

I-ESA 2014 Workshop: ICT Services and Interoperability for Manufacturing

By Keith Popplewell

I-ESA 2014, the Seventh International Conference on Interoperability for Enterprise Systems and Applications, took place in the Ecole des Mines d'Albi-Carmaux in France, from 24 to 28 March. This conference was inaugurated by the INTEROP-NoE network of excellence funded by the European Commission's Framework Programme 6 back in 2005, and now runs every two years in April,



franchised by INTEROP-VLab (AISBL), the non-profit spin-off enterprise created to continue the network of excellence achievements. It has always as the name suggests, addressed issues of systems interoperability, including at one extreme the alignment of major enterprise systems used by multinational large enterprise collaborations, and at the other extreme, low-cost, easily adopted collaboration support services aimed at groups of small and medium sized enterprises. With this track record the conference is highly influential in contributing to future research paths, and in particular to the several enterprise systems and manufacturing research roadmaps published over the last decade and a half.

A feature of the conference is its Workshop programme, where, unusually, workshop papers are fully refereed in advance of the conference, and are published in book form shortly after the conference itself, together with summaries of workshop discussions and conclusions. This attracts very high quality contributions, and the discussion sessions often trigger very real further actions. Indeed workshops at I-ESA 2012, in Valencia, were instrumental in starting the idea of the FLEXINET project itself, it was appropriate for the project to contribute to a workshop in this year's conference even though the project is still only in its first year.

In fact FLEXINET coordinated the Workshop on "ICT services and interoperability for manufacturing", which targeted four EU FP7 projects: FLEXINET, ADVENTURE, IMAGINE and TELL-ME. The first three of these are all part of the Factories of the Future Public Private Partnership initiative whilst the last is a living lab funded by DG-CONNECT. The call for papers was open to all, but even though almost all submissions came from these four projects the workshop was heavily over-subscribed, and it was difficult to select just eight papers, the very most we could hope to accommodate in the time available. Finally there were three papers from each of IMAGINE and ADVENTURE, the two projects that have been running for some time, whilst the TELL-ME living lab contributed one paper, as did FLEXINET, reporting on the objectives and visions of the project, which by the time of the paper submission deadline had been running for less than 6 months.

ADVENTURE presentations examined an application of interoperable data provisioning and discovery services to support collaboration in global virtual factories¹, a collaborative approach to predictive maintenance², and an approach to optimisation of manufacturing processes in virtual factories³. From IMAGINE we saw how a cloud based integration platform for dynamic manufacturing networks (DMN) is able to support effectively the process of data exchange⁴, the use of the causal characteristics cognitive maps to create a network of interconnected performance DMN factors⁵, and how the IMAGINE integration platform can contribute through the addition of mechanisms for semantic reconciliation between partners⁶. In contrast the presentation from TELL-ME discussed the solution proposed by the project to bind together heterogeneous training services using

¹ Pavlov G., Manafov V., Pavlova I., Manafov A., "Holistic, scalable and semantic approach at interoperable virtual factories".

² Ferreira F., Shamsuzzoha A., Azevedo A., Helo P., "Predictive industrial maintenance: a collaborative approach".

³ Schuller D., Hans R., Zöller S., Steinmetz R., "On optimizing collaborative manufacturing processes in virtual factories".

⁴ Stock D., Bildstein A., "Cloud-based interoperability for dynamic manufacturing networks".

⁵ Markaki O., Koussouris S., Kokkinakos P., Panopoulos D., Askounis D., "Modelling Interoperability-related, Economic and Efficiency Benefits in dynamic manufacturing networks through cognitive mapping".

⁶ Diop C., Kamoun A., Mezghani E., Zouari M., Exposito E., "A smart mediator to integrate dynamic networked enterprises".

a lightweight XML schemas⁷. And as mentioned above FLEXINET presented out vision of an ability to configure and re-configure global production networks to meet the ever-changing demands of product-service requirements⁸.

The full papers underlying these presentations will be published by the I-ESA 2014 Workshop Organising Committee in the next couple of months, so all of these will be available in book form then. We will note in the next newsletter the full reference to the Workshop Proceedings, but if you are particularly interested in one or more of these contributions, please contact the editor of this newsletter, who will try to put you in touch with the paper authors.



Discussion in the last 45 minutes of the workshop focused on the inter-relationships and synergies between the projects. There are clear differences in aspirations of the projects, but nevertheless each was learning from the other. In particular it seemed that there are common problems in managing and maintaining common knowledge repositories for collaborative networks, and in access control.

I-ESA 2014 Workshop: Standardisation developments for enterprise Interoperability and the manufacturing service domain

By Anne-Françoise Cutting-Decelle

FLEXINET was also mentioned in workshop WS9, during the I-ESA 2014 conference, chaired by Martin Zelm, through the presentation of a specific research work around standardisation, aimed at developing an ontology of standards and standardisation.

The paper presented was entitled: “A common vocabulary to express standardization features: towards the interoperability of industrial data standards”.

Excerpt from Martin Zelm’s minutes of the workshop: Knowledge about standardization and standards can be expressed through a set of well-defined concepts as for instance described in the ISO/IEC Guide 2 providing different categories of standards. This attempts to develop a vocabulary of standards and standardization, written as an ontology which to date, comprises 125 classes, 44 object properties (used for specifying axioms) and 4 datatype properties, with the goal to obtain a common vocabulary to communicate and to achieve semantic interoperability. Definitions of relationships and constraints between the terms and concepts are critical.

Questions asked (and answered) during the discussion:

How can the number of multiple interpretations among standards be reduced? How generic should a reference ontology for Manufacturing be? Which are the best tools to build the ontology and enable maintenance and amendments? Describe the procedure adopted, even if it is still in progress. Interest was expressed to clarify if the ontology has been validated in a standards committee, process or standard (yes, given the involvement of the authors in standardisation activities). Attendees were very interested in this approach of standards and standardisation and highlighted the usefulness of the ontology.

⁷ Sesana M., Gusmeroli S., Sanguini R., “Binding together heterogeneous future internet services in manufacturing workplaces”.

⁸ Young R., Popplewell K., Jaekel F-W, Otto B., Bhullar G., “Intelligent systems configuration services for flexible dynamic global production networks”.