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A Privacy-Preserving Architecture for a Smart Building Control System

Introduction

Smart Buildings try to adapt themselves in order to increase our comfort and safety, to minimize the building's energy footprint, etc. One example for a service in a Smart Building is a meeting room shared by different companies. Instead of heating several rooms all the time, the service that controlls the smart building is able to understand in which time periods the shared meeting room must be heated to a comfort temperature and controls the room's heating accordingly. When the room is not used, it is put into a energy saving stand-by mode.

Problem

A system able to control a building autonomously needs various sources of information. In the above example these sources might include data gained from sensors deployed in the building (temperature, presence of persons, power consumption, ...), the scheduled usage of a room, and maybe even the personal time schedule of individual persons, etc. Some of this data is obviously highly personal. Such data must be protected according to legal regulations - otherwise it might be abused to profile and monitor people in the building. This again conflicts with laws that protect employees at work. Hence, every system controlling a Smart Environment must be designed in a way that its user's privacy is guaranteed. Otherwise it may not be deployed and used.

Task Description

In this thesis the architecture of a privacy preserving Smart Building control system will be elaborated. First, various use cases need to be examined in order to understand in which situations the system needs which type of (personal) data. Based on this understanding, the architecture of this system can be specified using various design strategies for privacy preserving systems. Besides these "privacy-by-design" strategies, the applicability of other privacy enhancing measures can be examined. One particular example are privacy-preserving attribute-based credentials.

Requirements

You should have a good understanding of network security and related protocols, solid programming and Linux skills, and finally you should enjoy specifying a rather complex system architecture.

Miscellaneous

This thesis can be performed in German or English. As a Bachelor student you have the opportunity to stay at our chair after the thesis is finished as student researcher (HiWi) to continue your work.





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