flexWARE Newsletter

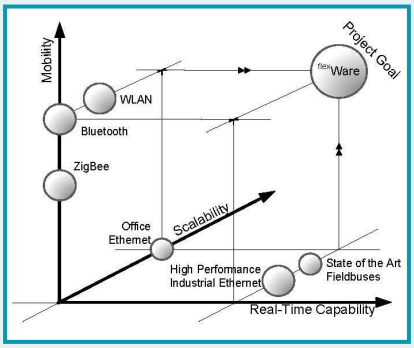
Issue #1
May 2009

flexible Wireless Automation in Real-Time Environments - www.flexware.at

Summary

About flexWARE…

flexWARE (flexible Wireless Automation in Real-Time Environments) is a STREP project (Specific Targeted Research Project) launched on 1st Sept. 2008 for a period of 36 months under the 7th Framework Programme (FP7) in the field of ICT (Information and Communication Technologies).
The intention of the project is to make wireless technologies suitable for automation and industrial needs and, hence, to develop adequate infrastructure to provide secure and reliable wireless communications with real-time capabilities and mobility through the whole factory.
The project is structured in 8 work packages described in full details on our web site.



Welcome to the flexWARE Newsletter !

Welcome to the first newsletter of the flexWARE project. The team has been working on the System Architecture (WP1) for seven months and our first set of public deliverables has been released on our web site. This edition includes updates on current activities and information on upcoming events.
We hope that you find this issue interesting and enjoyable.

Public Deliverables

"D1.1 - System Requirements Analysis": presents the project goals and provides a state-of-the-art analysis in the domains of wireless technologies, real-time, localisation, network management, clock synchronization, Quality of Service… The document also specifies a set of requirements which are intended to be used to develop the system concept which will be a basis for all other work packages. Another important part of this deliverable is to provide a set of application scenarios for wireless automation, which can act as target applications for flexWARE.
"D1.2 - Architecture Design and Specification": presents the overall flexWARE architecture and defines the basic flexWARE components, their functionalities, and the relationships between them.
The full deliverables can be downloaded from our project web site.

Future Events

April ➔ Start of WP2 "System Concept and Specification"
June 5th ➔ First review meeting with the European Commission in Brussels
August ➔ System concept freeze

Consortium:

European Project supported within the Seventh Framework Programme for Research and Technological Development

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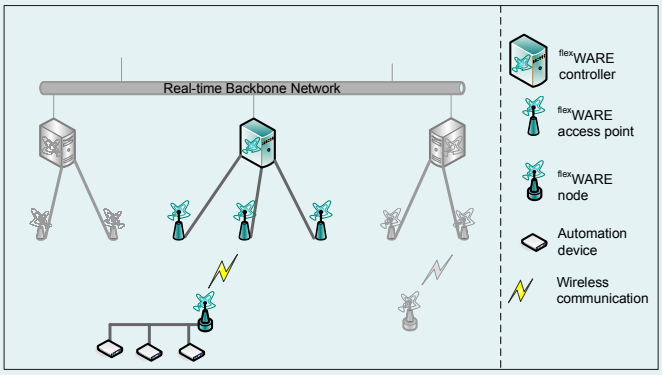
flexWARE Technology News…

This section summarises the progress that has been made within and between work packages during the recent months.

Insight of Deliverable 1.2: Preliminary System Design and Architecture Report

Deliverable 1.2 describes the preliminary system architecture which will be developed in the light of the system requirements, analysed during task 1.1 of flexWARE. With this initial system design and description of network components, this document undertakes the first step towards system specification thus providing the basic foundation for the flexWARE system. With this design a platform will be provided to carry out a transition from the wired to the wireless domain inside the factory without bargaining on the strict requirements on some essential issues like safety, security, real-time, etc. present in a factory environment.

The preliminary system architecture chosen by the consortium is based on a three-tier centralized approach and the following components:



Target system architecture for flexWARE

- *flexWARE Node (FN):* the FN provides a communication interface to field level devices inside a factory. The FN may be mounted on moving devices like Automated Guided Vehicles (AGVs) roaming from one place to the other. It can also be a stationary device connected, for example, with another fieldbus or to an I/O device. Human Machine Interfaces (HMI) can act as FN as well, allowing mobility for operators.
- *flexWARE Access Point (FAP):* the FAPs are responsible for coordinating FNs and to guarantee timely data transport. They are heavily involved in traffic scheduling within their respective cells to guarantee real-time and QoS. They are involved in the localisation of all (moving) nodes on the factory floor and have to accommodate respective resources to allow for seamless handover. FAPs need to adjust to subtle variations in the wireless environment. They should also monitor the wireless channel for possible inter-cell interference and report this to higher tiers enabling interference mitigation and effective power management.
- *flexWARE Controller (FC):* at the summit of the architecture, the FC has a network wide visibility and thus acts as the central manager of the system. It is in charge of coordinating flexWARE components in order to guarantee system performances. The FC plays a key role in network management and monitoring, resource allocation, inter-cell scheduling and handover management, clock synchronization, localisation of nodes, management of radio frequencies, and optimization of transmission power. The FC is also responsible for providing the interface between the flexWARE system and the real time backbone.

For full details on the proposed architecture and on the interaction between components please visit our project web site and download the full document.

Feedback:

Your feed-back will be highly appreciated. Please email your views and suggestions to eug@flexware.at

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Meet the Partners…

Interview with Dr. Georg Gaderer, Coordinator of flexWARE (AAS)

What is your general impression of the project so far, now that the first seven months are over?

flexWARE is a fascinating project. We have a powerful consortium comprising the experts in the field of wireless automation. We have not only a big player like Schneider Electric, but also small and not less powerful companies like connectBlue, Oregano Systems, and rt-solutions.de. Their contribution, as well as the contribution of the outstanding academic partners can be seen in the quality of the work. Another aspect are the results accomplished so far. The last six months were devoted to the collection of the system requirements and a detailed study of the state-of-the-art. This study revealed many interesting approaches, which will be investigated further. We learned that there is yet no such thing as the Wireless LAN for automation available, however, a few specific solutions are worth considering in the system specification phase, which has just started one month ago.

What are the most important breakthroughs you expect from flexWARE?

flexWARE is a revolution, not to say the revolution. I expect the a similar impact we could observe a few years ago. In that time, fieldbuses started to use Ethernet, which was by then limited to the office domain. The advantages and the success are obvious. Now we do the same, but with wireless LAN. Moreover, the usage of WLAN will be even a bigger step, since it will provide completely new possibilities and flexibility. Imagine a factory, where you can simply remove all automation cabling by just using a wireless technology. The special thing with flexWARE is now, apart from a few point-to-point cable replacements, that we want to network the whole factory with our infrastructure. The gain for the applications will be high, also due to the new services like localisation, which come with little or no additional effort.

Austrian Academy of Sciences

The Institute for Integrated Sensor Systems, founded in 2004, follows an interdisciplinary and integrative approach to the research and development of modern, integrated sensor systems. Integration in this context combines functional, systemic, and circuit design aspects. The institute comprises three research teams with extensive experience in the areas of sensor technology, ASIC design, and communication technology. Research is focused on biomedical, environmental, and automotive sensors, integrated scalable controllers and advanced signal processing techniques suitable for limited computing resources, and networking issues for sensors including real-time and wireless aspects.
In the area of sensor networks, particular emphasis is put on security problems in large-scale networks with limited communication bandwidth and resource-limited nodes. Another topic is high-precision clock synchronization in distributed systems.

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