I3CON nection
industrialised integrated intelligent construction

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WP1 Stakeholder Requirements: Changes at Stake(holders).

By *Lidewij Kemp, Jan Camphuijsen* *Draaijer & Partners*

Who do you consider the most important stakeholder in the building process? What are the greatest market opportunities in your opinion? What do you consider to be a "high-performance building"?

These are just some of the questions that the interviewing partners of Workpackage1 (Stakeholder requirements) asked key stakeholders in their country. Seven I3CON partners have interviewed a total of 72 organizations in different countries within Europe like, Spain, the Netherlands, Germany, UK, Finland and Turkey, who have a leading role in the construction industry.

These stakeholders together form a good reflection of all types of stakeholders involved in the building process: clients, professional team (architects/ advisors, etc.), contractors, occupants, occupant support services, regulatory bodies and infrastructure.

These interviews are a major part of Work package 1, which has the objective to gather stakeholder requirements.

A "program of requirements" is the result of the work package and this will be the input for the other, technical, work packages.

In these work packages technical solutions will be sought to answer to the (functional) stakeholder requirements. Ongoing results of the technical work packages will be compared to this program of requirements.

The first thing to be noticed was that all interviewees were enthusiastic and were honoured to share their ideas about the future of the building industry for the European project.

A lot is happening in the industry, for instance on new building processes (procurement), ecology (e.g. energy management changes in regulations, and construction methods),

Stakeholders are glad to join in the discussion on what current problems are and how innovation should take place.


Lidewij Kemp


Jan Camphuijsen

The I3CON Community of Interest (COI)

by Darren Morrant, Jacob Wells, *EurExcel*

The I3CON European Community of Interest (CoI) has been set up to:

- Provide the web infrastructure to support exploitation and promotion of the project outcomes
- Publicise the outcomes of the project through on-line discussions and conferences
- Liaise with other projects and publish newsletters
- Liaise with key stakeholders in the industry and RTD communities

It is targeted at people who have an interest in the dissemination of possible opportunities arising from the project. To this end the European Association of Innovating SMEs (EurExcel), has committed time to the compilation of a database of possible interested parties.

Our aim in developing this database, and eventually an extensive network of companies, is to enable and encourage interaction between large numbers of SMEs from around Europe.

The benefits to partners joining the CoI are varied, from the opportunity to get involved in the exploitation and dissemination of I3CON project results, to future collaborations in other EU funded projects, all done with the mindset of building long-term business partnerships.

In the future it is the intention of the consortium to have this database on the I3CON website and for it to be easily accessible to people for whom it may be of interest, however for the time being EurExcel will be responsible for the collation and set-up of the database until such a time as it can be incorporated in the online I3CON area.

For anyone who, having read this article, can see a possible interest or future opportunity for their company from joining the CoI, please do not hesitate to get in touch; an enquiry does not constitute a commitment, and your name will not be included in our database without your express consent.

Email: i3con.info@eurexcel.eu

Jacob Wells

Context Awareness for Building Management

by Apostolos Malatras, *Thales Research & Technology (TRT-UK)*

Context awareness has attracted the interest of a plethora of researchers from a variety of fields due to the apparent benefits obtained by allowing information from various sources (monitored by sensors) to dynamically and adaptively influence the behaviour of an appropriately designed system. Context awareness refers to the ability of a system to continuously remain aware of its environment (context) and as such to adapt dynamically its status and operation according to context information. The context of a system is the set of information of every nature that describes the system, influences system aspects and that is being affected by the system's operation.

The cornerstone of facilities management is accurate monitoring of the building system and its surroundings, performed by sensors dispersed throughout the premises, in order to enable context awareness. Regarding building and facilities management, there exist various sources of context information in the particular semantic domain, ranging from physically sensed data (structural, environmental, physiological, etc.) to electronic records (building maintenance records and schedules, personnel profiles and calendars, business processes and policies, etc.). When combined, the various sources of context information provide the overall building management context.

The motivation for context-aware computing springs from the natural desire of human users to ease the burden caused by continuous interaction with technical systems; this is satisfied by allowing such systems to reach a certain degree of intelligence. The first step towards intelligence is gaining awareness of one's surroundings and understanding it.

Users are flooded with information and are faced with a number of choices, that there is an apparent necessity for computing and technical systems to become intelligent enough so as to assist them. Extending the particular problem to the building management domain, one can identify similar conditions. Occupants of a building require automated and optimal living conditions being offered to them in terms of HVAC services, lighting, security, etc., with minimal personal intervention.

Context awareness is at the heart of all management functions, but has traditionally not been available in an automated and integrated fashion. Instead, it has required the experience of domain experts to gather disparate sources of low level context information in order to build up the awareness required to make relevant decisions. This requires large volumes of time from expert analysts to manually build up and synthesise the context information, which the decision makers need.

Automated context awareness supports decision makers at all levels by providing context information at a level appropriate to the operational needs. A low level building management system may for example improve its control loop by accessing low level context information generated by more sources than its traditional set of dedicated sensors (maybe using additional sensor fields, and the status of other related building systems). By contrast, a corporate global facilities manager may need very high level context awareness, aggregated from local context of individual sites (in turn taking into account low level context information and integrating operational and local parameters).

Apostolos Malatras

Our work in Task 3.4 of WP3 of I3CON follows this topic in providing for context awareness in building environments through monitoring of relevant context information by using Wireless Sensor Networks. In order to realise the vision of fully featured, dynamic and flexible context awareness, a number of key enablers must be put in place, namely enhanced data sources for data acquisition, enhanced data availability and exchange and availability of context models. Lately, there has been a paradigm shift towards novel architectures that allow for integrated building management system and support building automation and control under a unifying framework. In line with established move towards integrated enterprise architectures, we work towards enabling Wireless Sensor Networks within that scope.

Service Oriented Architectures for Building Services Management

This work is being carried out by the Thales Research & Technology (TRT-UK) team: Apostolos Malatras, Tim Baugé, Mark Irons, Hamid Asgari

Facilities management can be conceived as the integration of processes within an organisation to develop and maintain the services that support and improve the effectiveness of its primary activities.

Respectively, building services management refers to the management of technical building processes, including i.e. HVAC, electricity, security systems, etc.

Traditional administration of these building services regards them as having confined scope, operating in a standalone fashion or tightly coupled and provides minimal support for overall coordination and holistic management hindering the provisioning of advanced services.

This approach inherently bears weaknesses related to complicated management solutions, increased costs and rigid architectural design that restricts extensibility.

The necessity therefore becomes evident to adopt a broader perspective regarding the overall architecture of building management systems that will be open and extensible, allowing for dynamic integration of novel or updated/advanced building services.

The diversity of the offered building services needs to be addressed, as do the evident scalability issues subject to the building environment application domain.

The overall building services architecture should also realize a long-standing lifecycle view taking into account the needs of all stakeholders, which in turn further motivates the need for design flexibility.

Taking into consideration this set of requirements, in T3.4 of WP3, we proposed exploiting a service-oriented architecture (SOA) that will allow for dynamic, coordinated and distributed building services management. In the case of SOAs, all entities of the architecture are decoupled and considered as service providers and consumers. Service discovery and execution is performed in a dynamic manner, ensuring thus a generic and extensible design.

The service-oriented architectural framework assembles all underlying functionality and hides complexity from the upper-layer applications, by presenting to the building manager a single point of interaction for all operations regarding building services, while allowing for new service composition to support novel applications. From a technological viewpoint, Web Services constitute the major enabler of service oriented architectures due to the interoperability that they offer and the fact that they can easily support the integration of legacy systems.

WP3 has a focus on Integrated Building System Architectures to address building management issues in a holistic manner. The focal point of the research and development work in WP3 is the overall integration architecture, which provides the flexibility to support the vision of convergence of building and IT services.

This architecture draws on the state-of-the-art and ongoing architectural evolution of enterprise networks, which are actively striving to develop open and standard ways of connecting traditionally independent systems in a dynamic and flexible way.

Forthcoming Events

First International Conference on Industrialised, Integrated, Intelligent Construction. Loughborough, 14-16 May 2008

Revolutionary construction and production technologies are needed to enable the development of a sustainable European construction industry, which will deliver flexible and adaptable building space that uses less resources and provides optimum environment to the occupants improving their quality of life and productivity.

This will be achieved by using distributed control systems with embedded sensors, wireless connections, ambient user interfaces and autonomous controllers. New added-value business models with highly specialised SMEs working in radically contracted supply chains will deliver high performance spaces, smart business services and lifecycle solutions.

The International Conference committee is pleased to announce the first call for abstracts which will be followed by submission of full papers for the successful abstracts. Abstracts and papers will be peer reviewed by the conference scientific committee. Abstracts are invited on recent advances in the field of industrialised, integrated, intelligent buildings. Topics of interest include the following:

Industrialised building service system

- Open Building Services systems architectures and standard interfaces
- Models and reference solutions for mass customisation
- Prefabricated, quick installable product systems.
- Performance based contracting and real-time performance metrics
- Conformance testing and certification practices including EPBD.
- Market research on industrialised building services

Advanced applications of real-time integrated buildings

- Integrated user interfaces providing access to all building information.
- Utilisation of real-time building information in reactive and proactive building management - Utilisation of real-time building information in enterprise applications
- Life cycle optimisation of integrated building services
- Life cycle information sharing and management through Building Information Modelling (BIMs).
- Integration of indoor climate control and services to occupants of spaces
- Building services management
- Usability of integrated building services

Technologies for intelligent building services

- Networked intelligent building service products
- Standards for building automation and control
- Integration of building information systems using Web Service technologies
- Wireless sensor networks in buildings
- Recent development within International Alliance for Operability Industry Foundation Classes (IAI/IFC) like new domain models, model servers, data access interfaces and new design tools
- BACS objects in model based applications

Usage of simulation, for example guidance, control action design, prediction, training etc.

Abstracts should not exceed one page in 12 pt font and should include a descriptive title, the main results and achievements to be presented, five keywords and the name and email address of the corresponding author.

Key dates:

- **Review reports and notification:** 28 January2008
- **Revised papers due:** 29 February 2008

Conference dates: 14 -16 May 2008
Please submit your abstracts electronically to I3CONF@Lboro.ac.uk.

The conference is organised by the **I3CON** (Industrialised, Integrated, Intelligent Construction) European Integrated Project in the FP6 NMP programme, and Loughborough University, UK.

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Looking forward to your contributions.

I3CON Newsletter

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