

MINISTRY OF EDUCATION AND RESEARCH



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**TECHNICAL UNIVERSITY**  
OF CLUJ-NAPOCA, ROMANIA

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**DISTRIBUTED SYSTEMS**  
**FINAL PROJECT**

**Online Energy Utility Platform**  
*Integrated*

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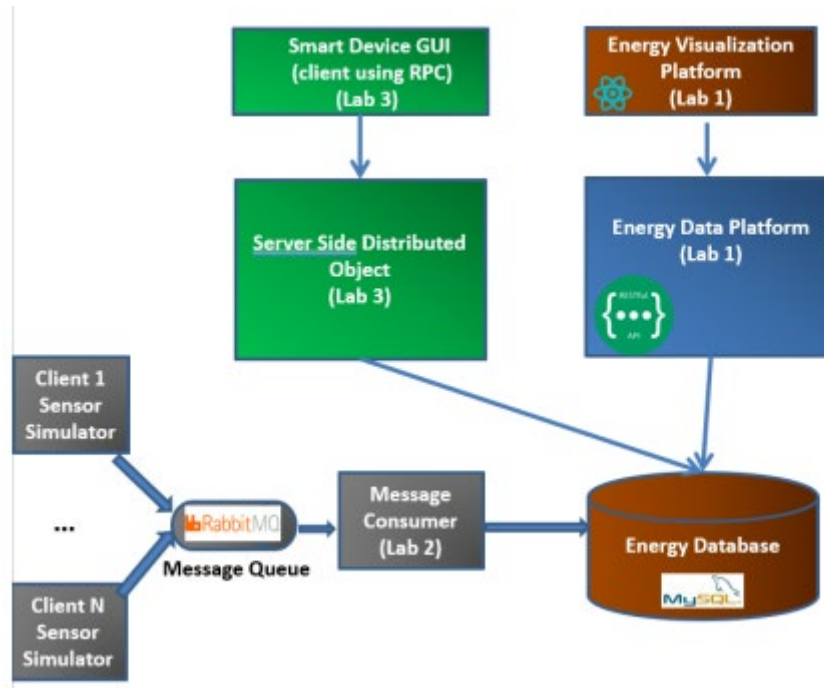
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## I. Assignment Objective

The aim of the final project consists in linking together the applications developed within the three assignments and adding some features including security and time-zone consistency. We must configure the network appropriately so that the programs may connect with one another. The database should be shared by all apps. HTTPS, SSL, and JWT are used to secure communication between modules. We must use a uniform time representation so that the information provided is consistent even if the modules of the applications are deployed in geographical areas with various time zones.



## II. Functional Requirements

The function requirements are taken from the previous assignments. The additional requirements include:

- Security: HTTPS and JWT over REST and gRPC SSL, WS Security
- Time consistency between different time zones
- Overall capacity

## III. Design and Implementation

For developing this system we have decided to use the following technologies:

- REST services for backend application – Java Spring
- Frontend – React
- For database – Postgres
- Deployment – Heroku and Docker
- RPC – using JSON-RPC 2.0

- RabbitMQ
- Websocket - SocketJS

JWT security has been implemented since first project and time zone consistency also. What I have did in the final project configuration was the HTTPS configuration and SSL certification for RPC.

#### **IV. Conclusions**

This improved to be a good assignment learning about JWT and HTTPS

#### **Bibliography**

- Provided documentations
- All the other bibliographies