Newsletter Issue 1

April 2014

Intelligent Systems Configuration Services for Flexible Dynamic Global Production Networks

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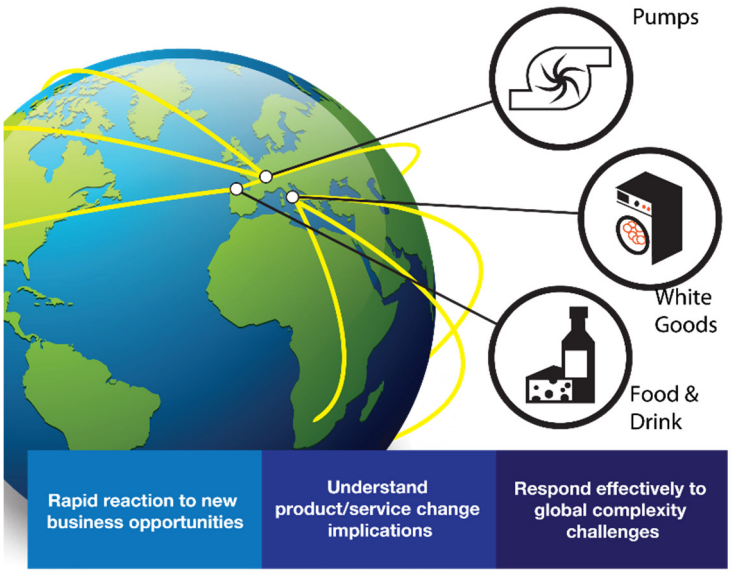
Welcome and Introduction

By Bob Young, FLEXINET Co-ordinator

Welcome to the first newsletter of the FLEXINET project. We hope that you will find this interesting, informative and, of course, have you queuing for the next issue! First though, we'd like to help you to decide if it should be worth your time to read any further. To do this we've put together a few questions that are highly relevant to FLEXINET and so if you are interested in the answers you should also be interested to read further!

The questions are:

- Do you want to be able to make well informed decisions?
- Are you frustrated by the problems that many current ICT in manufacture software systems bring when you want to access the right information?
- Do you have an interest in the design of product-services and the new global constraints that this brings to your business models and production networks?



FLEXINET is a European Union Seventh Framework Programme FP7-2013-NMP-ICT-FOF (RTD) project funded under grant agreement no 608627. It started on 1st July 2013 and runs until the end of June 2016. So we are up and running and working towards the answers, but still have a way to go to offer definitive benefits! These will come later in the project.

The FLEXINET consortium brings together an excellent range of experience and skill sets suited to the investigation, implementation and exploitation of a set of intelligent production network configuration services. The partners bring together world leading expertise in: product-service systems; complex production networks across a range of manufacturing sectors; business economic, risk and process modelling; product-service and manufacturing ontologies; interoperability; service architectures, SME manufacturing and collaboration; ICT for manufacturing; and standardisation.

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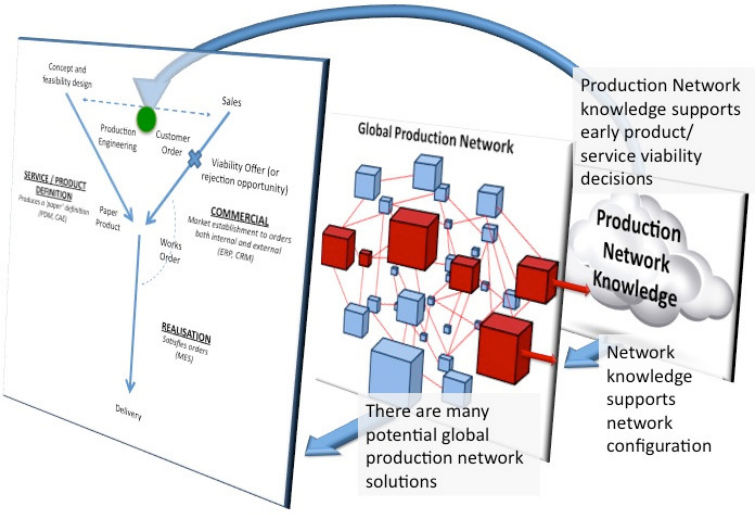
As co-ordinator of the FLEXINET project I am really excited by what we are doing and find it difficult to wait for the solutions that we will provide towards the end of the project. I started my career in industry in the technical management of complex manufacturing technologies for the design of high volume products. Ever since then I have been pushing for better ways to exploit ICT systems to support decision makers through improved information and knowledge sharing. The new research understanding that we have today, combined with emerging semantic technologies and the Software as a Service paradigm, bring me to this project and the benefits that it will bring. I hope that you will share the interest, excitement and enthusiasm that I have for the work that we are undertaking.

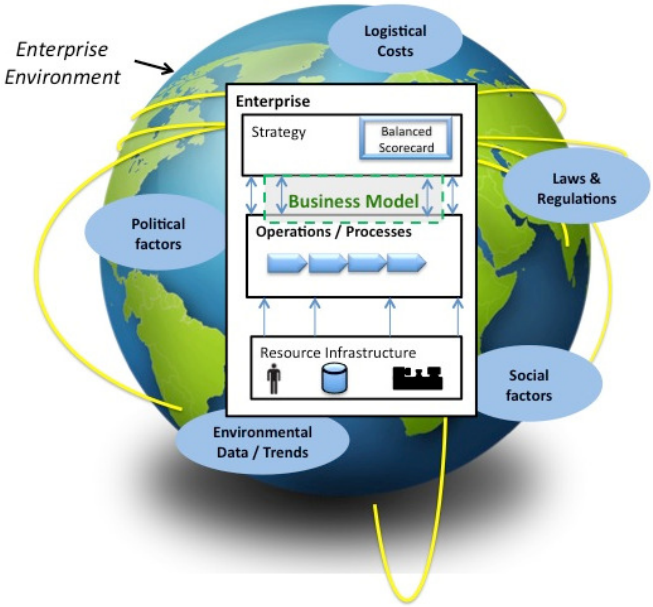
Project Overview

By Bob Young

As globalisation increases and market places become ever more competitive, manufacturing industry must be able to react to change and to understand the balance of possible options when making decisions on complex multi-faceted problems. Understanding how best to configure and re-configure a global production network, set against rapidly changing product-service requirements is one such complex problem area. This reduces the setup time and time to market of new business innovations.



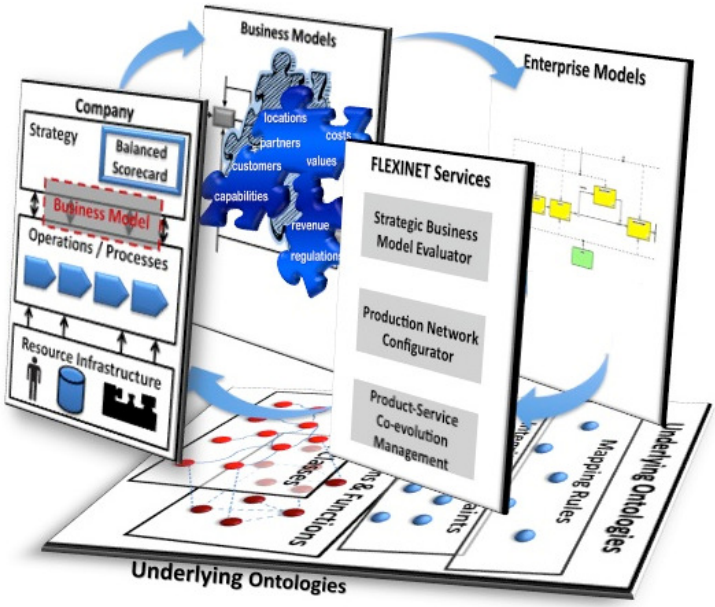
The FLEXINET project aims to provide software services that support the design and provision of flexible interoperable networks of production systems that can be rapidly and accurately re-configured based on the implementation of new software technologies. It applies advanced solution techniques to the provision of a set of Intelligent Production Network Configuration Services that can support the design of high quality manufacturing networks, understanding the costs and risks involved in network re-configuration, and then mitigating the impact of system incompatibilities as networks change over time.



The FLEXINET end user partners are especially interested in understanding the impact of external demands, such as environmental regulations, on their business and most especially when related to the introduction of new product-service opportunities into their production network. Therefore the front loading of reliable data into strategic and tactical decisions is of particular importance.

The provision of three key areas of service are under investigation, underpinned by a set of reference

ontologies to ensure a consistent understanding of product-service production knowledge. The first is a strategic business model evaluator that will consider the strategic business interdependencies for product-service manufacture in order to provide cost comparisons and risk evaluations. The second is a production network configurator that can support the design and evaluation of the required organisational and process structures. The third is a product-service compliance evaluator that will identify compliance issues through the evaluations of proposed network changes against existing ontological models of the product-service-production systems.



The underpinning reference ontologies will provide a standard foundation from which industry sector specific solutions can be adapted. The configuration of these service components is also aimed at improved integration between strategic and tactical business aspects to enhance the successful realisation of new business models. These configuration services, adaptable to suit multiple industrial sectors, will provide an understanding of the implications for the business of potential alternative production network configurations made necessary by product-service changes or new product-service requirements.

The Project So Far

Requirements analysis

A big part of this early stage of the project has been to understand our end user needs in terms of the design and configuration of their global production networks to suit new product-service business models. The diversity of our partner manufacturing interests is an important aspect of our work. With KSB from the pumps manufacturing sector, INDESIT from white goods and CustomDrinks from the food and drink sector, we expect to not only provide useful results for them but also to build an effective generic understanding of the software service needs of manufacturing industries targeting globally dispersed product-service offerings.

As part of the process of this requirements analysis phase we have had the pleasure of a trip to Frankenthal in Germany to visit KSB and a trip to Santiago de Compostela in Spain to see CustomDrinks and most recently we've been to visit INDESIT in Fabriano Italy. The photo below shows the team at the CustomDrinks factory, all dressed up for the occasion!

MANUFUTURE 2013

As one of our first dissemination activities FLEXINET provided a contribution to the poster session at the 9th conference of the European Technology Platform on Future Manufacturing Technologies held on 6-8 October 2013 in Vilnius, Lithuania. The MANUFUTURE 2013 conference brought together more than 500 experts and key stakeholders representing industry, universities, research institutions and government from 40 countries across Europe and around the world to assess the

success of research, development and innovation under the European Union's (EU) Seventh Framework Programme (FP7), and to prepare for the implementation of the Horizon 2020 Framework Programme.

Intelligent Manufacturing Systems (IMS)

IMS is an industry-led, international business innovation and research and development (R&D) program established to develop the next generation of manufacturing and processing technologies through multi-lateral collaboration. FLEXINET have now formed a new project under IMS involving partners from the EU, the USA and Mexico. This new Manufacturing Technology Platform is entitled "Configuration Services for Global Production Networks (CSGPN-MTP)" and runs alongside FLEXINET from July 2013 to June 2016.

As part of this initiative we have presented our work at an Intelligent Manufacturing Systems (IMS) Manufacturing Technology Platform workshop in Barcelona in February 2014, which drew a lot of interest from the workshop participants. There were a number of very interesting presentations made, one in particular from the "LinkedDesign" project which led to our attendance at the Engineering Ontology Workshop mentioned be-low.

Ontology Engineering Workshop

We attended an Ontology Engineering Workshop organised by Dimitris Kiritssi of epfl in Lausanne on 26 February 2014. This followed from his LinkedDesign presentation at the IMS workshop where it was clear that we shared a common interest across the projects in driving towards a common semantic base for shared information and knowledge. The workshop was well attended with around 20 participants with a fascinating range of ontology requirements, but all recognising the importance of defining a common formal semantic base.

The FLEXINET Project Consortium

Loughborough University

United Kingdom

Loughborough University, with approximately 3000 employees is research intensive and all departments have strong research bases which contribute to our international reputation. Winners of 7 Queen's Anniversary Prizes for Higher and Further Education in High Value Manufacturing to create economic growth; for work with aeronautical and automotive industries; support for developing countries; development of modern optics and laser technologies; world leading sports research, education and development; evaluating and helping developing social policy-related programmes and in recognition of the University's vehicle, road and driver safety research. It maintains strong partnerships with industry, government and the professions, which bring benefits to all our core activities: teaching and learning, research, and technology transfer. Long-standing collaborative links are held with many blue-chip companies. The university holds the highest spin-out rate relative to research funding of any UK university and provides space for up to 45 start-up businesses.

The Wolfson School of Mechanical and Manufacturing Engineering is one of the largest departments of its kind in the UK. It has an international reputation for being at the forefront of technological innovation and for maintaining extensive links with industry. The strong industrial focus to research generates work with some of the world's most renowned engineering companies and produces around £6million in external research each year, putting this department amongst the highest earning departments at any UK university. It has a world leading research record in research into manufacturing information and knowledge sharing extending back some 30 years.

Coventry University
United Kingdom

Coventry University is a forward-looking, modern University and a provider of high quality education and multidisciplinary research, and an established presence regionally, nationally and internationally with over 13,000 Students and 1,800 staff. Committed to further strengthening its applied research capacity, CU has devoted significant internal funding to the establishment of Applied Research Centres in its key areas of expertise, including the Future Manufacturing Applied Research Centre (FMARC), which provides the research capacity for FLEXINET. Further, the university's strategy for expansion of its research base has resulted in the establishment of a strong infrastructure to support management of research projects, particularly those funded by the EC.

The Faculty of Engineering and Computing, with which FMARC is associated, is one of the largest Faculties of the University, bringing together teaching and research excellence across the disciplinary boundaries between engineering and computing. Thus it forms the ideal base for research in the area of manufacturing enterprise collaboration and interoperable enterprise systems. The research portfolio includes mechanical engineering, manufacturing enterprise management, ICT communications and networking, and internet sensor technology.

Coventry University is committed to an active programme of applied research and innovation funded through national and European agencies, to support regional, national and global industry, and to inform undergraduate and postgraduate teaching programmes.

Instituto Tecnologico de Informatica, *Spain*

ITI (Instituto Tecnológico de Informática) is a Private Reference Technological Centre specialized in Information and Communication Technologies (ICT) Research, Development and Innovation. It was established in 1994 by a joint initiative of the Polytechnic University of Valencia (UPV), the Institute of Small and Medium Enterprises of Valencia (IMPIVA), and a group of companies in the information technology sector. It has a team of 150 technologists (researchers and technicians), which develop their research activity in three main areas, Computer Science (Pattern Recognition and Computer Vision, Operations Research, Distributed Systems, Ambient Intelligence and Cloud Computing), Hardware and Communications (Communications, Sensor Networks, Embedded Systems) and Software Engineering (Software Quality, Software Architectures and Development) and has participated in many national and international research projects in these fields, in collaboration with companies and institutions.

ITI is member of national and European structures and associations related to the definition of research strategies or initiatives in different domains. Among these associations and structures can be highlighted the following:

INTEROP-VLab (http://www.interop-vlab.eu/)
INES (http://www.ines.org.es/)
NESSI (http://www.nessi-europe.com/)
ARTEMIS (http://www.artemis-ju.eu/)
Net!Works (http://www.networksetp.eu/)

ITI provides a research infrastructure and related facilities to the Flexinet project; moreover its main contribution is in Work Package 3 (WP3) collaborating in the definition of the product-service-production reference ontologies for the development of compliance services used to assist the reconfiguration of global supply networks. In addition, ITI participation also participates in WP5 and WP6 for implementing and testing the services to be provided.

Fraunhofer IPK
Germany

Fraunhofer is Europe's largest application-oriented research organization with 66 Fraunhofer Institutes and a staff of 23,000. Its research efforts are geared

entirely to people's needs: health, security, communication, energy and the environment (http://www.fraunhofer.de/en/about-fraunhofer.html).

Fraunhofer IPK develops methods and technologies for management, product development, production processes and design of industrial plants. IPK explores new applications in future oriented markets such as security, mobility and medical technology. IPK's objective is a rapid transfer of research results into corporate practice. IPK works on integrated solutions in close cooperation with industry. Together with industrial partners IPK's experts transfer basic innovations from RTD into functional applications. IPK pay special attention to offer novel, cost efficient and environmentally friendly solutions to small and medium sized companies.

IPK currently employs a staff of about 330. Corporate Management researches the development and implementation of innovative concepts for the design of service processes in enterprises, management, planning and control of industrial plants, knowledge management, intellectual capital statement and corporate networks. The focus is a holistic understanding of the enterprise, including its processes, products, customers, organizational structure and information technology, and suppliers and competitors (http://www.ipk.fraunhofer.de/en/homepage/).

In FLEXINET IPK provides knowledge, methods and tools related to requirement analysis, enterprise modelling, design and engineering. IPK provides its enterprise modelling tool for the project duration. In FLEXINET IPK is responsible for the acquisition and management of the end user requirements and of the general architecture in Work Package 1. In Work Package 4 IPK coordinates the development of methods for the realization of new business models and is involved in service development in Work Package 5 and in the piloting of Work Package 7.

Asociacion de Investigacion de la Industria Agroalimentaria, *Spain*

ainia centro tecnológico

ainia is a RTD centre focused in the agro-food sector and related industries. Nowadays, it has more than 1100 company members. The aim of the centre is to promote research and technological development in the agro-food sector, to increase quality in production, to improve competitiveness and promote modernisation and diversification in the agro-food industries. This will be achieved providing a wide range of technological and consultancy services to its members, through the execution of scientific research projects and public or private technological development. ainia's staff is composed of more than 200 people (most of them with a University degree), and the centre is member of several associations and networks such as the European Technology Platform Food-for-Life, the Enterprise Europe Network (EEN), the Spanish Observatory for Prospective Industrial Technology and the "Agro-food sectorial group", a group composed of more than 40 members from food organizations all around Europe.

The Information and Communication Technologies Department of ainia (ICT Department) is a highly qualified and recognized agent within the agro-food sector in research, development and promotion of ICT Technologies, taking into account all the stakeholders of the value chain, its interactions or transactions and the relationship with the final consumer. Through it, ainia is a member of the INTEROP-VLab network (European Virtual Laboratory for Interoperability of Enterprise and Business), focused on the research of interoperability solutions for SMEs. The ICT branch has a large experience in analysis, design, construction, testing and implementation of innovative solutions for enterprises related to agro-food sector, participating in regional, national and European R&D projects. At the moment ainia ICT branch is incorporating intelligent software agents, semantics and interoperability technologies in their software developments.

Ainia's role in the project will be to contribute to the identification of the industrial requirements, to the development of the reference ontologies from which to base the flexible re-configuration of globalised production networks, to the testing of the methodologies and tools in the food industry use case and to the exploitation of the project results.

Control 2K Ltd.

United Kingdom

Control 2K Limited is a small company of less than 20 employees providing services for business improvement to industry. It occupies space in the Waterton Technology Centre, adjacent to the Ford Motor Company engine plant. The centre also incorporates a number of meeting rooms and lecturing facilities available to support local Industry. Waterton houses several influential organisations such as the Welsh Automotive and Aerospace forums. These forums have membership of some 450 members. Service to these clients range from the provision of web portals, order exchange utilising semantic alignment across organisations, opportunity matching with capabilities and collaborative consortia definition, with connections to cloud like information sources fed by C2K's INDUSTREWEB suite of software for business services. C2K has been involved with a number of European Projects including COSPACES, STASIS, SYNERGY, ADVENTURE, FITMAN and now FLEXINET. C2K is currently involved with ADVENTURE and FLEXINET in the Factories of the Future Public Private Partnership (PPP), and FITMAN in the Future Internet PPP.

In addition, consultancy for business improvement and collaborative working is also available, where C2K is experienced in multi-stakeholder management, both in and across organisations. The company works closely with its customers to ensure that any service provided is fit for purpose reflecting the experience gained by the introduction of business change. C2K is a member of TANet, a group of research organisations and multipliers (technology transfer) in the UK.

As a result of this project, C2K will be able to engage with its clients to offer an approach that will understand the business risk of change in the adoption of new products, movement of manufacturing sources both internally and externally and establishing alliances with other companies. Via the links with TANet, it will extend this awareness nationally across its network.

Universität St. Gallen

Switzerland

The University of St.Gallen (HSG) was founded as a business academy in 1898 – in the heyday of the St. Gallen embroidery industry and is nowadays a School of Management, Economics, Law, Social Sciences and International Affairs. The practice-oriented approach and integrative view have characterised the education at HSG since those early days. Today, HSG is one of Europe's leading business schools and are EQUIS and AACSB accredited.

Founded in 1989, the Institute of Information Management at the University of St. Gallen (IWI-HSG) is independently managed, but integrated with the University of St. Gallen financially and regarding personnel. It acquires its budget mostly from domestic and international corporate partners. The main research activities at IWI-HSG take place within the Institute's competence centres. The centres, and their projects, are managed by PhDs, mainly assistant professors, whose teams are composed of post-graduates working on their dissertation, and are aided by university students for specific tasks. The project managers are also part of the University's teaching team, supported again by the post-graduates.

St. Gallen's role in the project is to provide knowledge, methods and models related to strategic business modelling. IWI-HSG`s main contribution to FLEXINET will be the development of a conceptual model for business model innovation that allows exploring new innovative business models by explicitly taking external influence factors into account.

Indesit Company S.P.A.

Italy

Indesit Company is one of the European leading manufacturers and distributors of major domestic appliances (i.e. washing machines, dryers, dishwashers, fridges, freezers, cookers, hoods, ovens and hobs). It is the undisputed leader in major markets such as Italy, UK, Russia, Portugal and Ukraine. Founded in 1975 and listed on the Milan stock exchange since 1987, the Group posted sales of €2.9 billion in 2012. It counts 14 production facilities (in Italy, Poland, the UK, Russia and Turkey) and 16,000 employees.

The Group's main brands are Indesit, Hotpoint and Scholtès; one for every lifestyle. Hotpoint is dedicated to those who want their home to reflect their personality and style; for people who look for innovative products that deliver excellent results. Indesit is the European brand leader in Freestanding, and dedicated for users who look for maximum efficiency and reliability in products they buy to save time, effort and resources in the management of their daily lives. Scholtès is intended for those who have a passion for cooking and an interest in innovation and technology; for demanding people who want distinctive products featuring professional performance.

During the last years, the innovative drive has resulted in the launch of 479 new products in 2012, representing over 60% renewal rate of the product range. Such improvement was accompanied by a constant and continuous attention to the customer, in terms both its satisfaction and support. Indeed, Indesit Company manages 6.2 million contacts every year, 16,438 customers' calls every day and speaks 17 different languages. Moreover, the support to the customer is guaranteed by a 48 hours assistance and a worldwide network of 5,000 highly qualified engineers.

KSB AG.

Germany

KSB is one of the world's leading suppliers of pumps and valves and related systems. KSB has been growing continuously since it was founded in 1871. Today the Group has a presence on all continents with its own sales and marketing companies, manufacturing facilities and service operations. 16,500 employees generate annual consolidated sales revenue of 2.2 billion euros.

Currently, KSB is managing a huge number of product configurations, e.g. more than 360,000 variants for a single pump casing type, needed to be implemented in a complex customer environment. Furthermore, KSB continually introduces new products as well as variation of products combining innovative technology and excellent services to provide intelligent solutions. A comprehensive range of services rounds off this customer-focused portfolio of KSB. This creates a complex production and service network in more than 100 countries with around 1200 service shops and more than 200 external service partners worldwide, for which material flow and processes need to be synchronized and harmonized. Moreover, the global nature of the production and customer network of KSB, implies also legal, environmental and policy constraints which need to be also considered when specifying and negotiating new business approaches inside the production service network.

Currently KSB is running different business types from mass-production to individual design-based production of pumps and equipment. To meet future demands more flexibility is required. Especially new KSB products with higher complexity take a lot of time to implement in KSBs product configuration and production system which requires also a longer testing phase. At the moment KSB use a lot of different configuration and

production systems and at the same time perform product development and provides different kinds of services.

KSB wish to react in shorter time to changes coming from economic, political and social sides, and to be able to react in a short time to challenges coming from our competitors. Therefore the production network should have higher transformation ability.

.Customdrinks SL

Spain

CustomDrinks is a Container and Beverage Solutions company. Ever since its early days, when it started life as an R+D+I lab and an innovation platform, Customdrinks has skilfully managed to adapt the latest trends in formats and products to its productive and technological processes.

CustomDrinks offers a wide range of Premium products and also offers customers its Made to Order concept, which can be adapted to the production of all drinks in any format. The main products within the Company Portfolio are ciders (sweet, dry, fruit flavoured), grape juice, derivates of wine (Sangría, Tinto de Verano), apple based soft drinks, and liquors. However, the WorkTeam of Customdrinks is always ready to accept the challenge to package new drinks in new containers, for the company itself but also for other Customers.

Regarding the Flexinet Project, the main interest of CustomDrinks is to improve the management of information related to the whole innovation management process, from the product design to manufacturing. As a consequence the main expected objective is to make more flexible and speed-up all the stages involved in the process, with the following aims: reduce the time-to-market and improve the market compliance and acceptance of the products developed.

Highfleet Inc.

USA

HIGHFLEET®, Inc. offers a comprehensive solution for Analysis to support decision making and operations for commercial and government clients. Our suite of products and services provides an end-to-end solution to the challenge of performing cost effective, complex, flexible analysis across lots of data in lots of places. The HIGHFLEET constellation of products and services includes: Ontology/Logic Model development and testing tools and services; Logic Programming based Deductive Systems in which the Logic Model is instantiated; rapid semantic federation of existing databases; and all implementation, support and maintenance services to assure program success.

The result for our clients is full value from all their data. The HIGHFLEET solution provides a system that captures the knowledge implicit in enterprise data no matter where the data is located and getting full value from this data by exposing it to complex analysis using our advanced First-Order Logic based Reasoner at the heart of our Deductive Systems and Semantic Federation solutions. This result, captured in the phrase “Big Data to Knowledge – BD2K”, is achieved without the high costs, enterprise disruption, or inflexibility of traditional solutions.

HIGHFLEET’s solutions are being employed in: Manufacturing knowledge capture and re-use; information security; Health informatics; U.S. Government applications; and financial services, among others.

The role of HIGHFLEET, Inc. in the FLEXINET project is to provide the ability to create high fidelity models (logic models/ontologies) and instantiate these in scalable deductive systems that link information together at the level of meaning. Our Reasoner provides the flexible, rapid understanding for logically complex operations on large models and large amounts of data. HIGHFLEET essentially provides the brain for flexible, responsive systems. This capability is essential to knowledge capture and for putting that knowledge into operation in computer systems.

Holonix Srl.

Italy

Holonix is a spin off from Politecnico di Milano founded in 2010. The Company provides consultancy services and advanced ICT solutions based on the research outputs of the university researchers. Its staff comes mainly from consultancy companies and has experience of industrial ICT implementation, while the link with the RTD is guarantee by senior researchers holding a Ph.D. from Politecnico di Milano. Holonix focuses on the Lifecycle Data and Knowledge Management, and its core solution is the "*i-LiKe*" (*i*ntelligent *Li*fecycle data and *K*nowledg*e*) platform.

Holonix IT Offer

i-Like synthesizes the experiences and ideas from the last 8 years of research of the Politecnico on Product Lifecycle Management. It is architecturally based on the achievements of several European projects, while intelligence algorithms and DSS come from the experiences in industrial research carried out at Politecnico di Milano.

It enables the collection, integration and interlinking of data across different stages of the product lifecycle, supporting product virtualization, continuous improvement, product reengineering and design improvements, product traceability, maintenance activities and design of services as well as end of life process decisions such as remanufacturing, recycling or disposal.

Cheap nano-sensors are available as well as platforms for communications and data exchange that can satisfy various requirements.

Cloud computing and other technologies are on hand enabling analysis of data and knowledge creation for any user.

The i-Captain suite is the consumer-side offer for a personal platform tracking the lifecycle of products, where the product (a boat in that specific case) is represented through a "product avatar", a digital representation of it in the virtual world. Thanks to i-Captain, boat owners can keep track of the usage of the boat, of its equipment, and plan and check the status of maintenance activities.

Consultancy

The result of the research of Holonix team and the skills acquired in various European projects are exploited to provide a thorough consultancy service advising and assisting our customers by providing information and advice.

Holonix task, once having acquired the understanding of the kinbowledge that the customer already owns, will be to add all the factors of Holonix knowledge and professionalism that can promote developments in the desired direction.

Holonix has the ability to develop, if required, a suite based on the client's existing solutions, and the goal is always to help companies streamline operational processes, through an innovative approach, based on the ability to manage efficiently the knowledge generated in the cycle of life of a product.

Funded Research

Holonix has a successful track record of participation in several European Research Projects.

Current projects:

LinkedDesign

LinkedDesign has the goal of increasing productivity by providing an integrated and holistic view of data, people and processes throughout the life-cycle of the product, identified as a vital resource for a more competitive design.

Premanus

The objective of Premanus is the development of a software platform that simplifies the end-life of products and optimize the decision-making processes linked to this time, in terms of regeneration, recycling of materials or reuse of the same.

PathFinder

The PATHFINDER project is a CSA roadmapping action that runs within the Factories of the Future, a program in which the European Commission and

industry are collaborating to support the development and innovation of new technologies dedicated to the manufacturing of 'EU.

Closed Projects:

BOMA

BOMA is a platform for shipbuilding, on which are grafted on various services that make up the real added value to the client and allow a generation of value for the whole value chain of boatbuilding.

Technische Universität Dortmund, *Germany*

The Technical University of Dortmund was founded in 1968, during the decline of coal and steel industry in the Ruhr region. It has developed a unique profile with a special combination of faculties in the natural sciences and engineering, the social sciences and the humanities. This structure produces new knowledge, methodologies and technical innovations.

The international character of the university, with its 30,000 national students and 3,200 foreign students from over 100 countries, is of huge priority. One profile area of TU Dortmund is Production and Logistics.

Researchers develop innovative ideas for processing materials and shape the management of goods flows and production processes together with experts at the Fraunhofer Institute for Material Flow and Logistics. The chair of Supply Net Order Management, endowed by AUDI AG, was founded in 2013 and is the first of in total 8 planned chairs at the new LogisticsCampus in Dortmund, an interdisciplinary research centre for logistics with scientific and technical know-how. The chair's research is about concepts, methods, architectures and solutions for business and logistic networks. The activities emphasize on interdisciplinary access to the object of research at the point of intersection to the engineering science, business studies and computer science. The chair takes part in educating students in logistics, mechanical engineering and industrial engineering courses. Numerous cooperations with national and international partners in business as well as science characterize the activities in research and education.

TUDO's role in the project will be to provide knowledge, methods and models related to strategic business modelling. TUDO´s main contribution to FLEXINET, while being leader of WP 2, will be the development of a conceptual model for business model innovation that allows exploring new innovative business models by explicitly taking external influence factors into account.

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 factories[1], a collaborative approach to predictive maintenance[2], and an approach to optimisation of manufacturing processes in virtual factories[3]. From IMAGINE we saw how a cloud based integration platform for dynamic manufacturing networks (DMN) is able to support effectively the process of data exchange[4], the use of the causal characteristics cognitive maps to create a network of interconnected performance DMN factors[5], and how the IMAGINE integration platform can contribute through the addition of mechanisms for semantic reconciliation between partners[6]. In contrast the presentation from TELL-ME discussed the solution proposed by the project to bind together heterogeneous training services using a lightweight XML schemas[7]. 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 requirements[8].

The full papers underlying these presentations will be published by the I-ESA 2014 Workshop

[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".
[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".

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.

Future Events

We list here a few events in the near future which may be of interest to readers:

World Manufacturing Form 2014 - The way forward to prosperity through global manufacturing collaboration, July 1-2 2014, Milan, Italy, http://www.worldmanufacturingforum.org/

IFIP Working Group 5.7 - International Conference on Advances in Production Management Systems (APMS2014), September 20-24, 2014, Corsica, France, http://www.apms-conference.org/index.php

PRO-VE'14 – 15th IFIP working conference on virtual enterprises, 6-8 October 2014, Amsterdam, Netherlands, http://www.pro-ve.org/

KMIS 2014 – 6th International conference on knowledge management and information sharing, 21-24 October 2014, Rome Italy, http://www.kmis.ic3k.org/

Note: if you are organising an event which may be of interest to the FLEXINET community, and would like us to include it in a future issue of this Newsletter, please contact the editor at the address below.

In the Next Newsletter Issue

The next FLEXINET Newsletter will be published in September/October 2014. Planned content will include:

- FLEXINET project update.
- Configuration of Global Production Networks: the user perspective.
- Intelligent Manufacturing Systems (IMS) and the IMS project "Configuration Services for Global Production Networks" (CSGPN).

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