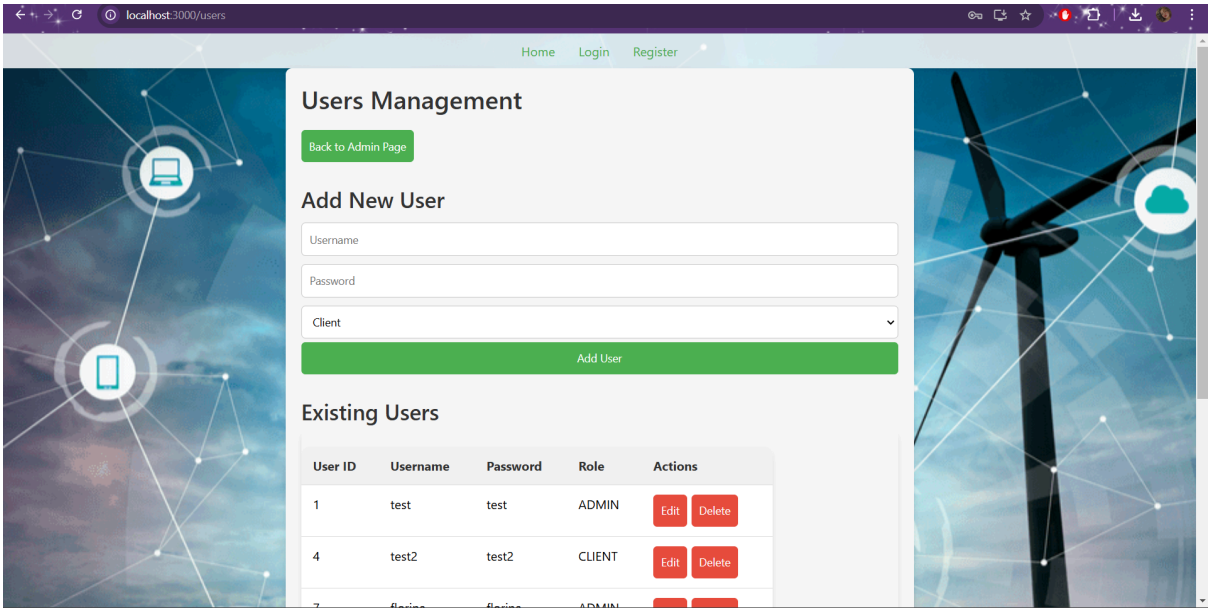
User Management

The User Management page is a dedicated section within the admin dashboard where administrators can view, add, edit, or delete users in the system.
Each user entry displays the user's ID, username, role, and password.
Administrators can use the edit functionality to update user details, including role changes, which are reflected instantly upon saving.
User deletion is also managed here and includes deletion of associated devices for that user, ensuring data integrity.



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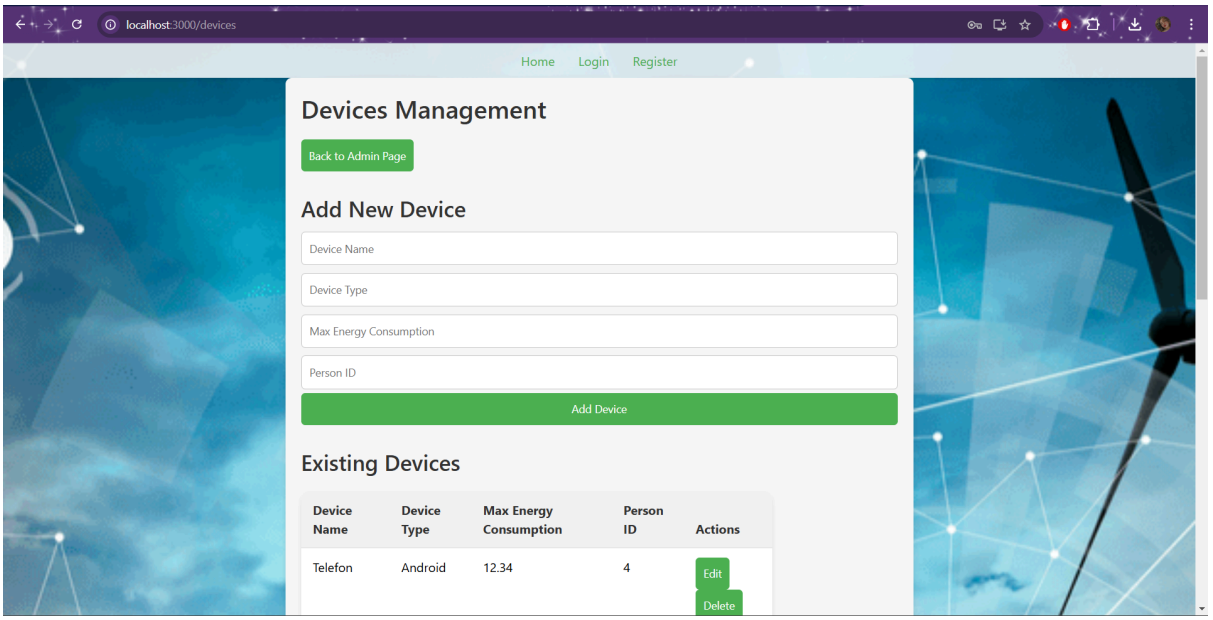
Device Management

Device Management is another key page within the admin dashboard where administrators oversee all devices in the EMS.
The page lists each device, displaying its ID, description, type, maximum energy consumption, and the assigned person ID.
Administrators can add new devices, assign them to specific clients, edit device details, and delete devices.



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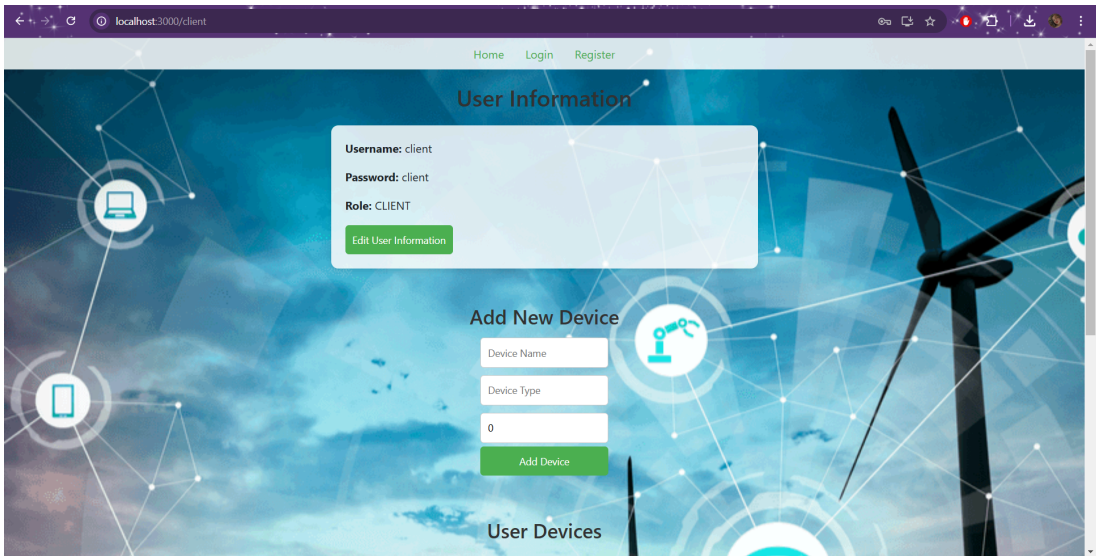
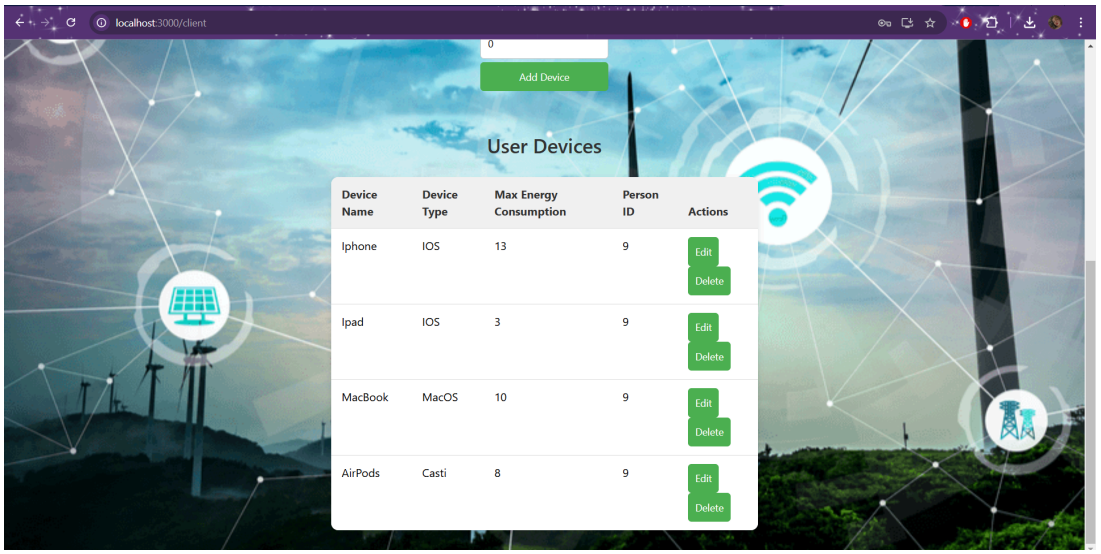
Client Dashboard

The client dashboard is the main interface for users with the Client role, providing a view of devices assigned to them.
Clients can view device details, including device name, type, and max energy consumption.
The dashboard gives clients an overview of their devices' energy attributes, helping them monitor and track energy consumption efficiently.





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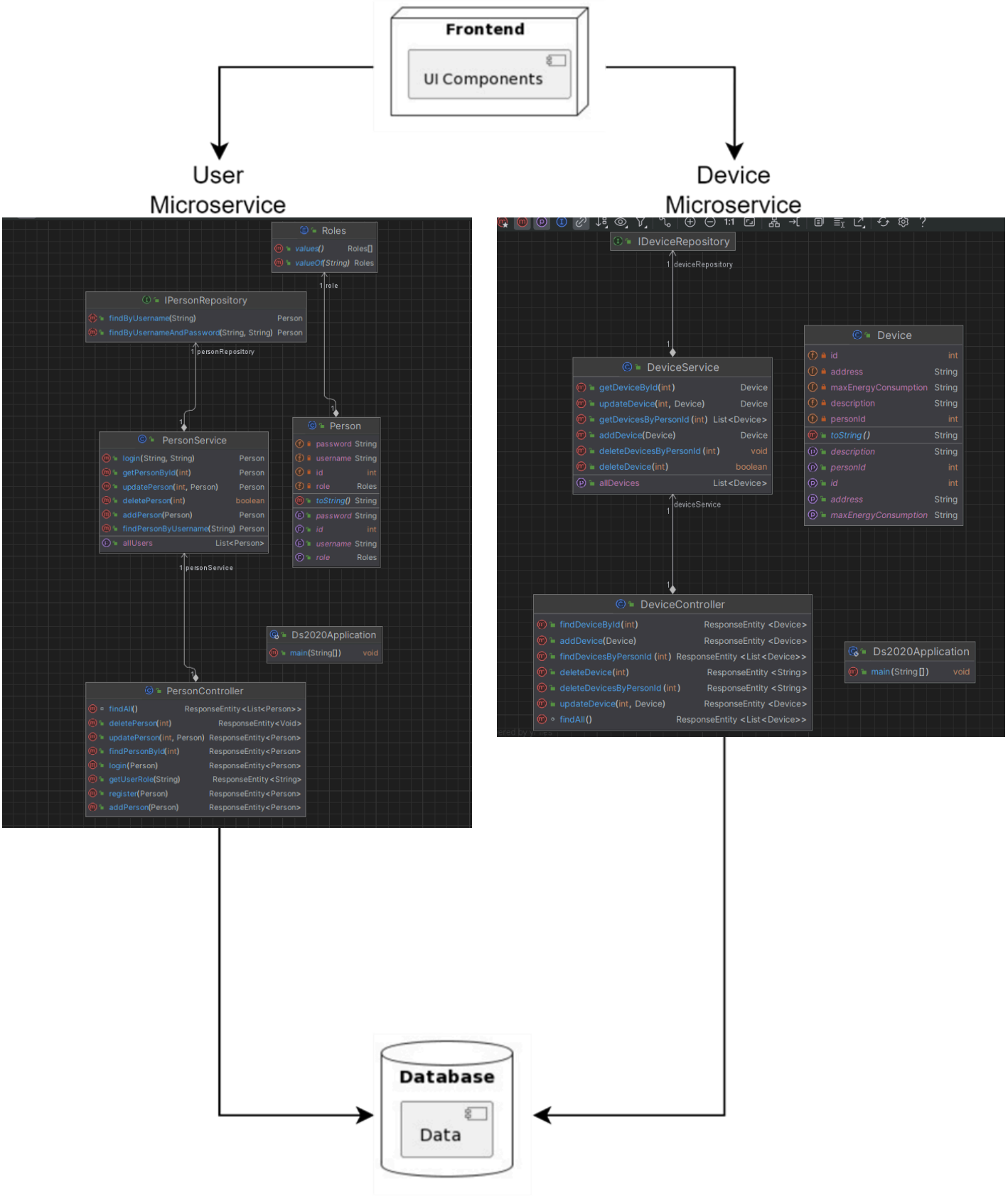

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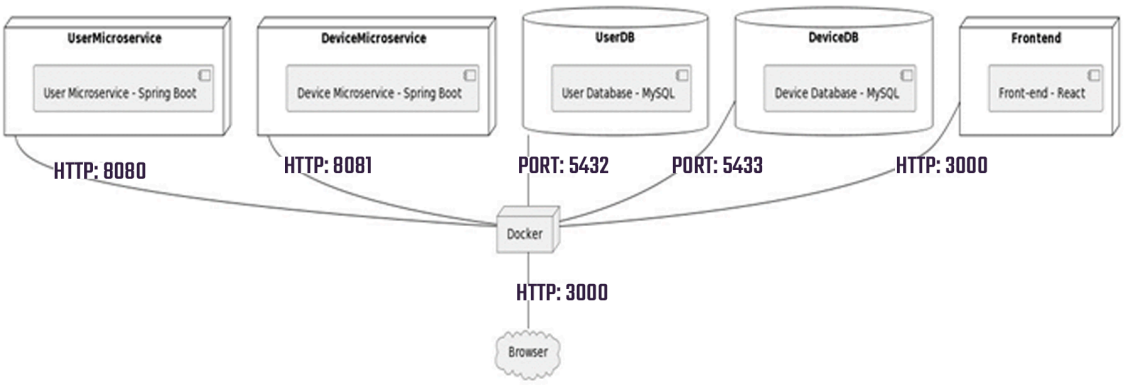
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