ADOPTING BUILDING AUTOMATION IN WEBLABS
Analysis Of Requirements And Solutions

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Abstract: Several companies have been developing domotic Stds. for building automation, enabling users to locally and remotely control several home devices, like: lights, power sockets, heating, ventilation, and air conditioning systems, among others. Besides contributing to improve the building comfort, these Stds. may also be adopted for other purposes, namely in weblabs used in sciences and engineering remote experiments. To increase the sense of immersion in weblabs, we identify domotic Stds. as a standard solution for turning on/off the power infrastructure and controlling the light and temperature conditions of the physical space where a specific experiment may run, thus approaching the sense of being in the lab facilities while accessing them through the corresponding weblab interface. After identifying the added value to weblabs in terms of power savings and in the control of the environmental conditions, it is presented a proof-of-concept (implemented with an adopted domotic system bus), which enables the control of an halogen lamp and a power socket, using a specific Web interface.

1 INTRODUCTION

Weblabs are used for educational purposes since the mid 90's. According to Aktan et al. (Aktan et al., 1996), it was maybe in 1996 the first time an undergraduate weblab has been made fully accessible through the Internet. This solution contributed to the appearance of the Remote Experimentation concept, defined as a distance learning area that enables the remote control of real experiments using computers connected to the Internet. Since weblabs require specific resources to enable a remote access, several solutions for harmonizing the software and hardware used for implementing them have already been proposed and described. However, the existence of many different technologies difficults the choice for a standard approach. Usually, when a specific weblab is required, an immediate and particular technical solution is adopted for its development. Moreover, due to the specificity of each solution, usually only qualified people are able to develop one, which partially justifies that almost all weblabs fall into the engineering domain (Jing Ma and Jeffrey, 2006). Thus, harmonization at hardware and software levels is an important aspect to take into consideration as to facilitate the construction of standard and well defined weblabs. By following a standard architecture, other aspects may be considered during a weblab implementation, namely the environment of the physical space occupied by it and the power infrastructure. Controlling these two common aspects to all weblabs, further control facilities are given to remote users, enabling them to control the place where a specific experiment is running, like if they were in that place, contributing to approach the in-place lab facilities to weblabs. To implement these aspects in any weblab, it is proposed the adoption of a standard domotic system bus usually implemented in smart houses, which will ease the control of all the environmental conditions encountered in any lab. In the next section of this paper we discuss some requirements associated with weblabs, namely issues concerning the control of the physical space (light incidence and temperature) and the power sockets where the lab devices are connected to; section 3 proposes an architectural solution, based on a domo-