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I. Introduction

Nowadays, keeping track of the domestic energy usage is a common scenario in domotic applications that aim to monitor the real-time watt consumption of home appliances. In most cases the solution is a sensor connected to the main safety switch yielding the total energy consumption. Our approach, to get more detailed information and to have control on the use of power by the appliances, is to have an energy sensor for each plug connected to the 220V line. In the following paragraphs, we present our *proof of concept* (POC) which, functionally, consists of three main components: the smart plugs, the main server and the web interface. In our POC, we have modified the architecture described in [1] obtaining a specific low-energy consume-driven infrastructure. This consists of: the smart plugs, a central processing unit (for the main server) and a device (for the web interface). In a home scenario these devices are connected to the home wireless router. The communication between smart plugs and server occur over UDP with a simple form of reliability implemented at the application level. Let's now consider a use case example: the user sets the maximum power consumption possible in the home and then turns on two appliances. When this happens for the first time the system decides, based on the type of appliance connected, a default value for the maximum power usage of the appliance. This value is then updated to reflect the real maximum power usage of the appliance. Now that the system is running and some appliances are turned on, the user will be able to switch on only the appliances that consume less then the available power. Our POC covers this use case and shows that such a system can be practical and useful and that the traffic generated isn't enough to sensibly worsen the performances of the typical home WLAN. To summarize, the system keeps the power usage from reaching the maximum limit set by the user by forbidding the power on of appliances that consume more then the available power. It also gives granular information about the devices consumption and allows the user to turn on or off appliances remotely (via web interface). Aside from the main use case, in the age of climate awareness, such a system could be interesting to an environmentally conscious user that can monitor the power usage of appliances but also could set the maximum power consumption to be lower then the real one in order to use less power or save money.

II. General architecture

As we already said, the architecture implemented is different from the usually provided by this type of system, also because the modern infrastructure relies on cloud computing or external services. Our implementation do not share information about the user, and keeps all the data in the main server, eventually providing the possibility to accessed from outside. Anyway, in this case is not true that a cloud-computing is better, even if is more scalable, if there is no power available at home, the plugs will not be managed correctly either in a decentralized infrastructure. Even worse in a cloud based system, the plugs could not work properly, if there is no internet connection.

After describing some architectural design aspects,

References

[1] Y. Tong and Z. Li, "Design of intelligent socket based on wifi," in *2017 4th International Conference on Information Science and Control Engineering (ICISCE)*, 2017, pp. 952–955.

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