

Project Results

ISN

Accelerating the use of standardised wireless technologies for systems monitoring and management

Although WSNs are now becoming well accepted in different application markets, there are several aspects that must be improved to enable future growth and consolidation such as the convergence of standardisation and technologies to offer wider and open solutions. With routing and security standards, energy-efficient communications protocols, integrated data processing and, in general, scalable solutions essential for WSN evolution, ISN sought to create a WSN-based open platform and to test and validate it in a selected set of vertical applications.

Despite being a very small project in ITEA 2 terms – about a tenth of the normal project size – the Interoperable Sensor Networks project, or ISN, has not only successfully created this first commercial co-application platform based on embedded IP/web technologies but it also provides the opportunity for the results to be deployed and exploited.

CHALLENGES ...

Based on experience developed in the ITEA ESNA project and emerging communications standards, ISN addressed a set of new, relevant technical challenges for interoperable sensor network application domains.

Given the dependence on technology being able to support and coexist with a number of communications protocols, the ISN project focused on the development, use and evaluation of emerging WSN standards to simplify the development of applications, deployment and integration, monitoring and management, and to enable the efficient use of data within and outside WSN applications, including management of WSN systems and specific applications needs.

... AND INNOVATIVE SOLUTIONS

The results of this project now mean that it becomes easier and more cost-effective to construct standards-based WSN applications in high-value contexts, which contributes to improved effectiveness and efficiency in society at large. Specifically, the open platform that is based on embedded IP/Web technologies (6LoWPAN/CoAP) with monitoring and control functionalities enables decoupling of application, middleware and sensors/actuators.

Furthermore, the project developed several exploitable building blocks along with multi-standard sensor nodes (MTP, Edosoft) and sensor boards with multiple standard communication interfaces, a hardware/software box (Freemind-VUB), an application (MAIS) and a management tool (MTP). Real-world pilots served as the validation environments for the ISN project results.

FROM DISSEMINATION ...

A key part of the ISN project came in the form of dissemination to get the ISN body of work to a wider audience. Some examples of this are the paper *Integrating Wireless Sensor Networks with the Web*, presented at the *Extending the Internet to Low power and Lossy Networks workshop*, which took place in Chicago, USA, in 2011 and which was co-located with the renowned international conference *Cyber Physical Week (CPS) Week 2011*.

Another important paper published by the ISN consortium is entitled *Evaluation of Constrained Application Protocol for Wireless*

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Partners

Edosoft
Freemind
MAIS
MTP
Vrije Universiteit Brussel

Countries involved

Belgium
Spain
Slovenia

Project start

July 2011

Project end

March 2013

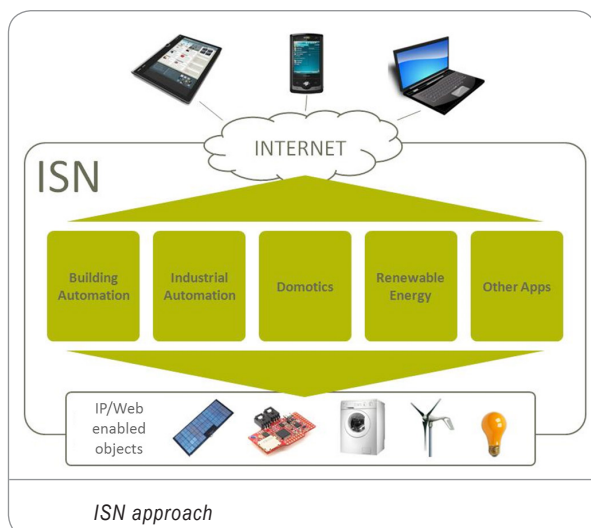
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Sensor Networks. The paper, presented at *IEEE International Workshop of Local and Metropolitan Area Networks (LanMan)*, in October 2011, at Chapel Hill, USA, demonstrated the energy savings of CoAP compared to HTTP.

The ISN project also actively participated in the *9th European Conference on Wireless Sensor Networks (EWSN)*, in Trento, Italy, 2012, with a demo entitled *Enabling Transparent WSN Resource Access via RESTful Web Services*. The demo showed how the use of embedded Web technologies simplifies the overall network architecture.

... TO DEMO ...

The results of the project have been demonstrated in the MAIS fidelity application with control functionality in the domain of hotel management, in a customised calendar application with control functionality and in the Freemind monitoring application that collects data from heterogeneous devices in the renewable energy and building monitoring domains. As for the single building blocks developed in the project, these saw tangible application in a management tool (sniffer), the GAIA3 sensor board and sensor motes with multiple communication interfaces. In fact, these demos provide the basis for commercial exploitation.

... AND EXPLOITATION

Freemind is expanding its gateway box with WSN open standards in energy management systems while MAIS is using the ISN platform in hotel management systems and MTP will commercialise both the sensor motes with multiple communication interfaces and WSN management tools, and Edosoft aims to commercialise the GAIA3 sensor board. Also twenty Flemish companies have shown an interest in the ISN project results and participate in the TETRA project "6LowPan: towards zero configuration building automation" that will run for two years in which the important issue of security is also taken into consideration and an agreement has been made with the Spanish company Inetsis to sell wireless solutions.

European industry stands to gain a competitive edge in the use of WSN technology in critical sectors of industry and society, sectors where global demand has a huge growth potential. The dissemination of the results to the rest of the world can exert an influence on both the pace and direction of related technical R&D work outside the project and in standards committees as well as help accelerate the uptake of modern technology and methodology as well as the wide deployment of WSN in large-scale integrated applications.

Major project outcomes

DISSEMINATION

- More than 10 publications (e.g. CPS Week, LanMan 2011, EWSN 2012)
- Several presentations/demos at conferences/fair (e.g. CPS Week, LanMan 2011, Aquasensor 2011, HotRest Trade Show, Gast-Expo, CeBIT, EWSN 2012, INSS 2012, SCVT2012)

EXPLOITATION (SO FAR)

- New products:
 - Sensor motes with multiple communication interface (IEEE 802.15.4 and WiFi)
 - Hardware platform GAIA3 wireless sensor and actuator networks based on open standards
 - Sniffer tool for IEEE 802.15.4 and 802.11
 - 6LowPAN/CoAP based gateway box
- New services:
 - Deployment of customised monitoring and control systems based on open standards
- New systems:
 - Commercial platform based on embedded IP/Web technologies (6LowPAN/CoAP)
 - Hotel management application based on (6LowPAN/CoAP) enabled monitoring and control
 - Renewable energy and building monitoring application based on 6LowPAN/CoAP

STANDARDISATION

- Participation in the IETF CoRE group
- Participation in the 1st IETF CoAP plugtest organised by ETSI and IPSO Alliance
- Participation in the IETF #83 meeting

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■ ITEA 2 – Information Technology for European Advancement – is Europe's premier co-operative R&D programme driving pre-competitive research on embedded and distributed software-intensive systems and services.

As a EUREKA strategic Cluster, we support co-ordinated national funding submissions and provide the link between those who provide finance, technology and software engineering. Our aim is to mobilise a total of 20,000 person-years over the full eight-year period of our programme from 2006 to 2013.

■ ITEA 2-labelled projects are industry-driven initiatives building vital middleware and preparing standards to lay the foundations for the next generation of products, systems, appliances and services. Our programme results in real product innovation that boosts European competitiveness in a wide range of industries. Specifically, we play a key role in crucial application domains where software dominates, such as aerospace, automotive, consumer electronics, healthcare/medical systems and telecommunications.

■ ITEA 2 projects involve complementary R&D from at least two companies in two countries. We issue annual Calls for Projects, evaluate projects and help bring research partners together. Our projects are open to partners from large industrial companies and small and medium-sized enterprises (SMEs) as well as public research institutes and universities.



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