eDIANA

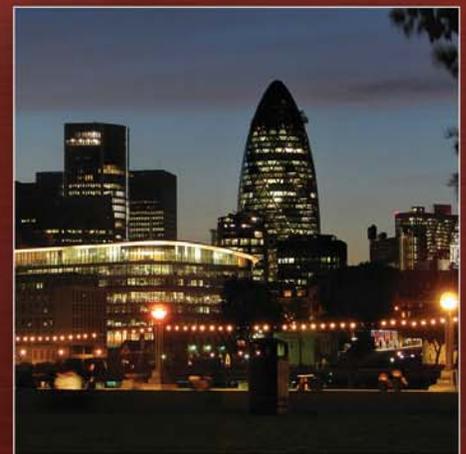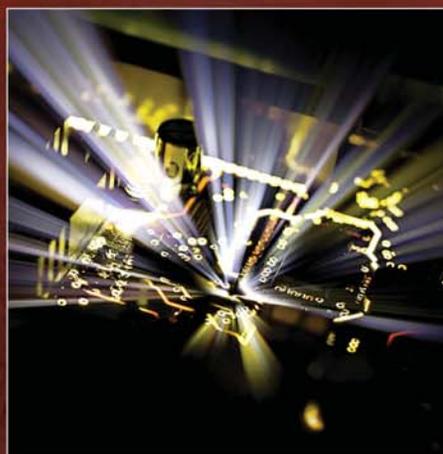## Embedded Systems for Energy Efficient Buildings

eDIANA (Embedded Systems for Energy Efficient Buildings) addresses the need of achieving energy efficiency in buildings through innovative solutions based on embedded systems.

The main goal of eDIANA is to enable sustainable urban life through rationalization in the use of resources while increasing comfort in urban environments by means of embedded intelligence and integration technologies. The eDIANA approach is to achieve greater efficiency in use of resources, prioritizing energy as scarce resource, more flexibility in the provision of resources and better situation awareness for the citizen and for service and infrastructure owners. This will be achieved through the deployment and inter-operation of embedded systems throughout the eDIANA environment of buildings and intra-building units. eDIANA's main outcome of application is in fact the improved energy efficiency in residential and nonresidential buildings.

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Main objectives

eDIANA's main goal is improved energy efficiency in residential and non-residential buildings through the use of embedded devices. While such systems exist today, their effectiveness is often limited by a lack of interoperability, leading to fragmentation and limited overall impact. This project is a strongly application-oriented initiative which is focused on the conceptualization, design, development, demonstration and validation of new devices operating in a uniform platform called eDIANA, based on Cells (living/working units), being part of MacroCells (buildings), that will be interconnected in a more complex network at a district or urban area.

The eDIANA Platform is an ambitious initiative that will integrate intelligent embedded devices, installed in residential and non residential buildings to improve energy efficiency and optimize overall energy consumption, production and storage.
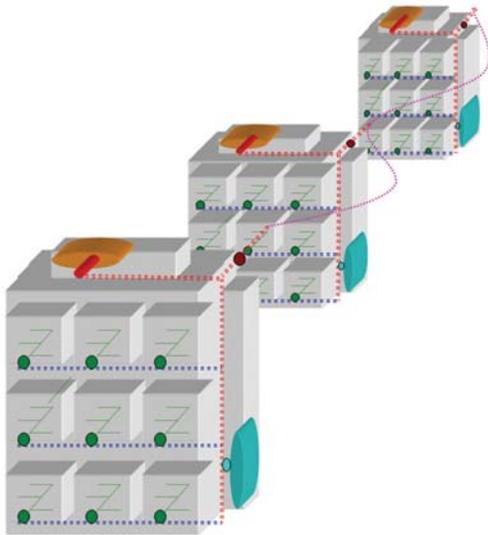
Technical approach

The eDIANA Platform is a reference model-based architecture, implemented through an open middleware including specifications, design methods, tools, standards, and procedures for platform validation and verification. eDIANA Platform will enable the interoperability of heterogeneous devices at the Cell and MacroCell levels, and it will provide the hook to connect the building as a node in the producer/consumer electrical grid.

Thus, eDIANA will provide a Reference Architecture for a network of composable, interoperable and layered embedded systems that will be instantiated to several physical architectures. The eDIANA Platform realisations will then cope with a variable set of location and building specific constraints, related with parameters such as climate, Cell/MacroCell configuration (one to many, one to one etc), energy regulations etc.

Expected impacts

The technology to be developed in eDIANA will improve energy efficiency and optimize buildings energy consumption by 25%, providing real-time measurement, integration and control. Moreover, comfort will be improved, making the user aware and enabling user-controlled policies for household devices (lighting, domestic electronics, etc.).

Such progress beyond the state of the art will enable the building to become an "active macroCell" in the energy network, connected to similar macroCells in a district or urban area.

At a glance