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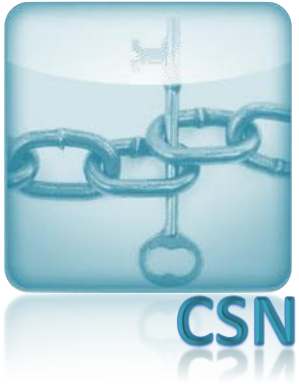
JIAE'13

Collaborative Supply Networks (CSN)

A new INTEROP-VLab Thematic Group proposal



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1. About IK4 IKERLAN
2. Proposal origin
3. Aims
4. Current status
5. Why enterprise collaboration?
6. Needs
7. Challenges
8. EU Funded Research projects
9. Next steps

- ❖ Created in 1974 by the **Mondragon Group** to encourage technological advancement
- ❖ **Largest of 12 Technological Research Centres of Mondragon Group**
- ❖ Private nonprofit **COOPERATIVE**
- ❖ Members of **INNOBASQUE** and **IK4 Research Alliance**



Figures:

Staff: over **200 people**
Turnover: **20+ million €**

65% R&D Industrial projects
35% R&D Public projects
24 Projects FP6+FP7

Research Lines:

- L1. Embedded Systems
- L2. Conversion and Control of Power Electronic Systems
- L3. Design, monitoring and control of mechatronic structures
- L4. Microtechnologies for in vitro diagnostics
- L5. Mass Product and Service Customization
- L6. Systems of electric generation and storage of energy





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CIGIP



Past and present collaborations

Coincidence in some research areas and common interests

Confidence in the relevance of this issue for companies



TG proposal inspired on the

Roadmap Factories of the Future 2020 prepared by
EFFRA's Industrial Research Advisory Group (IRAG)

http://www.effra.eu/attachments/article/335/FoFRoadmap2020_ConsultationDocument_120706_1.pdf



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- ❖ Promoting networking between association members
- ❖ Joining competences on TG research issues
- ❖ Generating ideas for potential proposals in this field
- ❖ ...



**TO PREPARE A PROJECT
PROPOSAL FOR
HORIZON 2020**



- ❖ Companies have to deal with **increasing complexity** resulting from frequently **changing product/service designs** and the need of a **higher reactivity to demand** and **rapidly delivering new products**.
- ❖ **Factories** are evolving faster than in the past and becoming **more complex, expensive, and geographically distributed**.
- ❖ Commonly used **IT-backend systems are neither widely interconnected nor interoperable** which makes holistic representation, monitoring and management of the factories difficult.



- ❖ Strategy to cope with **variable demands** and **highly complex products**.
- ❖ To reach a **faster response to demand and supply fluctuations** and **increase forecasting capability**.
- ❖ To **reduce cycle times** and **supply chain costs**.
- ❖ To have **better network traceability** to facilitate identification of products for distribution, recalls and withdrawals.
- ❖ To improve **supply network planning** and **execution performance** (KPIs).
- ❖ To **enhance supply network configuration efficiency** facing supply network disruptions.
- ❖ To **reduce the risk of supply network decisions**.



❖ Flexible Demand Driven Manufacturing

- **Flexible on-demand capacities** combined with enhanced product design capabilities to match supply with volatile demand.
- Demand driven manufacturing with **synchronized, closed loop between customer orders, production scheduling, and manufacturing execution**; all while simultaneously **coordinating the flow of materials and information** along the supply chain.

❖ Enterprise Modelling

- **Modelling methods and tools** to support the configuration of production systems.
- **Performance evaluation methods and tools.**
- Considering the **whole life cycle** and be able to **optimise the final part quality and throughput** considering the effect of each manufacturing step,
- **Distributed simulation systems with interoperability and holistic modelling options**, especially for complex manufacturing systems.



❖ Collaborative Frameworks

- Innovation focused on making collaboration smart.
- Decisions within the holistic value chain taken ‘on-the-fly’ **irrespective of the location of the enterprise or the decision maker.**
- Innovative **Collaborative Frameworks** and **Extended Business Processes.**

❖ Enterprise Applications

- SMEs and large manufacturing enterprises are increasingly looking **for enterprise applications for supporting collaboration.**
- Applications that are **agile, instant valued, real-time, easy to use, and platform agnostic.**



- ❖ **Cloud-computing ICT tools**
 - as the basis for communication amongst stakeholders for **exchanging data and information.**
- ❖ **Interoperable and open interfaces**
 - **to connect to systems across geographically dispersed competence centres.**
- ❖ **Agile UIs and mobile apps**
 - for **seamless collaboration by designers and customers** without requiring complex configurations will complement the functional aspects with usability properties.
 - that bring enterprise and network information under one roof for **better taking decisions across supply networks.**



❖ Tools and technologies

- to provide a coordinated and fast interaction between stakeholders to **accelerate the product life cycle and reduce the production lead times** by operating in variable supply networks.
- to **identify and transfer key consumer requirements and collected data from suppliers** into automated process routines.
- for **flexibly integrate manufacturing processes and design specifications** into efficient operational routines by keeping a comparable throughput time in different configurations.
- for **integrate and synchronize production with demand** while stream-lining material-flow by the interoperability of Enterprise Resource Planning (ERP), Manufacturing Execution Systems (MES), and Advanced Planning and Scheduling (APS).
- to **support decision-making processes**, activity planning and operation controlling and **facilitate faster ramp up through decreased time-to-market** for future factories.





- ❖ **Agile and evolvable Manufacturing Execution Systems**
 - **to deal with this highly dynamic environment and more sustainable manufacturing** through optimization of knowledge-based systems and synchronization with shop floor automation and supply chain management systems.
- ❖ **Closed loop**
 - **simulation instruments, visualization tools, knowledge-based systems and optimization algorithms** integrated according to the available set of data and the expected level of details of the configuration solution, both at factory and at supply network level.
- ❖ **Integrated multi-level simulation and analytics**
 - **to facilitate enhanced factory modelling** by enabling views and interpretations from different perspectives.



- ❖ **IoT-based real-time and continuous data collection**
 - **from real-world resources (i.e. assets, devices, products) from the field and along the value chain in conjunction with appropriate simulation and data analytics tools** will identify deviations between expected and actual results allowing early management of factory and production issues.
 - through the connectivity paradigm offered by the **IoT complemented with mobile decision-making apps** that will assist plant managers in getting a holistic overview of KPIs computed on collected data.
- ❖ **Integrated scalable and semantic factory models**
 - **holistic in nature** and be able to represent all levels of production functions and equipment.
 - **with multi-level access features**, aggregation of data with different granularity, zoom in and out functionalities, and real-time data acquisition from all the factory resources




<p>NET-CHALLENGE “Innovative Networks of SMEs for complex products manufacturing”</p>		<p>www.netchallenge.org (2009-2011)</p>
<p>Net-Challenge ICT platform: To support the management of SME networks (both Business Communities and Virtual Organisations, or collaboration projects). It includes decision support tools for collaborative product concept definition, operations planning, monitoring and event management and performance management.</p>		
<p>REPLANET "Resilient Multi-Plant Networks"</p>		<p>www.remplanet.eu (2009-2012)</p>
<p>DSS: A computational simulation-optimization tool to evaluate network configuration alternatives under different competitive scenarios.</p> <p>ColNet: ICT Platform for Collaborative Business Processes Management supporting mass-customization scenarios.</p>		



<p>CONVERGE “Supply chain integration and real-time decision making in non-hierarchical manufacturing networks”</p>		<p>http://www.converge-project.eu/ (2009-2011)</p>
<p>CONVERGE platform: It constitutes a de-centralized operational tool for exchanging tactical and strategic information for decision making, production planning and resource optimization in non-hierarchical supply chain networks.</p>		
<p>ADVENTURE “ADaptive Virtual Enterprise ManufacTURING Environment ”</p>		<p>www.fp7-adventure.eu (2011-2014)</p>
<ul style="list-style-type: none"> •Virtual Factory Management: (i) formalised semantics-based descriptions of factories, their services, and their properties; and (ii) tools for description of virtual factories in cloud-based architecture. •Process Definition and Simulation: graphical editor for definition, forecasting and simulation of processes in Virtual Factories Optimization of processes. •Partner Finding: (i) identify particular partners who offer a distinct product; and (ii) definition of data formats for exchanging information to ensure their connectivity. •Real-Time Monitoring, Knowledge Management and Process Adaptation: (i) using Service-Oriented-Architectures; and (ii) using technologies from the fields of Ubiquitous Computing and the Internet of Things. 		



<p>AmePLM “Advanced Platform for manufacturing engineering and Product Lifecycle Management”</p>		<p>www.ameplm.eu (2011-2014)</p>
<p>The knowledge-driven amePLM-platform: will drastically accelerate product and production engineering by integrated workflows, capturing and reuse of knowledge and experiences and by facilitating cross-disciplinary knowledge-sharing and collaboration with the goals of: (i) to engineer an ontology as an interoperable model, (ii) to develop an open engineering platform based on existing tools and libraries, (iii) to develop tools to assist product and process development, analysis, virtual testing and optimization, and (iv) to devise a visualization module to enable cross-disciplinary collaboration and remote consultation approaches.</p>		

<p>GLONET “Glocal Enterprise Network Focusing on Customer-Centric Collaboration”</p>		<p>https://sites.google.com/site/glonetproject/home -1 (2011-2014)</p>
<p>GLONET Cloud-based platform: to commonly represent/provide the information and knowledge which needs to be shared/exchanged among different stakeholders in this collaborative environment of networks as dynamic software services that may upgrade in time, generating user-customized interfaces which dynamically adjust to different stakeholders, supporting their access, search and visualizing needs with the goal of providing these services through the cloud, to be available to anybody, at any time, from anywhere.</p>		



- ❖ CSN-TG13 approval by Interop-VLab
- ❖ Search for potential Interop-VLab partners using KMAP
- ❖ Call to Interop-VLab members to participate in the CSN-TG13
- ❖ Workshop on this TG proposal in the **7th INTEROP-VLab General Assembly – Brussels** (1st week of July)
- ❖ Work Programmes drafts analysis and project target identification (2013)
- ❖ Project consortium creation (2013)
- ❖ Final project proposal (February 2014- Estimated)





The International Virtual Laboratory for Enterprise Interoperability

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fi documentation space
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news
events
ut

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you are here: home → i-v kmap

interop integrated taxonomy

The INTEROP Hierarchy

- ☐ actor (4)
- ☐ object (2)
- ☐ process (11)

livesearch on the entire site

quickly key-in possibly uncomplete words

navigation

-  I-V KMap
-  KMap People
-  KMap Activities
-  KMap Results

view
search kmap
browse
query
my kmap
semantic search

 Please, select a "named" query below.

I-V KMap

KMAP Query Tool

Organisational Unit Queries

- [2.2 Find Persons with specific skill \(Domain\)](#)
(click above, then select the domain in the domain taxonomy tree or use the search form below)
- [2.4 Find Persons or Groups Involved in Projects or Collaborations \(activities\)](#)
(click above, then filter projects and collaborations by text content or select them individually)
- [2.4.1 Find Persons or Partners involved in Projects or Collaborations \(activities\) that cover some specific topics \(Domains\)](#)
(click above, then select the domain in the domain taxonomy tree or use the search form below)
- [2.6 List the INTEROP-VLab persons ordered by the number of publications within some specific topics](#)
(click above, then select the domains in the taxonomy tree)
- [10.1 Find Persons or Groups which have produced the given Results](#)
(click above, then then filter results by text content or select them individually)

Activity Queries

- [3.1 Find Projects by topic \(Domain\)](#)

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Muchas gracias

Thank you

Merci beaucoup



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