Online Energy Utility Platform

Distributed Systems Laboratory, 2022-23

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Conceptual Architecture

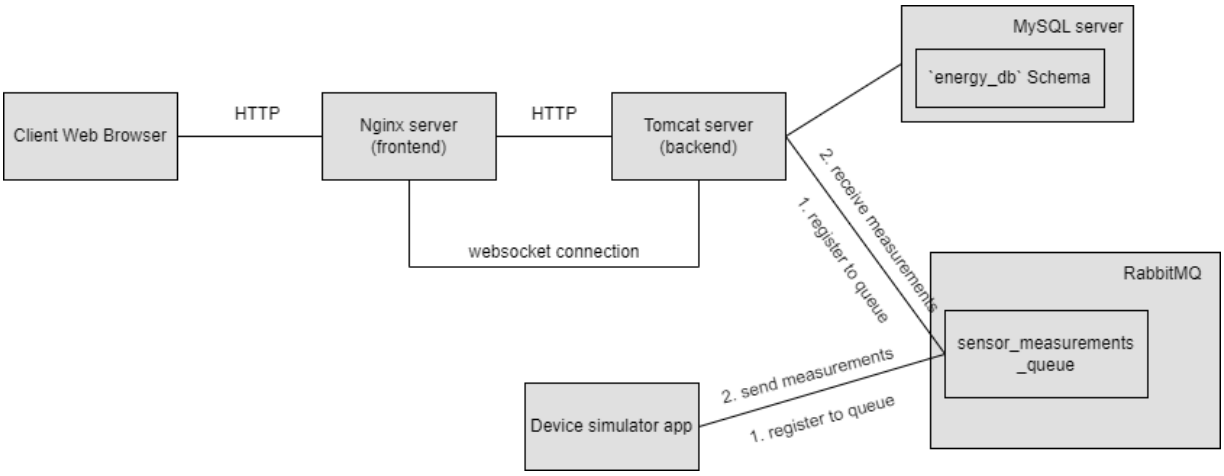
The responsibilities can be divided between 5 main components:

- the back-end application, responsible for providing the basic functionality
- the front-end application, responsible for providing the user interface
- the database server, responsible for persisting the data related to the users, devices and measurements.
- Desktop application which sends the collected measurements on a message queue in order to be received by the backend (Spring) application.
- Message Queue from RabbitMQ acts as the middleware for the indirect communication between the application that collects the sensor data (message producer) and the spring application which reads the measured data (message consumer) and process/stores it.

The spring application, after processing the received messages from the queue, it detects if the total energy consumed is higher than a predefined threshold and notifies the client which owns the device using websockets.

Initially, on start-up the client connects to the server's websocket and subscribes to the notification endpoint. On the server side we register the client's sessionId in order to be able to send private messages to only 1 client, instead of broadcasting it to every connected client. Thus, whenever a message is dispatched notifying the client that a given device consumed a higher energy value, the client which owns the device with the corresponding sessionId, received a notification on the frontend, while other clients will not receive the notification.

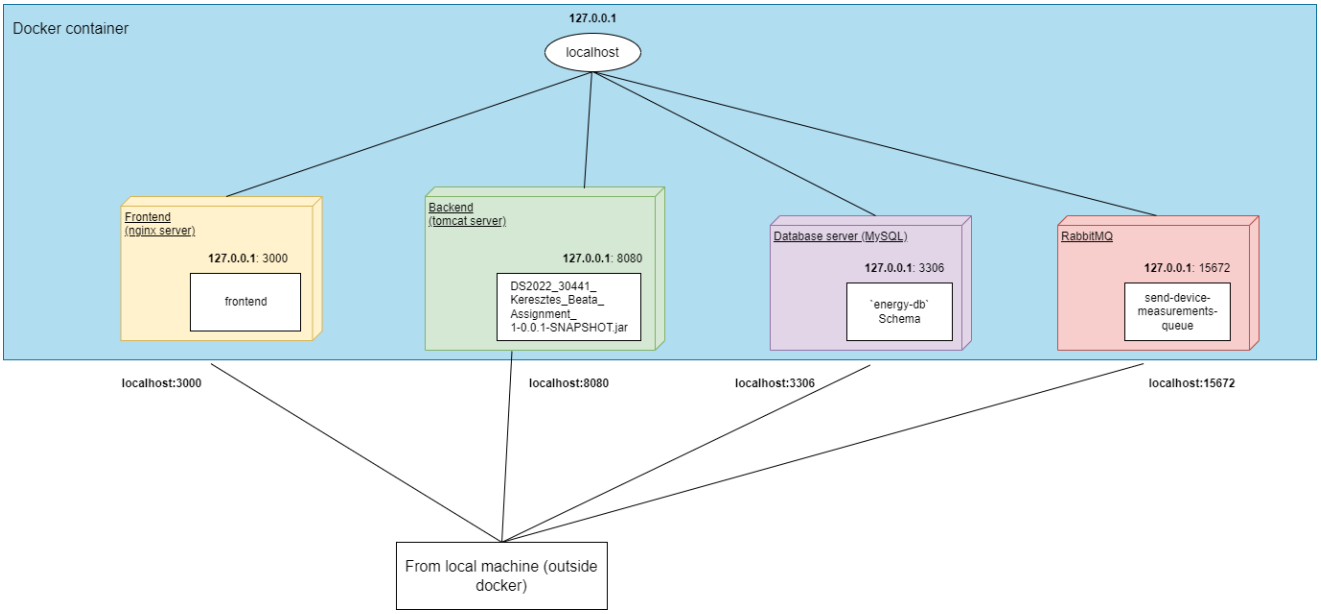
Based on this responsibility division between the components of the system, it is obvious that the preferred architectural model for designing the system should be a layered architecture.



Deployment Diagram

Local Deployment using Docker

A high-level view of the main components (hardware and software) of the system, modeling the physical architecture of the system or how the processing/services are distributed among the nodes:



Deployment on Cloud (Azure) using Docker

The container group with the 4 images for each individual service(backend, frontend, mysql_db and rabbitmq) from docker is pushed on the created container registry on Azure: containerregistrybeatakeresztes30441.

Then the application, ds2022_30441_keresztes_beata_assignment_2, is deployed on Azure and it receives a public IP address which exposes the application to be able to access it from a browser from any machine (not only the host's machine).