SME Services in an Open Environment with Demand on Risk Management

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Abstract
Large organisations tend to force suppliers to follow their rules in terms of IT and organisational solutions. Small and medium size enterprises (SME) have still no choice. Usually they have to follow the pressure and in a worst case to implement for each customer or supplier specific processes and IT solutions. Sometimes this results in additional cost and time consuming manual tasks. Therefore, SME require real and reliable, pluggable, cost and time-efficient solutions for the integration of their resources into network structures implying organizational, process, semantic and IT interoperability. Also, new cooperation challenges such as risk management compliance to European regulations need to be considered in the service provision. This requires a flexible configuration of services depending of the current business, legal and policy demands. The vision is the provision of the ability for enterprise interoperability by a flexible service invocation.

Keywords
Interoperability, Open Source, SME, Risk, Service, WEB

1 Introduction

Cooperation between organisations has been extensively increased in the past decade. Industry requires short-term response on market opportunities to be successful. It results in cooperation between independent organisations and their bundling in value-added collaboration networks in terms of product development, production, maintenance and recycling. Especially small and medium size enterprises (SME) are confronted with tremendous demands of conformity to requirements of their business partners related to business processes, process quality, risk management and assessment conformity, etc.

The example of compliancy to risk management regulations illustrates the dynamic in the challenges within enterprise collaborations. Strong regulations in the US (Sarbanes Oxley Act (SOX404)) [Sarbanes-Oxley Act, 2002] and related upcoming EU regulations can influence the interaction between supplier, customer and service providers. Even SOX is related to corporations (e.g. INC, Ltd, PLC, CORP), the requirement of risk management for the trust will be sent (upstream) and influence their supplier network consisting of smaller companies independent of their legal form. Therefore it can be expected that the handling of risks will become more important in cooperation between companies. This will lead to risk management requirements also within smaller companies as reflection of the risk prediction in their cooperation and could result in the provision of different solutions for different customers. Risk management approaches and solutions exist for smaller companies [COSO, 2006] as well as for supply chains. But the solutions are not homogenous and directly interoperable. Therefore the alignment of risk handling between organisations and therefore their interoperability will become more important in a world of enterprise networks covering value added services, supply chains, virtual organisations etc.).

Handling distributed organisations; large companies tend to react with the establishment of company standards which are distributed to their subsidiaries in order to manage better both cooperation and complementary risks within their trust. They also have a tendency to force suppliers to follow their “company standard” in terms of IT and organisational solutions. Unlike large companies, SME cannot rely on company-wide standards and require far more flexible
solutions and interoperability to cooperate in different networks within different partnerships. However, the targeting on shareholder value in large organisations results also in an increasing outsourcing of assets (machines, buildings, staff, etc.). Therefore, also large organisations can not simply rely on their “standards” ensuring interoperability e.g. for seamless risk management between the related solutions of the different organisations.

To express the requirement of interoperability the following simple example of establishing a decentralized video conference via web with participants and presentations distributed locally is taken (Figure 1), but still today an amount of challenges appear such as

- Setup effort of the systems
- Configuration challenges for each participant (e.g. IP-Address)
- Security issues (ports blocked)
- Missing compatibility of local conference systems to other devices
- Technical support and administration demand

![Diagram showing barriers to interoperability](image)

**Figure 1:** Simple example: Non-interoperability between conference system and web

The simple issues above still exist (Figure 1) even digital virtual environments are addressed since a long time. One reason might be missing cost-efficient and standardised services for such jobs. In contrast solutions exist for telephone conferences with the provision of easy to use and cost efficient services. Solutions for business-oriented, user-friendly services should also have a competitive edge on the market because of the cost of absence of interoperability such as the following identified throughout different domains:

- Insufficient interface management to suppliers costs the European automotive manufacturers about 14 Billion Euro per year and German manufactures approximate 900 Euro per car related to interoperability issues but in Japan it is only 150 Euro [Automobilwoche 2007],
- The US-construction-industry loses about 15 Billion US Dollar because of insufficient interoperability [M. Gallaher, et al., 2004].

## 2 Challenges

A huge amount of activities related to interoperability and service oriented architectures have been done in the European framework program FP6 (ATHENA-IP, INTEROP-NoE, SeCSE, etc.) and advanced in FP7 (COIN, etc.). Technology platforms such as NESSI have been established and provided frameworks for coordinated research. But still the gap between the research solutions and existing implementations in the industry exists. It does not mean that the industry requirements are underestimated. The requirements given by industry are really taken
into account in the research projects as well as in the standardisation process. But the economic, knowledge and technical barriers to change from a standard client server approach to service orientation and distributed or federated applications are still high. Particularly with regards to the tendency of large IT providers to stay in their proprietary system a change to an open service orientation might also request a change of providers.

In the specific case of risk management solutions exist but in terms of enterprise interoperability the question is how to align these solutions in a flexible and federated way to allow different configuration of partners at the same time without changing the system or providing for each customer another solution. This can imply all aspects such as financial risks, risks of failure, risk of losing competitive knowledge, critical process parameters, etc.

Enterprise interoperability [ATHENA 2007] covers business, knowledge, technical and semantic aspects of interoperability [IEEE 1990]. Therefore finally the risk management in terms of interoperability can be seen similar to other approaches integrated in the business processes among the cooperating partners.

Facing the extensive increase of collaborative works, the technical challenge is the implementation of interoperability capability by developing an open environment to provide methods, software packages and consultancy services to help organisation in their cooperative work. Such environment needs to be attractive in order to evolve into a standard way of creating and providing services for collaborative work.

New business models and governance approaches are required for services together with open source software management to allow companies an on demand usage like a telephone call. The open environment should have an open source base to allow different organisations and projects to work in a standardised way and compatible mode but in a distributed and organisational independent manner.

It is expected that strong EU regulations such as for risk management and for environmental management will create a market for related services in the next years. Related to this strong market demands risk management services but also technologies around RFID for tracking goods because of requests of the transparency of the product life cycle need to be further considered in the future design of service solutions.

It is expected that especially medium-size organisations will require support services (software, consultancy and technology mediation). The assumption is that the existing tools are too complex, proprietary and expensive. Therefore, it can be assumed that easily configurable service packages based on an open source software base together with process implementation services will have a competitive edge on the market.

Services supporting cooperative work between organisations incorporating enterprise modelling, semantic aspects, knowledge management, organisational aspects, enterprise interoperability, human interactions, decision structures, risk assessment, and management can benefit from existing approaches resulting from projects such as ATHENA-IP (www.athena-ip.org), INTEROP-NoE (www.interop-vlab.eu), TRUSTCOM, SPIDER-WIN (www.spider-win.de), FLUID-WIN (www.fluid-win.de) etc. in FP6 and now COIN-IP in FP7. Their results can be the initial starting point of the service development especially in terms of real plug-and-play behaviour.

Regarding the standardisation of such “open environment” it is important to harmonise the development with other activities for example with the “Open Software Model and Collaboration Mechanism for Service Oriented Computing” in China.

3 Approach

The approach out of two FP6 EU projects (SPIDER-WIN and FLUID-WIN) illustrates the adaptation of services to the needs of SMEs. SPIDER-WIN considered the handling of events
regarding the order management within the supply chain. The result is an application service which ensures that an event such as a change request can be registered immediately by all concerned stakeholders. Therefore, tier 4 can get a related change request of its order without delays caused by tier 1-3. Taken into account the usually restricted IT resources of SMEs, those companies need only an internet connection but if required this application service can be implemented in the IT infrastructure of an enterprise.

The addressed market is the industry from IT providers, manufactures to service providers because all need to cooperate also with each other. Therefore the project FLUID-WIN extends the SPIDER-WIN results and illustrates an example for services supporting cooperation between financial, logistic services and supply chain networks. It provides a first step of effective but easy-to-use services which are adaptable in their implementation. For example, it is possible to connect the services to local systems of the supplier but if the supplier does not have such systems or does not want to connect them a manual interaction can be used.

![Network Model Diagram](image)

**Figure 2: FLUID-WIN Service Concept (Source: FLUID-WIN Heiko Weinaug)**

FLUID-WIN provides a number of services on top of a communication middleware which is supported by an Application Service Provider (ASP) concept. The novel B2(B2B) model of FLUID-WIN targets to easy adaptable support service processes attached to a B2B network with low customization effort. For this purpose, there is the necessity for generalized models as well as for company- and service-specific models. In order to establish a general, re-usable base for the services, an Interdisciplinary Service Model is defined that specifies workflow templates which implement the functionalities and the parameters that can be adjusted to instantiate these templates. In addition, different functionalities need to be selected and connected for specific customized services. The instantiation, parameterization, and connection of the workflow templates is conducted with the support of an Interdisciplinary Service Modeller, which then in turn results in the definition of operating services, which are used by a Service Engine to drive the B2(B2B) business processes in the FLUID-WIN Platform (FLWP).

Consequently, the path for the creation of particular services starts from general schemes that are defined for the platform independently from specific users:

- The workflow-oriented business services define the typical and ideal workflow of the business services provided through the B2(B2B) platform, including activities conducted by the platform as well as services performed by the participating companies.
- Functionalities define the workflow within the FLUID-WIN Platform. Functionalities are used by one or more business services.
Methods that support one or more functionalities.

The service workflows are implemented without relationship to the companies, and are therefore templates which form the Interdisciplinary Service Model and need to be customized before they can be used in operation.

In order to establish required B2B(B2B) services, the Network Model with information about the network members is required (e.g. company name, location, user’s roles and access rights, interoperability parameters, etc.). This information is static, i.e. it does not depend upon the services that the company uses or will use in the future. In order to operate on the platform, templates are instantiated and configured with respect to the involved companies as well as with data specific for the service. [FLUID-WIN 2008]. Currently the FLUID-WIN approach does not cover the risk management aspect explicitly but in terms of the financial services it is already implied. These services are considered to support a faster provision of requested money based on information about the company and the customer orders.

Summarising out of European and international research and development activities a wide range of approaches and solutions exists. But, the current situation is characterised by islands of solution and research prototypes. Therefore a holistic concept seems required. Just as a first attempt without describing too many details such holistic approach should incorporates the following aspects in a standardised way:

1. Open Service Ecosystem
2. Interoperability services
3. Service Engineering and business concept for open services
4. Service packages for
   - risk assessment and risk management
   - object tracking
   - virtual machine handling
   - etc.
5. eLearning concept to accelerate the knowledge transfer to industry
6. Reference models and cooperative work templates
7. Service management and governance concept
8. Reference implementations and real world business scenarios
9. Consortium to ensure sustainability

The approaches have to incorporate concepts and solutions under consideration not only in Europe but also in China, USA etc. Otherwise the idea of a “standard” open environment for services can not survive in a global market. Already a large problem for interoperability is the heterogeneity of standards required for interoperability solutions. This is reflected in a statement coming from an SME during an industrial project:

“A lot of - interoperability - solutions are on the market but each of my customers uses a different one and this only increases the costs because I have to buy several systems”.

The solution adopted by this SME was to do the work manually which unfortunately affects the order to customer delivery time and therefore the competitive edge on the market.

4 Conclusion

In the paper presented the risk management aspect has been taken as one possible example for an application provided by an open service environment as in opposite to larger organisations in smaller companies risk management solutions are currently less implemented. This could lead to a better market acceptance of such service because under the upcoming EU regulations related to
SOX404 the need of implementing such solutions might increase. This results in two major complementary challenges to be handled by the industry especially by SMEs in the next years:

- Enterprise interoperability as prerequisite for co-operations between organisations—Enterprise Modelling, Semantic, Knowledge, IT management for SME [Kai Mertins, et al., 2008]

- New European regulations concerning risk management

Organisations such as the INTEROP-VLAB and in Germany the DFI e.V. do valuable work on a harmonisation approach for Enterprise Interoperability approaches, but a sustainable technical open source platform providing SMEs with real understandable and applicable solutions is so far not seen. Research is required how enterprise interoperability can benefit from an open source policy. Related to this issue is the availability of research results to SMEs which lacks details and is related to the availability of business models (e.g. How to make money if the service is for free?).

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