Technical University of Cluj-Napoca

Structure of Computer Systems

Device Management System
Assignment 1

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Project Description

The purpose of this project was to implement a microservices-based full-stack application. The project theme is a device management system that is to be used by both administrators and regular users. An administrator can do CRUD both on **Users** and on **Devices.** They can also do mappings between the two. A regular user can see their own devices.

Solution Description

To respect the microservices architecture I needed to divide my application into 5 independent systems.

1. Frontend

My client application was implemented using Next.js. I chose this framework because it adds some very useful functionality on top of classic React. Like the app router, that uses the filesystem to automatically map routes to different pages. Or the capability to use React Server Components. It runs on an Alpine image, with Node.js 18.

2. Backend

My backend application uses two Go images to run two different Go executables, one for each backend microservice. The backend services use Gin as the HTTP/HTTPS web server framework, and Gorm for database interfacing and migrations. Using these tools I created a REST API for each microservice. I chose Go because it is quite elegant to write compared to other solutions, and it has great performance.

3. Databases

As persistent data storage, I chose two instances of PostgreSQL databases. Postgres is an industry standard for database solutions and is also my favorite SQL database, so the choice was clear.

Deployment and Architecture Diagram