

Online Energy Utility Platform

Laboratory 3, Project 3

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Requirements:

Suppose that the clients have intelligent home appliances that can be controlled remotely using remote procedure call (RPC). Each such device can communicate with the server that will compute the time when the device will be started for an optimal energy consumption.

Develop a client-side application (either a desktop application or a web application based on a JavaScript framework running from the browser) for the smart appliance associated to a client that:

- i) gets the client hourly historical energy consumption over d days in the past ($E_{client}^d(h)$);
- ii) gets the averaged energy consumption for the client over the past week (e.g. client baseline);

$$Baseline(h) = \frac{1}{7} \sum_{d=1}^7 E_{client}^d(h), \forall h \in \{1..24\},$$

where $E_{client}^d(h)$ is the client energy consumption for day d in the past and hour h from day d

- iii) allows the selection of a program with a duration in hours (select a duration D of a program);
- iv) gets the best time to be started considering the baseline and the program duration to avoid energy peaks from the client (e.g. to minimize the maximum energy consumption for every hour of the day)

Compute t_s, t_e such that $Min(Max(Baseline(h) + E_{Device})), \forall h \in [t_s, t_e], t_e = t_s + D$

Problems that I came across during the implementation of this assignment:

1. Entity framework caching. When retrieving a device from the database the returned device gets cached and the updated maximum energy consumption will not be seen in the messaging service. This was fixed by forcing entity framework to reload the object in memory.
2. SignalR connection problem because the JWT token authentication was enabled. Startup class was updated to support SignalR.
3. JWT token authentication for SignalR connection to the hub.
4. RPC Calls not working with an older version of SignalR