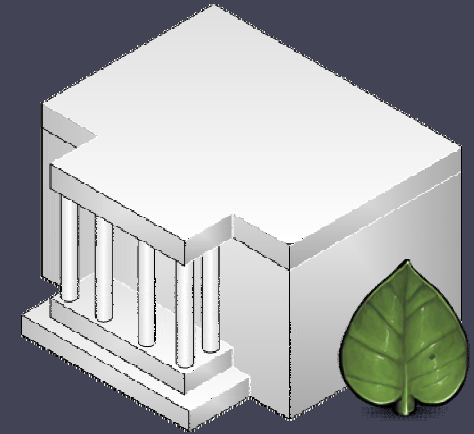


System Architecture for a Smart University Building



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Outline

1. Introduction
 2. Smart Building Overview
 3. Home Automation Network Technology
 4. Information Integration
- System Architecture



1 Introduction

- *Goal*

Build an Ambient Intelligence platform in the University for:

- Automation common tasks
- Energy consumption/carbon footprint Reduction
- Remote monitoring/control

- *Related FP7 projects*

- Dehems (<http://www.dehems.eu>)
- Hydra (<http://hydramiddleware.eu>)



1 Introduction

Comparison to FP7 Projects

- Dehems
 - Energy efficiency monitoring in different households
 - We focus on a University Building
- Hydra
 - Semantic Web Service middleware to expose devices
 - We construct our own SWS middleware but also develop automated application composition atop



2 Smart Building Overview

Requirements:

- i. Power Consumption Monitoring
 - building (total), room, floor to device level
 - Compute Data Center efficiency metrics
- ii. Energy Efficiency Savings
 - Remote control
 - based on historical and real time data
- iii. Building Automation
 - Intelligent Adaptive Application Composition



3 Home Automation Network Technology

- PLC
- Radio Systems
 - RFiD
 - ZigBee
- Problem:
 - Integrate heterogeneous devices by various manufacturers and working on different platforms
- Solution:
 - Web Service middleware



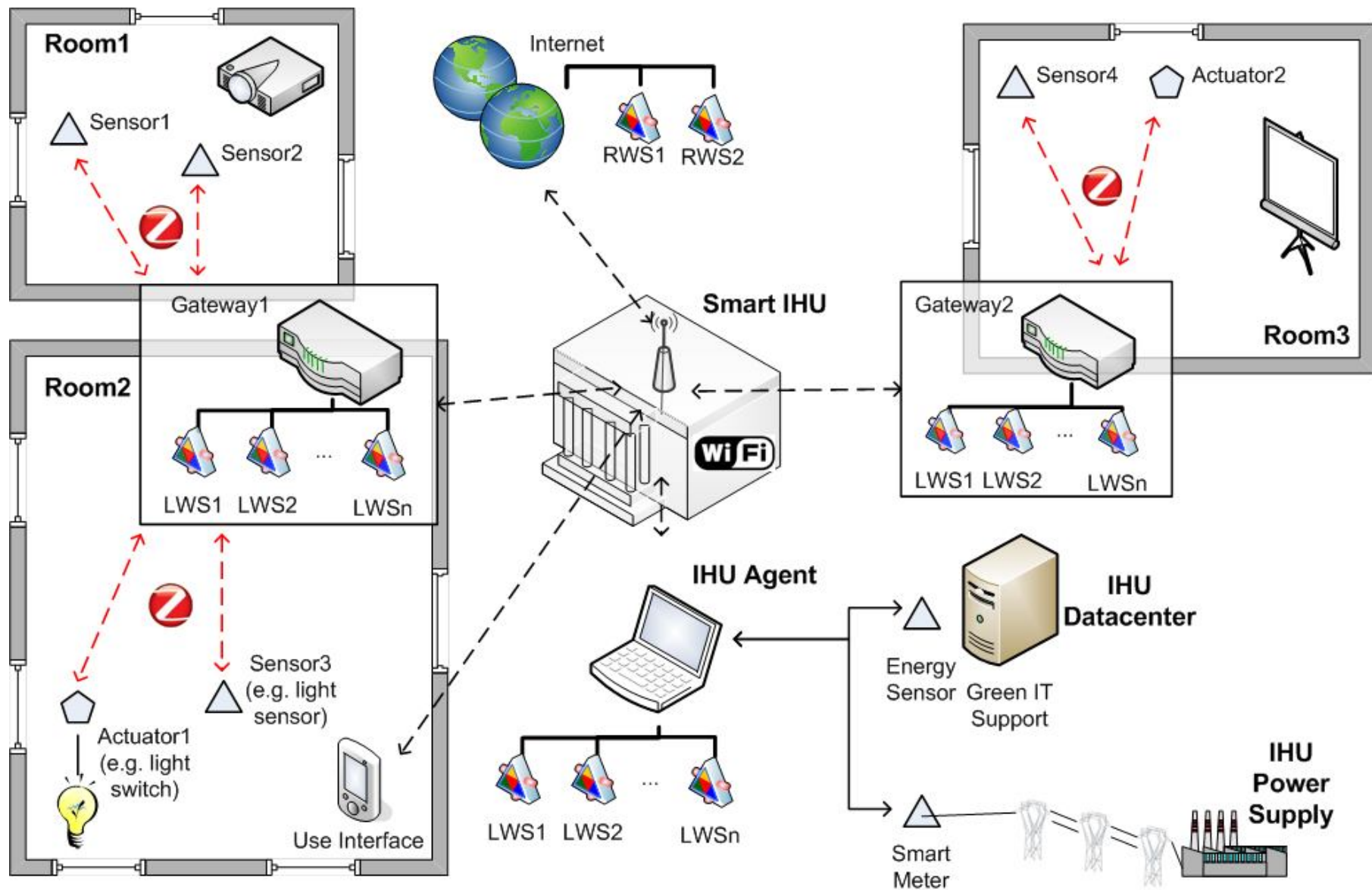
4 Information Integration

- Service Oriented Architecture (SOA)
 - Web Services wrap each system module
 - Homogeneous access to sensors and actuators
- Dynamic Web Service Composition provides Adaptive Applications [3,4]
- Web Service Composition by AI-Planning [1,2]:
 - Web Services as *actions*
 - Both have *preconditions* and *results*
 - Plans are Composite Web Services



System Architecture

- Central IHU Agent
 - Web Server hosts LWSes
- Gateways
 - Devices within range (mainly ZigBee)
 - Various Manufacturers
 - Embedded Web Server hosts LWSes
- Internet
 - Remote agents access LWSes and host RWSes
- LAN also accesses LWSes, RWSes





Thank you



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