Construction Informatics Newsletter 2006

Judging by the construction informatics events and journal publications, this field of engineering remains to be developing at a fast pace. Its development seems to be pushed forward by three main drivers. The information processing is taking advantage of faster and faster processors and of architectures that distribute the processing over many machines organised into a cluster or a grid. Artificial intelligent processing of information is re-inventing itself in the context of the semantic web, semantic grid and ontologies. In the area of encoding construction information we are seeing a commercialization of structured and standardised representations of building products. Research is filling in some gaps in the areas of structural systems and environment. Information delivery is studied. However, the research is looking beyond this structural interoperability into semantic interoperability of systems that may not be very rigidly structured and standardised, but are instead semantically annotated, ontology committed and therefore suitable for intelligent processing. Finally, the construction industry cannot ignore the rapid development of the converging communication technologies on the IP platform. These networks are connecting people, services and computers and facilitate ITC network-integrated construction – a vision still to be fulfilled.

In 2006 the Chair of Construction Informatics has been actively involved in all three topics. A small Chair has a very significant share of EU projects of the University of Ljubljana, and our role is everything but passive. We are coordinating one of the few construction related IST projects – InteliGrid. The technical coordination of IST project DataMiningGrid and eContent project CONNIE is also in Ljubljana. We have grown to 14 persons and are looking ahead. The calls for the next EU research framework are around the corner.

We are looking to a successful new year – and we wish such to be also to our friends, partners, and colleagues around the world.

Žiga Turk, December 2006

EU projects

InteliGrid (Interoperability of Virtual Organizations on a Complex Semantic Grid) – www.InteliGrid.com – is an FP6 IST EU project. It is providing a grid-based integration and interoperability infrastructure to complex industries such as construction, automotive and aerospace. It is contributing to a vision of engineering that is flexible, secure, robust, ambient accessible and interoperable, using pay-per demand access to information, communication and processing resources. The works started in fall 2004. Final workshop is expected in May 2007. The architectural framework that was designed draws experiences from projects such as ToCEE and ISTforCE, the Service Oriented and Model Driven Architectures. InteliGrid's basic assumption is that software not only has to model the real world, it also has to model the technical resources that this software is using, because these resources are becoming increasingly complex in a networked or grid environment. The InteliGrid framework architecture therefore includes four layers: (a) problem domain layer, (b) various conceptual models and ontologies, (c) the software layer which includes applications and services, (d) the layer of basic hardware and software resources, whereby both (c) and (d) are to some extent also modelled in (b). The software architecture (layer c) distinguishes between business applications, interoperability services, business services and grid middleware services. The concepts in the layer (b) are organized in the following ontologies: business ontology, organization ontology, service ontology and meta-ontology.

Key elements of the software have been developed. In Ljubljana we have contributed to grid based interfaces to WebDAV compliant document databases and to OGSA-DAI compliant access to product model servers. OGSA-DAI is a standard grid mechanism for accessing various data resources, including structured SQL databases, local/remote file systems and XML databases.
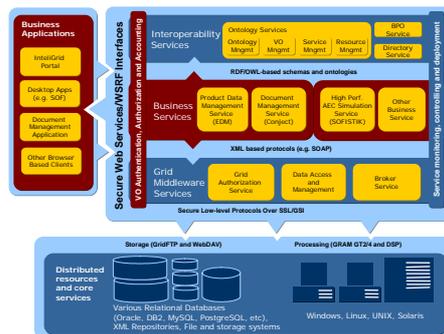
InteliGrid architecture: end-user applications (left), services (right) and basic resources (bellow). Services are logically grouped into: business services (central), interoperability services (top), and middleware services (bottom).

The demonstrator is increasingly complete. It includes VO management (dynamic creation of VOs based on InteliGrid platform that includes registered grid resources, e.g. individuals, companies, services, data resources, etc.), secure access to diverse data resources (using extended OGSA-DAI mechanisms), using existing off-line applications in grid environment, different portal based client applications (VO management, document management, grid security management, end-user role management, …), etc. A demonstration to our industrial advisory board is expected in late February 2007. Please contact the project website if you would like to take part.

CONNIE (Construction News and Information Electronically) – www.euroregs.org EU e-Content project CONNIE, which aims at delivering pan-European access to building regulations and standards through a network of information services dealing with content coming from 7 European countries. The CONNIE approach is original in several ways: it facilitates the use, feedback and exchange of building regulations; it is a network of decentralized portals with flexible conceptual architecture; it provides new B2B and B2C internet business models. The approach adopted to develop the CONNIE systems is based on the "CONNIE commons" (common data models, common APIs, common syntax) and IPR issues. Functionally, the services provided by the CONNIE system are divided into: core services, common added-value services informative services and descriptive services. First two support latter two that are regulation specific – providing improved regulation information retrieval, usage and exchange of not only building regulations, but also related content across EU countries. The network nodes are portals, which are completely independent but can connect and exchange users through SSO, exchange and syndicate content, deploy and use each others developed components, and services.

The CONNIE network is a building regulations exchange network providing mechanisms for: Exchange of Building Regulations related content: across EU countries, Exchange of users, the Exchange of developments and Exchange of services: Once ser-
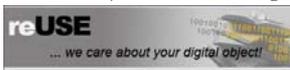

Example of CONNIE node with access to distributed RSS supported search engines and the biggest known engineering SSO network.

vices are in place individual nodes can use each others services. One of the most important components that were developed in the project includes a specialized engineering search engine, multilingual controlled vocabularies and personalization capabilities. Personalization covers static and dynamic profiling, and collaborative filtering.

reUSE project (Reuse Digital Master Files of Printed Material) funded through the European Commission eContent has

successfully finished in June 2006. The main goal of the project was to set up the trusted digital repositories in 2 university libraries in Austria and Germany and in the national library of Estonia. Beside that, the overall methodological approach and comprehensive methodology for the evaluation were designed in such a way that the organizational, technical and users aspects were included. The evaluation methodology was developed by the National and University library of Slovenia who was the coordinator followed by Die Deutsche Bibliothek and University of Ljubljana, Faculty of Civil and Geodetic Engineering.
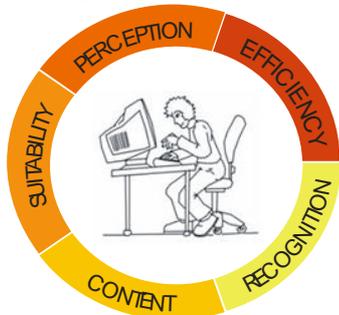
The research objective was to obtain information on the following topics: content, recognition, performance and efficiency, personal and subjective perception and suitability.

The reUSE methodological approach with its results were presented at LIDA and ELPUB conference where arouse interest to some experts from the EC suggesting to use the same evaluation as well for the European digital library.

Considering the results gained by the evaluation, demonstrators managed to technically improve their digital repositories in order to become more user-friendly.

DataMiningGrid (Data Mining Tools and Services for Grid Computing Environments) an EU IST FT6 project that ended in November 2006. The project

partners are University of Ljubljana, University of Ulster, Daimler Chrysler, Fraunhofer Institute and the Israel Institute of Technology.

Due to the increased computerization of many industrial, scientific, and public sectors, the growth of available digital data is proceeding at an unprecedented rate. The effective and efficient management and use

Who are we

dr. Žiga Turk (chair), dr. Tomo Cerovšek, dr. Matevž Dolenc, Anton Kajzar, Robert Klinc, dr. Iztok Kovačič (vice chair), mag. Vid Marolt, Vladimir Mijatović, Damjan Murn, Tomaž Pazlar, Etiel Petrinja, mag. Vlado Stankovski, Mateja Šmid and Jernej Trnkoczy.

Grid-enabling existing data mining applications is easy when using a DataMiningGrid online service.

of ubiquitous data resources, and in particular their transformation into information and knowledge, is considered a key requirement for success in many domains. Grid-based data mining is the technology that addresses this information need. The DataMiningGrid project was one of the first to make a serious attempt at developing a conceptual and technical framework for data mining in grid computing environments.

To facilitate data mining in grid computing environments, the DataMiningGrid project designed a novel and standard-compliant systems architecture that integrates the following key technology components: (1) a Data Mining Application Enabler, a Web application, which is used to grid-enable existing data mining applications, (2) a workflow manager and editor, which facilitates the discovery, execution, and management of complex data mining workflows in grid environments, (3) data manipulation services allow the users to identify, locate, access, integrate and interface distributed data sources, (4) a resource broker and information services, and (5) grid middleware functionality provided by the Globus Toolkit software and Condor local scheduler.

The solutions were evaluated on the basis of a selected set of representative demonstrator applications from different sectors, including: civil engineering, automotive industry, health sector, systems biology, computer networks monitoring, ecological modelling, text mining and digital libraries. The DataMiningGrid testbed is now open for participation. You are welcome to join at www.DataMiningGrid.org!

I3CON (Industrialised, Integrated, Intelligent Construction) – www.i3con.org – is a four year "integrated" European project that started in autumn 2006. It will enable the transformation towards a sustainable European construction industry delivering industrially produced, integrated processes and intelligent building systems using distributed control systems with embedded sensors, wireless connections, ambient user interfaces and autonomous controllers. New value based business models with highly special-

ised SMEs working in radically contracted supply chains will deliver high performance spaces, smart business services and lifecycle solutions. We are working on issues related to education, learning and knowledge transfer and are co-leading the workpackage on training. This is not a core objective of the project but a very important element. We are seeing all to many technologies that are not picked up because of the lack of knowledge with the end users.

The project consortium (26 partners from 14 European countries) includes: Dragados (coordinators), Fraunhofer IAO, Istanbul Technical University, Loughborough University, VTT and many others.

Events

Knowledge Grid: DataMiningGrid and InteliGrid Technologies was an exhibition that was running for three days at the **Helsinki IST 2006**. Live software demos were shown from the area of civil engineering, personalized federation of digital libraries, medicine, ecological modelling and bioinformatics. In addition to the exhibition, we organized the workshop: **Knowledge Grid: Grid Technologies for Knowledge-based Industries and Businesses and RTD Agenda** (knowledgegrid.eu-project.info) that was attended by several prominent researchers in the field.

In Slovenia

We organized the **Construction Informatics 2006** (www.ikpir.com/gi2006) seminar where research and development trends on advanced information technology civil engineering ware discussed as well as the adoption of those technologies in all stages of a product life cycle. Invited lectures included speakers from University of Ljubljana, University of Maribor and Central Technical Library. At the event several CAD software vendors (CGS, Autodesk, Graphisoft, Nemetchek, etc.) demonstrated their latest software developments and products.

On the Web

We provide more than 60 different websites (at least this is the number of domains on our main server), quite a few are very small or restricted to intra-project use, but some are quite relevant including: ITcon Journal – www.itcon.org, bibliographic collections cumincad.scix.net and itc.scix.net, etc.

Off the Web

Members of the group travelled to conferences, project meetings or academic visits to Brussels, Nice, Las Vegas, New Delhi, London, Valencia, Madrid, Las Palmas, Cracow, Oslo, Helsinki, Ascona, Athens, Dubrovnik, Bansko, Luxembourg, Graz, Amsterdam, Guilin, Peking, Bonn, Wellington, Poznan, Cork, Kranjska gora and … Bovec.