



GreenerBuildings

An ubiquitous embedded systems framework for energy-aware buildings using activity and context knowledge

Editorial

Welcome to GreenerBuildings!

It is well known that buildings account for more than 40 percent of energy consumption worldwide and are the largest carbon dioxide (CO₂) producers in many regions. Making efficient use of energy in buildings is critical both to conservation and to reducing greenhouse effects. To date, automated control and adaptation systems in buildings are often limited to occupant commodity installations that regulate aspects of the indoor climate, such as room temperature and CO₂ levels, or control lights through motion detectors.

GreenerBuildings is a new project funded by the European Commission to investigate how buildings can dynamically adapt their operations according to actual use and context. The project aims at substantial energy savings, especially in public and commercial buildings (offices, shops, hotels, and hospitals) that involve highly dynamic use patterns but whose operational settings are fixed at building design time and rarely changed thereafter. GreenerBuildings develops an integrated framework to realize energy-aware adaptation using energy-harvesting sensors, occupant activity and building-context recognition, and service-oriented middleware for coordinating thousands of building-distributed smart objects.

The project will consider real validation cases with at least 1.000 devices deployed in living lab buildings. Public buildings, such as offices, universities, hotels, and shops will be considered. With its multi-national consortium, the project's outreach will go beyond European borders.



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GreenerBuildings coordinator

At a Glance

Duration: 36 months

Start: 2010.09.01

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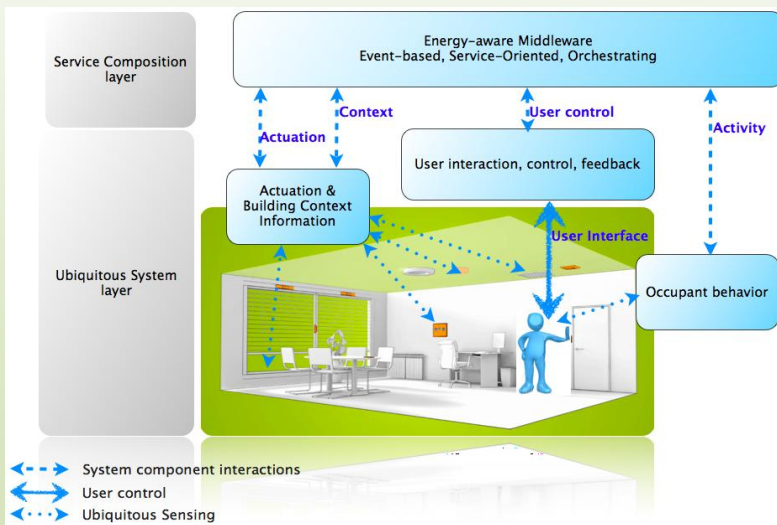
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Technical Approach

GreenerBuildings aims at developing an energy-aware framework based on embedded service middleware and a building-distributed architecture of smart objects. The framework relies on advances of ubiquitous ultra-low power sensing, sensor-based human activity recognition, and device orchestration, to guarantee responsiveness, scalability, and dependability in its goal to achieve energy savings at the whole building level.

The key to effective energy management in buildings depends on several functions, most notably, low-maintenance activity and building context sensing, robust recognition and sensor-based inference, and the framework's scalability to massively distributed installations. GreenerBuildings addresses these functions in its technical architecture and allows retrofitting all solutions into existing buildings.



The GreenerBuildings architecture specifically emphasises occupant activity and behaviour as key element for adaptation, but addresses other building context information as well. The building adaptation concept foreseen in GreenerBuildings follows a layered representation to decouple different abstractions:

- Ubiquitous system layer, which consists of physical devices, as well as the occupant activity and building context recognition functionalities.
- Service composition layer. This layer comprises the abstract composition and orchestration functionalities of the energy-aware framework.

Project Partners

TU Eindhoven, coordinator (NL),

University of Groningen (NL),

Consorzio Interuniversitario Nazionale per l'Informatica (I),

Sapienza University of Rome (I),

Fluid Solutions - alternative Srl (I),

Philips Research Laboratories Eindhoven (NL),

Advantic Sistemas y Servicios S.L. (SP),

Industrial Technology Research Institute of Taiwan (RC)

