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Newsletter

Manufacturing SErvice Ecosystem (MSEE)

www.msee-ip.eu

Editorial

Dear MSEE Newsletter Reader,

The MSEE project is in its final stretch. One fundamental question has mostly troubled the MSEE team in this last period: did we manage to impact the Manufacturing Industry with a disruptive service innovation mind set and an easy-to-follow servitisation strategy?

At the beginning of the project we optimistically believed that it was just a matter of systematisation, consolidation of practices, integration with new FI-based IT services and platforms. Being almost at the end of our journey, we now discover that in spite of several tangible examples of product-services available in the market, no stable service innovation methodology, no common product-service models and ontologies, no generic SLM IT tools and platforms are currently adopted by industry. MSEE was able to break the ice, to cut into the surface, to pioneer methods, tools and platforms, to retrofit existing product-service ideas, to show the feasibility of a service engineering "science" applied also to manufacturing, but the journey towards a fully servitised manufacturing industry is still long and full of obstacles. Maybe the new Research & Innovation action of European Commission H2020 programme will be able to finalise the work initiated by MSEE: *product-service design via manufacturing intelligence* is indeed a much more feasible and focussed objective to achieve in one single project.

MSEE was and remains much more ambitious. We demonstrated to be able to drive service innovation not just in SMEs such as BIVOLINO and IBARMIA, but also to influence new strategic product-services investments in INDESIT washing machines or in PHILIPS-branded TV sets. Lessons learned, best practices, recommendations are the main MSEE selling point for exploitation and you will find several examples of them in this newsletter.

HAVE a NICE READING with the 3rd MSEE Newsletter

Sergio Gusmeroli, Project Coordinator

The MSEE project (Manufacturing Service Ecosystem) aims to create a new **Virtual Factory Industrial Models**, where **service orientation** and **collaborative innovation** will support a new renaissance of Europe in the global manufacturing context.

MSEE vision: By 2015, service-oriented management methodologies and the Future Internet business infrastructure will enable European virtual factories/enterprises to self-organize in distributed, autonomous, interoperable innovation ecosystems of tangible and intangible manufacturing assets, to be virtually described, on-the-fly composed and dynamically delivered as a Service, end-to-end along the globalised value chain.

Content

MSEE information

Project Coordinator: TXT E-SOLUTIONS SPA Italy
Project number: 284860
Duration: 36 months
Start date : 01 Oct. 2011
Consortium: 19 partners, 9 countries
Total budget: 15,2 M€ of which 9,8 M€ EC funding
EC objective: 7.3 Virtual Factories and Enterprises

This article aims to present the results obtained in the Sub Project 1 (SP1) on "Service orientation in Virtual Factories and Enterprises".

SP1 partners have developed during the first two years of MSEE project various methods, models and tools to support service lifecycle engineering activities. All these results are combined in a coherent way in a single methodology which aims at integrating main SP1 R&D results and defines a structured way of using those results to support service engineering.

SP1 methodology contains two parts:

- SP1 Bag of Assets
- SP1 structured approach

The five main SP1 assets consist of three methodologies for respectively modeling (M), engineering (E) and governance (G). They are supported by two supporting assets: SLM framework (S) and SLMToolbox (T). Figure 1 gives the link between these assets.

M	**Service Modelling Methodology**	
	M1	MDSEA architecture
	M2	Service Modelling Language (BSM, TIM, TSM)
	M3	Model Transformation method
E	**Service Engineering Methodology**	
	E1	Service Engineering Framework
	E2	Assessment of servitization level (Product, Process, Organisation)
	E3	PLM / SLM interaction model
	E4	Role Model for Service engineering
	E5	ServLab
G	**Service Governance Methodology**	
	G1	Service Governance framework
	G2	Service PI method
	G3	MSEE PI list
S	**SLM Framework**	
	S1	MSEE 3D space MSE
	S2	MSEE Servitization 2D plane
	S3	SLM 3D framework
T	**SLM Tool Box**	
	T1	Service Modelling and model transformation
	T2	Service Engineering and simulation
	T3	Service Governance and PIs selection

Figure 1. Overview of SP1 assets

SP1 structured approach defines the process of using SP1 assets to carry out a set of service engineering activities along the service lifecycle phases.

Figure 2 shows the proposed structured approach of the methodology with the indication of SP1 assets to be used for each of the steps. In the methodology, the assets are identified in each step.

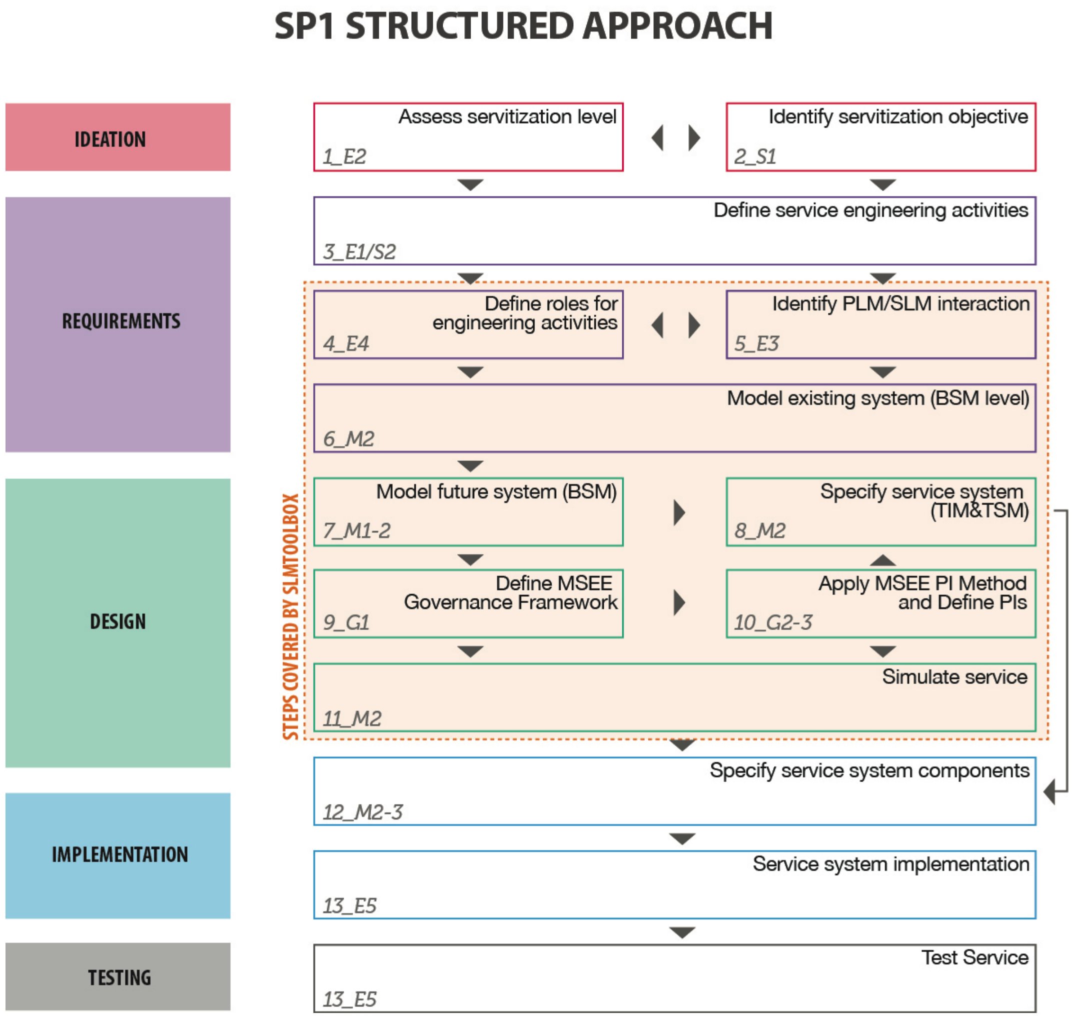


Figure 2. SP1 methodology structured approach

It is to note that SP1 methodology is used when initial service innovation and its concepts to implement have been already defined (in SP2).
Generally speaking the later phases of service lifecycle phases such as delivery and operation are not concerned by SP1 methodology. The Sub Project 4 has developed tools to implement the results.
The sequence of the structured approach represents a normative servitization project situation. It should be adapted accordingly to the specificities of each specific servitization engineering project. Some steps are optional such as step 6 and step 9.
It is also to note that this structured approach is not straightforward. Iterations between steps may take place whenever necessary.
Two points can be highlighted in this article: the MDSEA architecture and the associated SLM Toolbox.

The Model Driven Service Engineering Architecture

The MDSEA is a Model Driven Approach aiming to better define and implement the service system supporting the service life cycle. Indeed, in order to do so, it is necessary to do a distinction between the user point of view and the technical point of view. The user point of view is more focusing on the definition of the service product and service system, in particular from the business processes, the decision and the information system modeling points of view, while the technical point of view is more focused on the progressive implementation of the service product and service system taking into account the technical constraints.

A model driven approach can be particularly valuable to support the formalization of the service system based on the fact it uses enterprise models acknowledged by professional and standardization. This approach supports the system engineering and allows taking progressively into account the technical constraints.
MDSEA is inspired from the well-known MDA/MDI (Model Driven Architecture/ Model Driven Interoperability) (MDA, 2008; MDI, 2010) approaches to allow supporting the needs of modelling the three types of service system domain (IT, Organisation /Human and Physical Means). It is therefore considered as an adaptation and an extension of MDA/MDI to the engineering context of product related services in virtual enterprise environment.
The MDSEA is proposed in the figure 3 below:

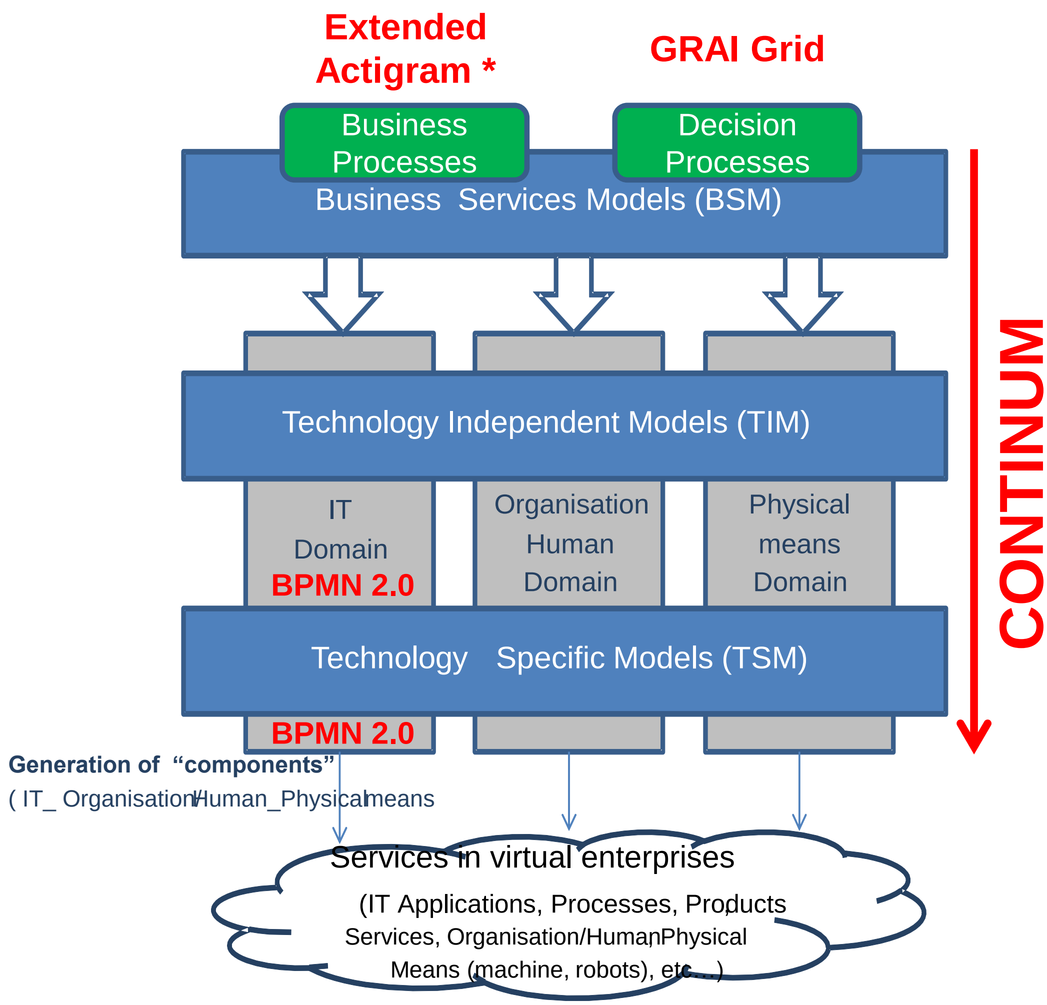


Figure 3. MDSEA Architecture

BSM specifies the models, at the global level, describing the service running inside a single enterprise or inside a set of enterprises as well as the links between these enterprises. The models at the BSM level must be independent to the future technologies that will be used for the various resources and must reflect the business perspective of the service system. The BSM level allows also defining the link between the production of Products and the production of Services.

TIM delivers models at a second level of abstraction independent from the technology used to implement the system. It gives detailed specifications of the structure and functionality of the service system which do not include technological details.

TSM enhances the specifications of the TIM model with details that specify how the implementation of the system uses a particular type of technology (such as, for example IT applications, Machine technology or a specific person).

Based on the modeling levels previously described, the MDSEA proposed to associate relevant modeling languages at each level in order to represent the existing system and the future service product and service system.

As for process modeling at business level, Extended Actigrams Star (EA*), derived from GRAI extended Actigram was chosen to model processes at BSM level due to its independence regarding IT consideration, its hierarchical decomposition and the fact it can model three supported resources: material, human and IT. GRAI Grid was selected for modeling governance in a service system.
At the TIM level, BPMN 2.0 was chosen because this language offers a large set of detailed modeling construct, including IT aspects and benefits from the interoperability of many BPM IT platforms allowing the deployment and automated transformation to execution of BPMN processes.

The SLM Toolbox

The SLMToolBox will be used by enterprises willing to develop a new service or improve an existing one, within a single enterprise or a virtual manufacturing enterprise. The tool will be used at the level of "requirement" and "design" of the service engineering process.
The basic motivation for SLMToolBox development is the lack of reference tools for designing and managing service innovation projects. This fact is affecting European Manufacturers willing to invest in service innovation as they currently have to rely on various generic tools, mostly oriented on "business process management" and "software engineering" domains. Key requirements are based on needs related to service engineers and IT teams.
The SLM Toolbox is compliant with the methodology presented previously.
So, the functionalities of the SLM toolbox are summarized in the figure 4 below:

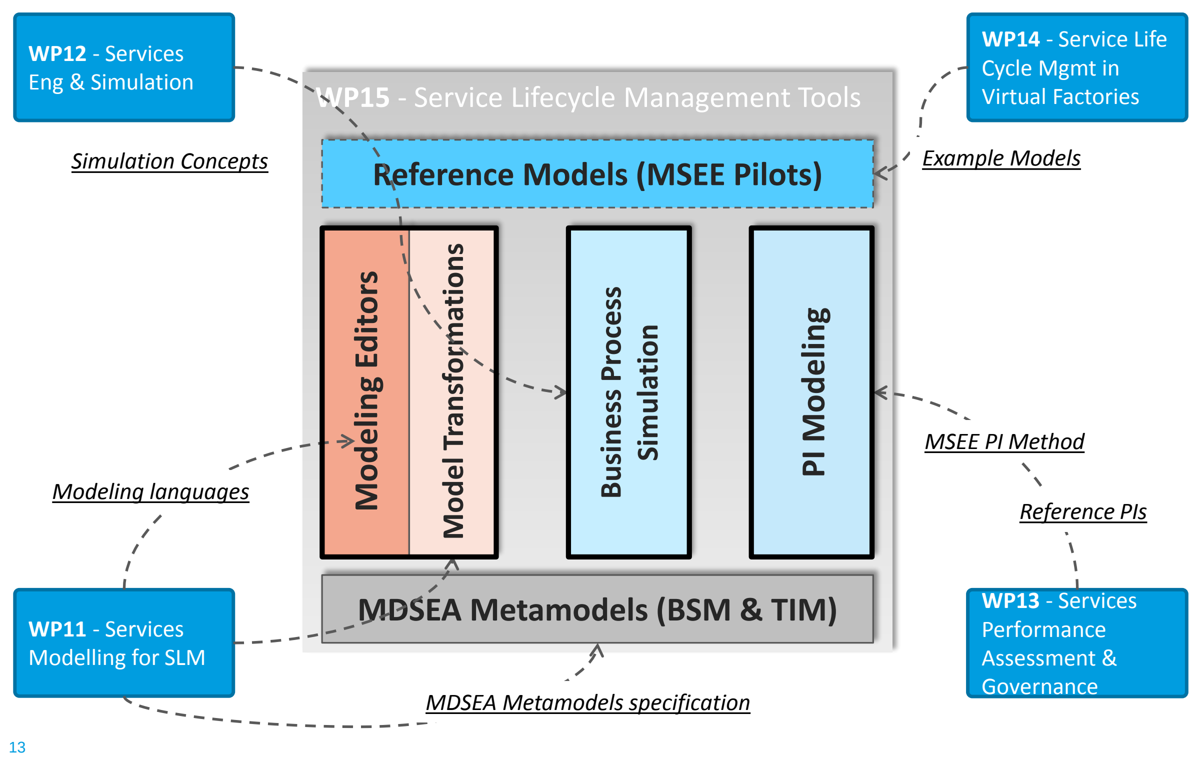


Figure 4. SLM Toolbox components

The graphical user interface of SLM Toolbox is presented in the figure 5 below:

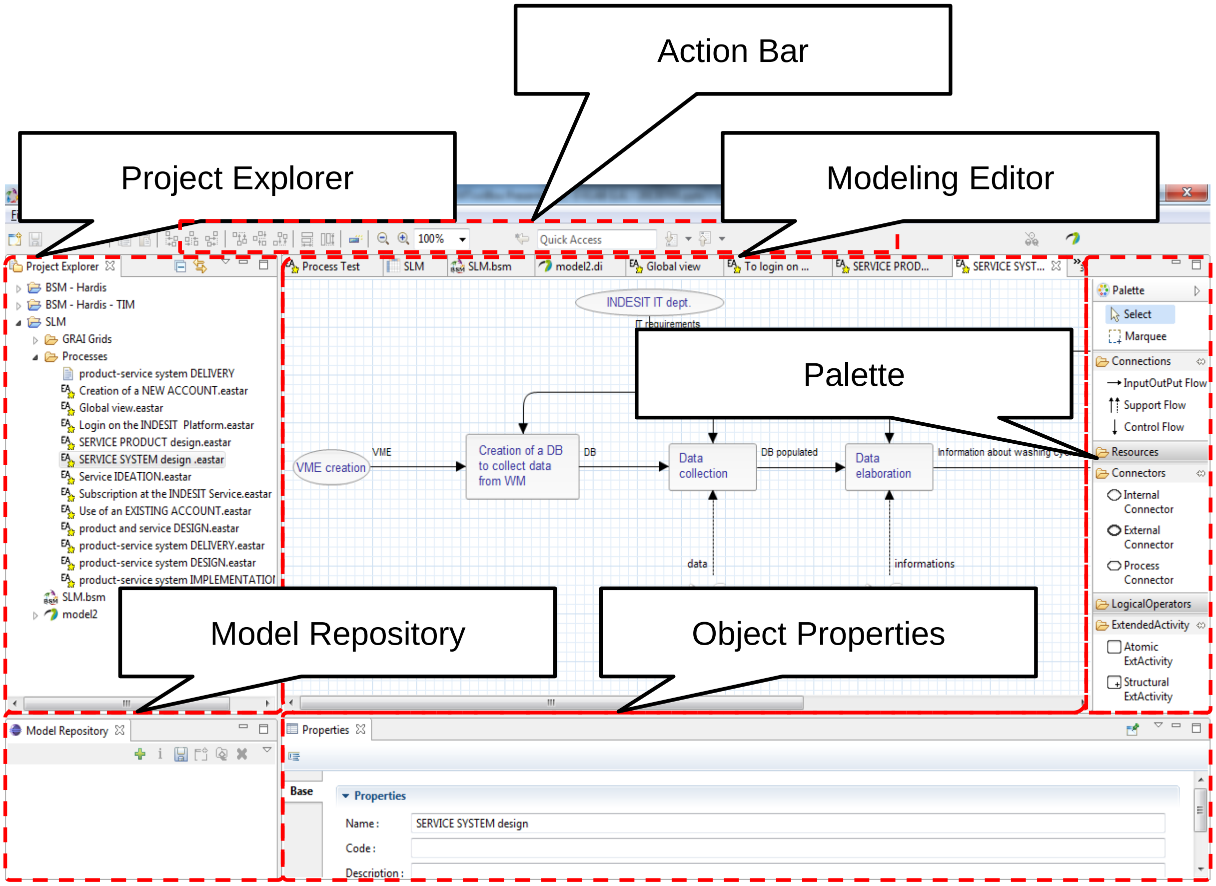


Figure 5. graphical interface of SLM Toolbox

Application of the SP1 results to pilot cases.

The SP1 methodology was applied in two pilot cases: BIVOLINO (a manufacturer of shirts sold on Internet which develops services round the manufacturing of shirt and INDESIT, a manufacturer of white goods developing service toward its customer. The results were very satisfying from an enterprise point of view to define precisely and to develop their new services. Several Business Process and decision models were developed and implemented and performance indicators identified using the SLM Toolbox. The application of these results to the two others use case of MSEE , TP Vision (a supplier of TV programmes) and IBARMIA a manufacturer of Machine Tools have started.

Tools and methodologies for supporting the servitization within a Manufacturing Service Ecosystem

This article contains the main elements of validation related to the methods and tools enabling servitization on the Manufacturing Service Ecosystem level (MSE) developed by MSEE project partners. The objective of the Sub-Project 2 is to provide the scientific foundations to support innovation and problem solving in virtual enterprises, within an industrial collaboration ecosystem, inspired by non-hierarchical and business oriented SMEs. Therefore, the basic principles of SP2 rely on the following directions:

a) managing the Enterprises transition from Products to Products+Services (PLM+SLM);
b) defining and developing an Ecosystems of SMEs, which can provide an adequate environment in which services can be combined and integrated together and highlight new business opportunities;
c) managing both tangible and intangible assets, to provide elementary components of an ecosystem, which can be aggregated as a service within an ecosystem of different partners;
d) fostering service innovation, which is originated by comparing and integrating existing services into new synergies and opportunities.

The work is based on a detailed research and cooperation with industrial use-cases of a period of more than 2 years, in the attempt to understand whether those methods and tools are eligible for extensive use by European manufacturing enterprises, ranging from SMEs to large manufacturing enterprises, and under which conditions.

While gathering the most relevant information concerning the lessons learned with industrial use-cases, a systematic analysis of strengths/weaknesses and opportunities/threats has been carried out, thus providing a roadmap for the next phases of the project and extrapolating general principles to extend the scope to further industrial clusters. Consequently, this article encompasses the main lessons learned acquired during the application on three industrial use-cases.

Research approach

The research approach has been based on the state of the art analysis related to manufacturing ecosystems, which has underlined gaps and opportunity for improvements for SMEs aiming at enhancing their services in a collaborative environment.

As described in Figure 1, according to MSEE project vision, both implicit and explicit market requirements may be addressed by a VME (i.e. Virtual Manufacturing Enterprise), which is formed on occurrence by combining different skills and capacities/capabilities of SMEs belonging to a certain MSE (i.e. Manufacturing Service Ecosystem)

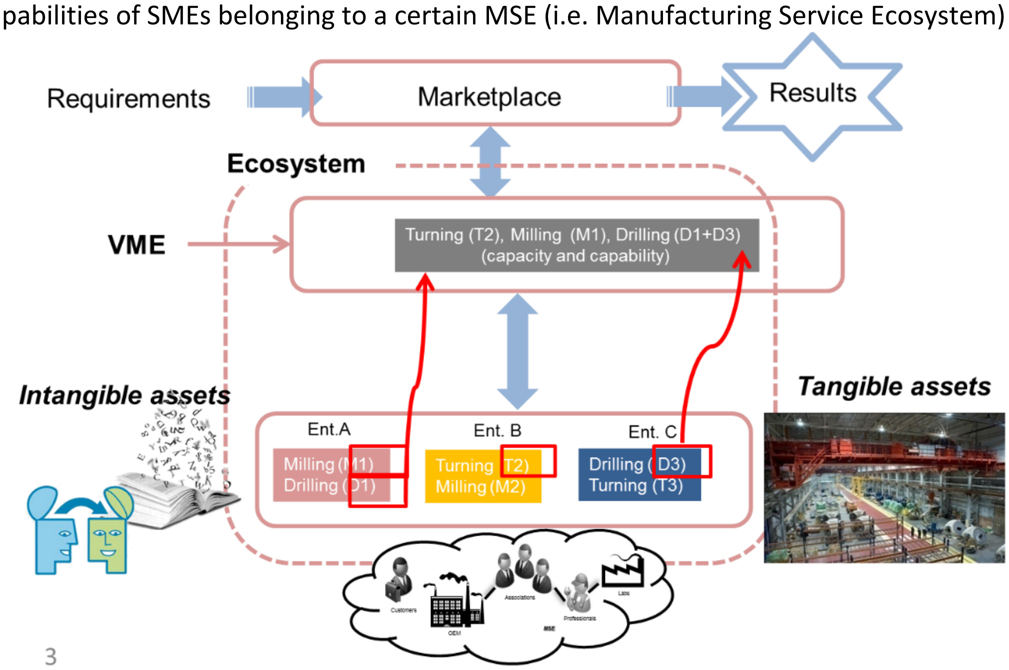


Figure 3: SMEs, VME and MSE

The original question was how to set up a MSE, based on mutual trust among the Partners within a non-hierarchical environment. Furthermore, it was quite a challenge combining tangible and intangible assets to provide a holistic response to the market, without knowing the attitude of the Partners to provide innovative services and to cooperate with others.

Application

The tools and methodologies involved were the following:

- Service innovation framework on the MSE level covering the ideation phase of servitization *(Work Package 2.1).*
- Identifying and managing the key tangible and intangible assets management on the MSE level, with specifically the following key methodologies and tools *(Work Packages 22 and 23)*:
    - Process for identification of Key Intangible Assets
    - Virtualization Procedure
    - Intangible Assets in Manufacturing Service (IAMS) Framework
- Maturity models - consists of a scientific metric for maturity, that allows to analyse industrial practices in order to set an improvement target for what regards service management and collaboration in ecosystems *(Work Package 2.4).*
- Change management approach, which is a 9-step procedure that offers a company the support needed to define a target improvement and the indications to achieve it (it indicates how to select the company's processes to change and the tools to be used *(Work Package 2.4).*
- Methodology for the conception of a MSE and procedure to design its governance processes *(Work Package 2.5).*
- The Innovation Ecosystem Platform (IEP) plays from the end-user point of view a unified entry point to the herewith presented wide array of MSEE tools (Work Package 26).

The relation among the tools and methodologies is depicted on the Figure 2.

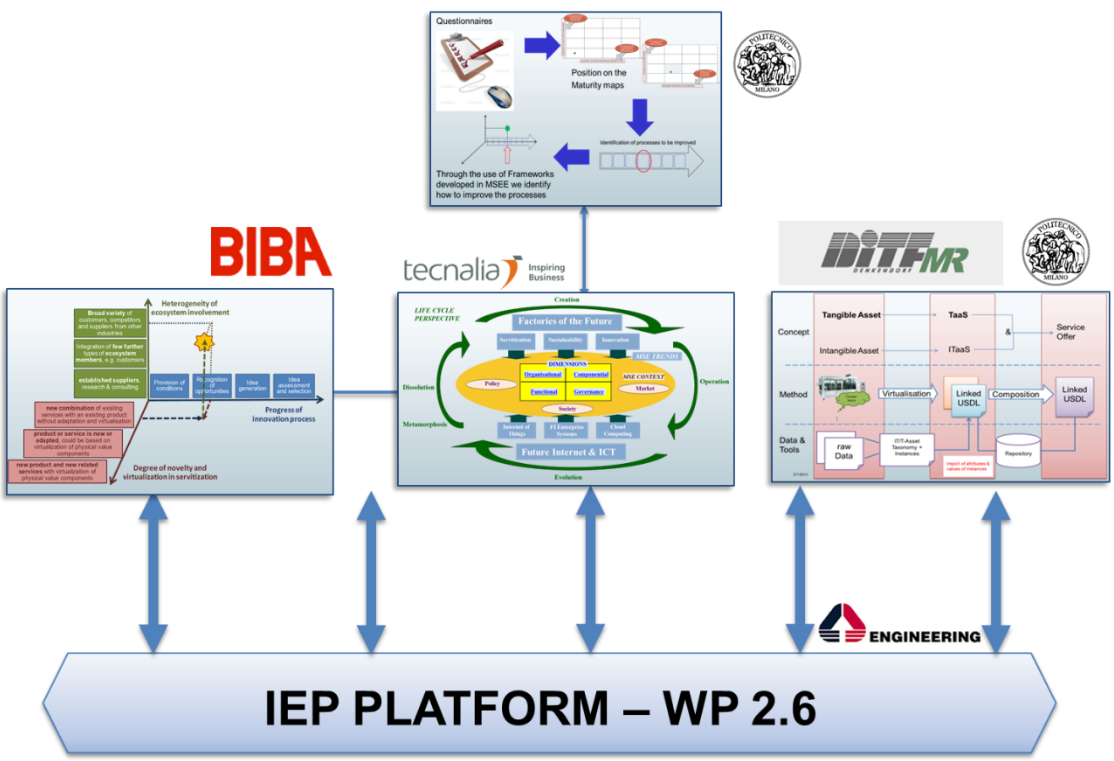


Figure 4: Relations of validated tools and methodologies applicable within a MSE

The lessons learned during application of the tools and methodologies is gathered within a SWOT matrix that is depicted in figure 3.

The most relevant factors, recorded during the validation process, have been reported on the following SWOT analysis. It depicts the potential benefits that the key SP2 tools and techniques can provide to a manufacturing enterprise collaborating within a MSE. Furthermore, the aim of the SWOT matrix is to enable current and future industrial end-users to obtain a holistic view from the business perspective of the MSEE outcomes related to the Sub-Project 2 dealing with ICT tools and methodologies on the MSE level.

Strengths	*Weaknesses*
✓ Methods and tools may be applied separately, according to the enterprises 'needs ✓ Reference framework for idea generation can easily foster new services ✓ Maturity assessing is useful to evaluate currently weak process areas ✓ It is possible to set up a MSE even for SMEs. ✓ Opportunity to develop new services ✓ Low investment necessary and relevant risks are reduced ✓ Open source ICT tools are available	✘ GUI should be improved ✘ It is difficult for a SME to apply methods and tools without any consulting support ✘ Even though ICT tools are open source, integration with existing platforms is to be considered. ✘ Change management is an issue for a SME
Opportunities	*Threats*
Benchmarking for different industry sectors Better cooperation among Partners and supply chain New business opportunities and capacity utilization Quicker response to Customers' demand Fast reaction in case of market change	• IPR issues • Knowledge management • Other comptetitors may develop a similar collaborative network before implementing MSEE methods and tools

Figure 5: SWOT matrix of the tools and methodologies applied within a MSE

Based on this matrix, a Manufacturing Enterprise can take advantage of the opportunities arising from servitization and collaboration with other enterprises within a MSE. In addition, meeting ever raising Customers' expectations for new, quicker and more reliable service responses might be managed through specific ICT tools which can be exploited by SMEs too. However, for industrial end-users to be able to take full advantage of those opportunities, the tools and methodologies in question should be implemented, thus providing an holistic approach.

The value of the presented tools and methodologies is multi faced. For instance, they are decreasing the uncertainty, complexity and transaction costs arising during servitization and collaboration. Finally, it has to be emphasized that training and guidelines are necessary in order to properly and as seamlessly as possible tool integrate the tools and methodologies herewith presented.

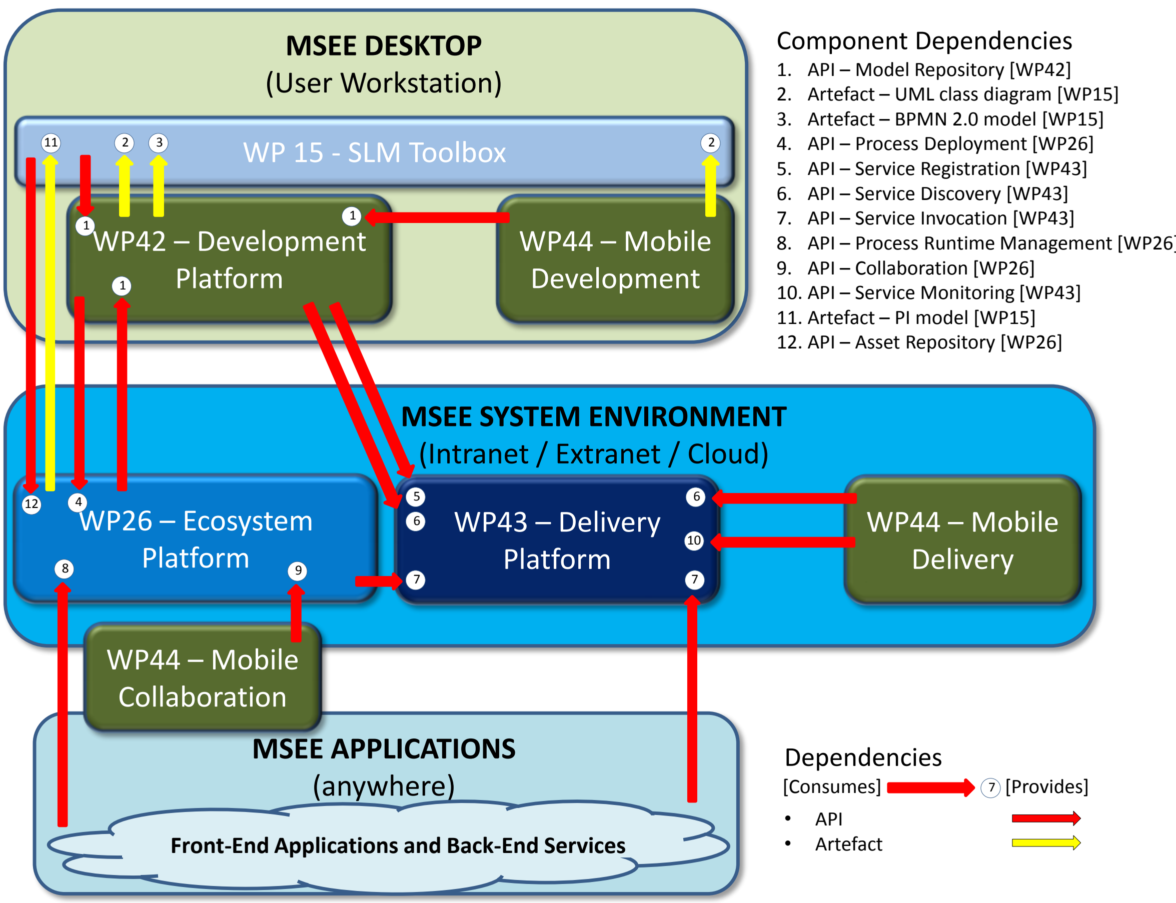
At the time of writing (April 2014), all MSEE prototypes have been released in their final form, while the technical assessment of the fully-functional MSEE System is just starting. Arguably, this is the ideal moment for a global recap on MSEE IT.

This article draws a high-level picture of MSEE IT results: platforms, services, applications and tools which collectively deliver the *MSEE System* – i.e., the composite IT environment providing end-to-end support to manufacturing enterprises' *service strategy*. In the context of a newsletter, space constraints allow nothing more than a overview, given also the very large number of individual components to report about. The target audience are developers and developer communities with an interest in manufacturing, service innovation, collaborative enterprise ecosystems. Specific inquiries are obviously welcome, and should be addressed directly to the article's author (Mauro Isaja - mauro.isaja@eng.it).

In the following paragraphs we'll navigate the entire MSEE System, component-wise, exploring the network of links on which internal integration is implemented. For our convenience, we have grouped these artefacts under two broad categories: Core Components and Add-on Applications. The former, representing the IT outcome of sub-projects 1, 2 and 4, materialize the *horizontal* MSEE value proposition: a generic environment supporting the full lifecycle of manufacturing services, from ideation / engineering up to operation / monitoring. The latter, from sub-project 3, is a collection of *vertical* applications targeting some typical problems of the service-oriented manufacturing domain.

MSEE System Core Components

The best way of illustrating the Core Components of the MSEE System from the integration perspective is probably this picture, borrowed from deliverable D45.4 "Test Plan and Documentation":



This block diagram highlights the dependencies between components (i.e., integration points). Each single component is briefly introduced below.

Baseline: the Ecosystem Platform

The Innovation Ecosystem Platform (IEP) is the backbone of the MSEE System, providing an aggregation point for most of its components. It is the outcome of WP26, the final release of which was out by September 2013 as deliverable D26.4. From a functional point of view, it can be decomposed into several autonomous modules.

- **Ecosystem Front-end**

  Provides portal-like access to all web-based front-end components of the MSEE System. It includes a Federated Single-Sign-On (**F-SSO**) feature, contributed from WP33, which enables the seamless integration of corporate users from multiple enterprises into a unified, federated environment with no public sharing of user credentials. F-SSO is also responsible for role-based user profiling. This module is based on the Liferay Community Edition portal server[1], while F-SSO is built upon Jasig's CAS[2], with original extensions developed in the scope of MSEE. It integrates with the Mobile Collaboration tool (WP44), which is a consumer of its Collaboration API.

- **Maturity Assessment and Change Management Wizard (CMW)**

  A web-based tool to support enterprises pursuing a higher maturity level with respect to *servitization*. This module was entirely developed in the scope of MSEE.

- **Idea Management**

  A web-based collaborative system for fostering innovative ideas and managing their lifecycle.
  This module extends the OpenideaL web content management system[3] with some MSEE-specific lifecycle workflows.

- **Process Management**

  A web-based system for the orchestration of automatic (e.g., a web service call) and human-oriented (e.g., the submission of a web form) workflow activities. It is used to enact business processes related to ecosystem governance and to the operation of manufacturing services.
  This module is the result of incorporating the Activiti workflow engine[4] into the MSEE Ecosystem Front-end, also leveraging F-SSO and the user role system. It integrates with the Development Platform (WP42), which is capable of deploying BPMN 2.0 executable process definitions using the module's API, and with the Delivery Platform (WP43) by means of the Service Invocation API exposed by the latter.

- **Asset-as-a-Service Management (AaaS Management)**

  A portlet and a set of back-end services allowing enterprises to describe tangible assets (e.g., machinery) and intangible assets (e.g., corporate knowledge/human capabilities) as virtualized entities, and to offer them *as-a-service* (individually or as an asset composition) on a marketplace.
  This module is mostly an original MSEE implementation, but uses the Sesame2[5] back-end as its Asset Repository. It integrates with the SLMToolbox (WP15), which is a consumer of the module's API.

- **Virtual Enterprise Management (VEM)**

  A portlet and a set of back-end services which enable the basic definition of virtual enterprises – i.e., the management of virtual enterprise members. The structures defined here are used by F-SSO to track the membership of individual users, which affects user profiling.
  This module is entirely developed in the scope of MSEE, as a joint effort of WP26 and WP33.

- **Performance Indicator Management (PIM)**

  A portlet and a set of back-end services which enable the creation, sharing and management of Performance Indicator (PI) models, PI definitions and PI historical values. All PI entities may optionally live in well-defined scopes, like those defined by a specific enterprise or by a given virtual enterprise.
  This module is entirely developed in the scope of MSEE, as a joint effort of WP26 and WP33. To manage PI scopes, it depends on functionality provided by F-SSO. It integrates with the SLMToolbox (WP15), as the PI definitions can be automatically imported from BSM models created there.

As a final note, it should be stressed that all third-party components mentioned above, as well as all the original MSEE extensions and modules, are free and open source software.

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[1] https://www.liferay.com/
[2] http://www.jasig.org/cas
[3] https://**drupal**.org/project/idea
[4] http://activiti.org/
[5] http://www.openrdf.org/

From Engineering to Operation of Manufacturing Services: Platforms and Tools

To create or modify a service within an organization, stakeholders need to specify requirements, evaluate scenarios and model implementations in a structured and "easy to read" format. Visual modeling tools facilitate design tasks and ease the sharing of knowledge between stakeholders. Development of applications and software components must stem from the modeling phase in a straightforward, self-documenting way, to ensure alignment with business requirements. Code-generation tools are useful to automate and standardize the transformation of abstract models into executable software and processes. After deployment, process activities must be coordinated and traced, and the performance of supporting IT systems must be monitored to assess the global quality of service and to identify any weak points. Workflow engines and communication logs are key factors to this objective.
This wide array of requirements is addressed by a wide array of MSEE platforms and tools, which are an integral part of the core MSEE System.

- **Service Lifecycle Management Toolbox (SLMToolbox)**

  Delivered by WP15 (D15.5, September 2013), it provides a set of graphical editors to create both business- and technical-oriented models (BSM[6] and TIM[7] level, respectively) of a service system. The use of these models is not limited to service design and to communication between stakeholders: models can be turned into implementation with some partially-automated task – e.g., code generation from class diagrams, executable workflow deployment from process diagrams, etc.

  This package is a desktop application, actually a custom distribution of the Eclipse platform[8], with some MSEE-specific plug-ins. It integrates with the IEP (WP26) as a consumer of its Asset Repository API (see the IEP's AaaS Management module) and as provider of PI definitions embedded in BSM files (see the IEP's PIM module). It also integrates with the Development Platform and its Mobile Development extensions (WP42 and WP44) as provider of UML class diagram and BPMN files, and as a consumer of the Model Repository API.
- **Development Platform (including Mobile Development Tools)**

  Delivered by WP42 (D42.4, March 2014), with Mobile Development extension from WP44 (D44.4, March 2014), it's a fully-fledged Java IDE which exploits TIM-level models and Delivery Platform functionality, and also provides a shared Model Repository as a standalone service.

  The desktop application module is based on the Eclipse IDE for Java developers[9], with some MSEE-specific plug-ins. There is also a separate Model Repository server module which implements a WebDAV API. It integrates with the SLMToolbox (WP15, see the previous entry for details) and with the Delivery Platform (WP43) as a consumer of its Service Registration and Service Discovery API. It also integrates with the IEP (WP26) as a consumer of its Process Management module API.
- **Delivery Platform (including Mobile Delivery Tools)**

  Delivered by WP43 (D43.4, March 2014), with the addition of some Mobile Delivery external tools from WP44 (D44.4, March 2014), it plays the role of centralized hub for online web services: these can be registered in / retrieved from a searchable catalogue, invoked from clients in a proxy-like fashion and monitored by a system administrator. The general concept is to promote web service reuse and still maintain a strict control over the actual usage.

  All services and applications have been entirely developed in the scope of MSEE. They integrate with IEP (WP26) and with the Development Platform (WP42) as providers of the Service Registration, Discovery, Invocation and Monitoring APIs.
- **Mobile Tools: Ambient Intelligence, Mobile Collaboration, Multimodal Interaction**

  Delivered by WP44 (D44.4, March 2014), this is a collection of complementary utilities running on mobile devices.

  All applications have been entirely developed in the scope of MSEE. The Mobile Collaboration app integrates with the Ecosystem Front-end module of IEP (WP26), as a consumer of its Collaboration API.

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[6] Business Service Model
[7] Technology Independent Model
[8] http://wiki.eclipse.org/Platform
[9] http://wiki.eclipse.org/JDT

From the IPR point of view, the Delivery Platform (WP43) and all the Mobile-related packages (WP44) are free and open source software; licensing terms of both the SLMToolbox (WP15) and of the Development Platform (WP42), on the other hand, are still to be determined.

MSEE System's Add-on Applications

Add-on Applications, as mentioned in the introduction, address some typical problems of service-oriented manufacturing. They are basically proof-of-concept implementations, demonstrating some specific facet of MSEE operations. We are not going in too much detail here, and simply browse the catalogue with a brief mention of the overall functionality and of existing links to other MSEE components. Again, we invite you to contact the author for any additional information.

- **Internet-of-Things Manager (IoT Manager)**
  Delivered by WP32 (D32.4, September 2013): provides communications capabilities for MSEE services to reach out to Internet-of-Things devices via IP / non-IoT protocols (e.g., ZigBee).
- **Service Marketplace**
  Delivered by WP32 (D32.4, September 2013): aggregates several local service marketplaces into a marketplace federation, enabling users to search for available services across their whole enterprise ecosystem. In the context of a complete MSEE System, it may be used by IEP's AaaS Management Module (WP26) to publish its own service offerings.
- **Feedback Manager**
  Delivered by WP33 (D33.4, September 2013): used to publish corporate communications to aggregated social media channels (one-to-many), to retrieve consumer feedback and to perform sentiment analysis on the outcome.
- **Production Planning on Tangible Assets (PP4TA)**
  Delivered by WP34 (D34.3, September 2013): publishes manufacturing capabilities offered as a service (e.g., under-utilized machinery), enabling other users to search for available resources and to negotiate with their owners a concrete production plan which allocates them to a calendar schedule. Exploits the IEP's AaaS Management Module API (WP26).
- **Team Building on Intangible Assets (TB4IA)**
  Delivered by WP34 (D34.3, September 2013): it is basically an alternate version of PP4TA (see previous paragraph), re-targeted at assembling teams of professionals (people capabilities instead of machinery capabilities) for a specific goal.
- **Product Maintenance**
  Delivered by WP34 (D34.3, September 2013): connects customers of a product, the product manufacturers, and a set of maintenance service providers in an innovative "social" maintenance case handling scenario.

Conclusions

The MSEE project has now reached its final stage: all IT prototypes are released, and work is in progress in the four MSEE pilots – Indesit, Ibarmia, TPVision and Bivolino – in order to demonstrate how this wealth of results can be exploited in realistic production use cases. Besides the exploitation plans of individual MSEE partners, we also expect these results to be interesting and useful for the manufacturing industry at large – e.g., further development of open source MSEE components being taken over by non-MSEE communities. We hope that this article might prove itself a first push in this direction.

MSEE upcoming events

MSEE Workshops organized throughout Europe

MSEE partners will organize several workshops in order to present the MSEE methodologies, tools and application cases to the industrial potential users and applied researchers located in their regions. The workshops will be held:

- 16 May 2014, in **Achim (DE),** organized by BIBA
- May 2014, in **Innsbruck (AT),** organized by University of Innsbrück
- 3 June 2014, in **Stuttgart (DE),** organized by IAO Fraunhofer and DITF
- 13 June 2014, in **Tarbes (FR),** organized by University Bordeaux and ENI Tarbes
- June 2014, in **Basque country (ES)**, organized by Tecnalia and Ibarmia
- June 2014, in **Minho (PT)**, organized by Uninova and University of Minho
- 10-11 July 2014, in **Stuttgart (DE)**, organized by DITF
- 16 July 2014, in **Genova (IT)**, organized by Softeco
- Sept. 2014, in **Milano (IT)**, organized by POLIMI, TXT and Softeco

If you are interested to participate in one of the MSEE workshops and you want to receive more information (dates and agenda), please send an email to info-MSEE@txtgroup.com

MSEE Workshop on "Methods and Tools for Servitizing within a Manufacturing Service Ecosystem" during ICE 2014

Save the date! MSEE will organize a workshop on **24 June 2014** in Bergamo (IT) during the ICE conference (website) in order to present a "Roadmap of exploitable assets by developing a use case" which is a set of tools which are useful for a potential SME and a sequence of steps to follow, and the Bivolino and Indesit Use Cases in MSEE.

And also…

MSEE plans to participate in the following events:

- 6th CIRP **Conference on Industrial Product-Service Systems**, 1-2 May 2014, Ontario (CA)
- **ICE IEEE TMC 2014**, 23-25 June 2014, Bergamo (IT)
- **European Conference on Information Systems**, 9-11 June 2014, Tel Aviv (IL)
- **World Manufacturing Forum** (WMF 2014), 1-2 July 2014, Milano (IT)
- **International Conference on e-Business** (ICE-B), 2-4 Sept. 2014, Vienna (AT)
- 29th **ACM/IEEE Automated Software Engineering** conference, 15-19 Sept. 2014, Västerås (SE)

MSEE past events

- Special Session "**Model-Driven Service Engineering: New Paradigms for Services Development in the Manufacturing Domain** (MDSE 2014)" at MODELSWARD 2014, 7 Jan. 14, Lisbon (PT) website
- MCPC 2014 World Conference on **Mass Customization, Personalization, and Co-Creation**, 4 Feb. 14, Aalborg (NL) website
- **FIA Athens 2014**, 18-21 Mar. 14, Athens (GR)
- **Factories of the Future (FoF) Impact Workshop** 2014, 24 Mar. 14, Brussels (BE)
- I-ESA Workshops 2014 – **International Conference on Enterprise Applications and Systems**, 25 Mar. 14, Albi (FR) website. MSEE co-organized 3 workshops on:
  - "IoT Interoperability for Manufacturing: challenges and experiences"
  - "ICT Services and INteroperability for Manufacturing" and
  - "Standardisation Developments for Enterprise Interoperability and the Manufacturing Service Domain"
- 9th annual **European Textile Platform** Conference, 31 Mar. 14, Brussels (BE) website
- **Technology Cooperation Days** 2014, 8-10 Apr. 14, Hannover (DE)