

LibCap-Project-Documentation

Idea:

The idea behind LibCap is a Library-Capacity-Measurement-System that detects the occupancy of workstations passively, without user interventions. With this system, users can find free places easily and can check whether a trip to a library is even needed.

Tools:

Numerous new state of the art technologies were implemented in the project; ranging from database over containerization to messaging brokers. The following technologies have been used: Postgres, Docker, Flask, Bootstrap, HTML, CSS, JavaScript, Arduino, ESP32, C++, Mosquitto.

Team:

The team consists of 4 People. The planing and brainstorming was done in team-meetings with the help of Github's KANBAN Boards. We collaborated on all fields and worked together to achieve our goal. Nevertheless we decided on splitting the responsibilities in 4 areas as follows:

- Alina Buss (Research & Theory)
- Ayman Madhour (Middleware & Timeseries)
- Phillip Lange (Frontend & Container)
- Lukas Benner (Hardware & Design)

Implementation:

LibCap is a fully functional System on a docker-stack. It can be easily deployed on minimal hardware requirements. The system is designed in such way, that the frontend, middleware and hardware can work independently of each other. This is possible due to the use of a MQTT-Broker between the Middleware and the hardware, as well as on strictly not making a direct connection between the frontend and middleware. All communication is over the database. Therefore, the system is easily scalable and the components can be switched or enhanced without much hassle.

For a quick demonstration see here: <https://youtu.be/ml8fKBpgCN8>