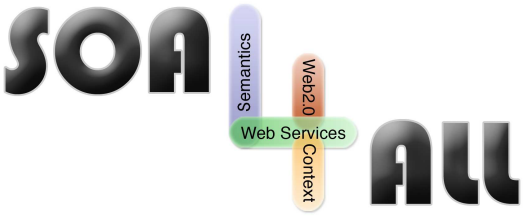


Project Number: **215219**

Project Acronym: **SOA4All**

Project Title: **Service Oriented Architectures for All**

Instrument: **Integrated Project**

Thematic Priority: **Information and Communication Technologies**

D12.6.4 Final Collaboration Activity Report

Activity 4:	Activity 4 – Exploitation and Impact Activities
Work Package:	**WP12 – Dissemination**
Due Date:	31/03/2011
Submission Date:	31/03/2011
Start Date of Project:	01/03/2008
Duration of Project:	36 Months
Organisation Responsible of Deliverable:	Atos Origin
Revision:	1.0
Author(s):	Belén Serrabou (ATOS), with contributions from partners
Reviewers(s):	Reto Krummenacher (STI) and Maurilio Zuccalà (Cefriel)

Project co-funded by the European Commission within the Seventh Framework Programme (2007-2013)		
Dissemination Level		
PU	Public	**X**

Version History

Version	Date	Comments, Changes, Status	Authors, contributors, reviewers
0.1	31 January 2011	First version	Belén Serrabou (Atos)
0.2	10 February 2011	Inputs from partners	Belén Serrabou (Atos), Jesus Gorroñogoitia (Atos), John Domingue (OU), Sven Abels (TIE), Reto Krummenacher (STI) , Juergen Vogel (SAP), Maurilio Zuccalà (Cefriel), Nathalie Steinmetz (Seekda), Lyndon Nixon (STI), José María García (US), and Jean-Pierre Lorré (EBM)
0.3	21 February 2011	Revision of existing material and corrections	Belén Serrabou (Atos)
0.4	9 March 2011	Introduction, Executive summary, conclusions, formatting, revision & validation of the final version of the document	Belén Serrabou (Atos)
0.5	15 March 2011	Ready for internal Review	Reto Krummenacher (STI) and Maurilio Zuccalà (Cefriel)
1.0	31 March 2011	Ready to Submit	Belén Serrabou (Atos)

Table of contents

Glossary of Acronyms

Acronym	Definition
COIN	Enterprise Collaboration and Interoperability
EC	European Commission
FAST	Fast and Advanced Storyboard Tools
FIA	Future Internet Assembly
FIArch	Future Internet Architecture
FINES	Future Internet Enterprise Systems
FIRE	Future Internet Research Experimentation
FIS	Future Internet Symposium
FP7	The 7th Framework Program
ICT	Information and Communication Technology
IST	Information Society Technology
NESSI	Networked European Software and Services Initiative
NEXOF	NESSI Open Service Framework
NEXOF-RA	NEXOF Reference Architecture
NSP	NESSI Strategic Projects
NWG	NESSI Working Groups
PPP	Public Private Partnership
S&S	Software and Services
S-Cube	The Software, Service and System Network of Excellence
SLA@SOI	Empowering the Service Economy with SLA Aware Infrastructures
SME	Small and Medium Enterprise
SOA4All	Service Oriented Architectures for All
SPICE	Service Platform for Innovative Communication Environment
STASIS	Software for Ambient Semantic Interoperable Services
USDL	Unified Service Description Language
WG	Working Group
WS	Web Service

Executive summary

This deliverable reports the most relevant collaboration activities carried out by SOA4All together with other projects and initiatives.

This deliverable is the third and final version of the Collaboration Activity Report and it provides information at two levels:

- ✓ It reports main relevant collaboration activities carried out along the last year of project development
- ✓ It provides an assessment of all collaboration activities during all the project with the aim of identifying the real impact on SOA4All

In all collaboration activities there is always a benefit not only for SOA4All, but also for the other activity involved in the collaboration. Collaboration with other projects helps to position SOA4All within a more general context of initiatives and projects contributing to a better understanding of our own project but also of the others.

Benefits range from an increased visibility of project results to a reduction of costs to perform specific tasks (be they technical or related to dissemination), or to the achievement of more ambitious scientific or industrial goals that go far beyond the objective of a single project.

SOA4All collaboration was very active during the entire project, and the project consortium got the achievements by addressing mainly the following projects/ initiatives/ sets of projects:

- ☐ **NESSI** European Technology Platform and its flagship project **NEXOF-RA**, besides the community of NESSI Strategic Projects, NESSI-driven events like ServiceWave and the NESSI Projects Summit.
- ☐ Initiatives around **Future Internet** such as **FIA, FIS** and **FIArch** and thus collaboration with many projects. The FIA have positioned SOA4All as one of the main projects within the pillar “Internet of Services”. John Domingue is Caretaker for FIA and he is on the Steering Committee for the FIS. Atos Origin had included some SOA4All results in the FI Core Platform developed in the FIWARE project.
- ☐ **University of Seville** joining the project as a result of discovering the clear synergies between some of the SOA4All technical works and the ones carried out by University of Seville.
- ☐ **STASIS**, addressing both technical contributions and joint dissemination events such as the Semantic Week pushed by STATIS with the collaboration of several projects in the Semantics area
- ☐ **S-Cube,** with a focus on scientific collaboration and training activities via the SSAIE Summer School
- ☐ **ESTC**, three ideas from SOA4All were presented at the Venture Capitalist Seedcamp.
- ☐ **STI** International, through which SOA4All can reach a wider constituency in the Semantics area and have a strong presence in numerous events like the

OCG Forum Semantic Systems or the Semantic Data Management Initiative

- **COIN**, with which SOA4All has defined a concrete agenda of technical contributions to benefit the two projects. Now we are investigating whether iServe can be connected to COIN.
- Internet of Services and **W3C USDL XG**; Collaboration on various different service related technologies and tools to allow large-scale, service-based business networks over the Internet.
- Many other projects such asNetChallenge, Omelette, CHOReOS, LarKC, NoTube, FAST and mEducator to name a few.

All these collaboration activities show the activeness of SOA4All project. Many synergies have been discovered between other projects showing the greater SOA4All impact had in the research community.

1. Introduction

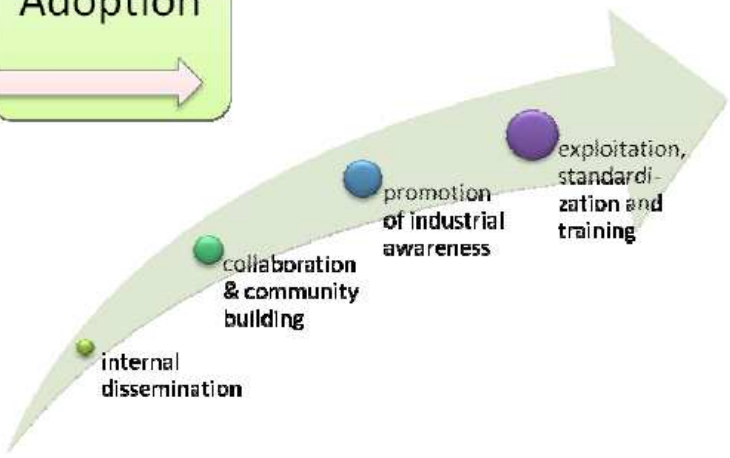
1.1 Purpose and scope

This document is the third and final version of the Collaboration Activity Report. Its main purpose is, on the one hand, to provide an update of the collaboration activities carried out by the SOA4All project along the third reporting period of the project, and on the other to provide a general assessment of the collaboration done during the whole project.

It is impossible to understand this deliverable without considering its former versions: D12.6.1 Definition of Collaboration Activities, submitted in M6, D12.6.2 First Collaboration Activity Report, submitted in M12 and D12.6.3 Second Collaboration Activity Report, submitted in M24. In addition to these documents, and as part of WP12, - devoted to the overall dissemination of SOA4All - it is relevant to take into consideration the contents of other related deliverables: the dissemination strategy set up in the first period of the project (D12.1.1 submitted in M6), its revision (D12.1.2 submitted in M18) and of course the different versions of the Dissemination Activity Reports ready in M12, M24 and M36, respectively.

Finally, as said, collaboration happens in the context of the overall dissemination strategy of SOA4All and as a result, it has an impact on the creation and update of the dissemination material and tools already created by the project as well as on other impact-related activities, such as standardization, training and of course exploitation.

Because of this intimate relationship between all these WPs and their tasks, the information is often repeated, but this will help to even more communicate the main messages, including both intentions and actions of SOA4All with respect to collaboration.



1.2 Structure of the document

In this version of the deliverable we avoid the repetition of content that was already distributed through previous versions of the deliverable. As a result, we have focused

on the actions performed in the last year of project execution (specifically between March 2010 and February 2011). We consider that part of this information is also explained in a complementary way in the Dissemination Activity Report released at the same time than this report and therefore we took the freedom of including almost only new information instead of adding new data to the older version.

Besides the executive summary and other common sections included in all SOA4All deliverables, this document is divided into the following chapters:

- ✓ Chapter 2: Update of collaboration activities performed in this period by SOA4All together with other stakeholders, either projects or other kind of initiatives
- ✓ Chapter 3: Brief assessment of all collaboration activities during all the project

1.3 Audience

The following groups compose the audience of this deliverable:

- ✓ Partners in the SOA4All consortium
- ✓ Projects and initiatives that have already collaborated with SOA4All
- ✓ External audience, since reading the document may provide inspiration for further activities

2. Collaboration activities for the third year

When we defined the strategy of the Collaboration Plan, two different modalities were pointed out:

1) Exploitation of synergies at the technical level
2) Joint dissemination actions

The two of them are of utmost importance for SOA4All because they allow the project:

- **Perform same activities that we could do individually**, but in a faster and cheaper way (sharing resources and gaining experience from each other). This could be the case of attending an event together with another project, as SOA4All did for the Research Connection by sharing a stand and related efforts and costs with the STASIS project
- **Perform activities that we could not do as an individual project**, such as the organization of the Semantic Week. For this to happen a lot of activities and resources are required, as well as different points of view on the use of Semantic technologies that only many diverse projects with different approaches can guarantee.
- **Increase the impact of the project**. This is by taking advantage of being a NESSI Strategic Project and Initiatives around **Future Internet** such as FIA, FIS and FIArch. The FIA have positioned SOA4All as one of the main projects within the pillar “Internet of Services”. John Domingue is Caretaker for FIA and he is on the Steering Committee for the FIS. SOA4All has participated actively in all FI related events.

The following activities have been carried out during this period:

2.1 SOA4All and its collaboration with NESSI and NEXOF-RA

2.1.1 Collaboration with NEXOF-RA in Year 3

NEXOF is one of the main goals of NESSI, the European Technology Platform on Software and Services (S&S). NEXOF as such refers to the NESSI Open Service Framework, that is composed of several elements, among them: the so called Open Reference Model, Open Reference Architecture, Open Reference Implementation (the target of NESSI for the medium term is the implementation of one of them, although understanding that many alternative implementations may be possible), Conformance Test Suite and validation of NEXOF instances in real scenarios (for this, kind-of instantiation guidelines are required to go from the abstract world of a generic architecture to the real implementation and deployment of the architecture into a specific industrial domains and contexts).

For these ambitious goals NESSI works with main industrial companies in the S&S field since several years ago and represents other groups like the one of SMEs (especially important in Europe, since the S&S industry is very fragmented). Besides the contributions of companies and individuals, NESSI defined a cooperation program that gave birth to the definition of a set of coherent projects addressing

different and complementary research challenges to build systematically the aforementioned NESSI Open Framework, or NEXOF.

NEXOF-RA is the project in charge of defining the Reference Architecture, but not all the elements of NEXOF and of course, it does not address all the working areas defined under the NESSI umbrella. As part of its activities, NEXOF-RA got the challenge of defining a collaboration process to allow many projects working in the S&S area, amongst many other NESSI strategic projects and in particular SOA4All, to cooperate towards the building of NEXOF.

SOA4All and other projects thus provided direct contributions to the concrete expected outcomes of NEXOF-RA: the Open Reference Model and the Open Reference Architecture. In addition to that, NEXOF-RA works towards the realization of proof-of-concepts that validate the technical choices of the project as well as the NEXOF Roadmap, which will provide the basis for the sustainability of NEXOF, including its implementation and further use (exploitation).

During Year 3 of SOA4All, the collaboration with NEXOF-RA was concluded shortly after the participation to the last NEXOF-RA Architecture Board Meeting that took place in Rome, May 17-18, 2010. After the reference architecture-related discussion in previous meetings, the main topic of the last board meeting was the implementation of Internet of Services patterns, for which SOA4All has done significant research throughout the last three years and on sustainability of the project results and the architecture board.

2.1.2 Collaboration with NESSI: NESSI Projects Summit

SOA4All, as NESSI Strategic Project, is one of the projects that were actively promoted at the NESSI Projects Summit in Valencia (12-13 April 2010).

The NESSI Projects Summit focused on the collaboration between NESSI projects at this stage of their developments, when many of them showed live demos and promoted the use of their software components in other projects. Attendees got an overview of what is the status of all NESSI projects and had the opportunity to follow them more in detail during the second day thanks to the parallel thematic tracks that have been defined by the conference organizers.

Day 1 focused on the role of NESSI in the Future Internet as well as on providing an overview of what has happened in NESSI in the last period, general progress of all the NESSI projects and the contributions to NEXOF as well as on other issues such as INES (the Spanish initiative on Software and Services) as successful implementation of a National Technology Platform.

Day 2 changed the approach and offered attendees an attractive agenda with three parallel tracks: Track 1 for Service Platforms and Service Infrastructures, Track 2 for Service Front-ends and finally Track 3 for SMEs and National and Regional Initiatives.

Further information at http://www.r2sconference.eu/sideEvents_nessiSummit.php.

The collaboration of SOA4All with NESSI in this NESSI Projects Summit had been represented though three main contributions:

- ✓ Day1: presentation of the progress beyond the state-of-the-art in the Service Layer driven by SOA4All representative John Domingue (The Open University).
- ✓ Day 2: SOA4All parallel session in Track 1b. Service Platforms and Service Infrastructures. See agenda of this session below.
- ✓ SOA4All had a stand during the entire week that happened in Valencia (not only NESSI Projects Summit, but also FIA and the launch of the FI PPP).

Track 1b - Services Platforms & Service Infrastructure

15:00 - 16:30 SOA, Semantics & Web 2.0: Towards a Web of billions of services (driven by SOA4All Project)
(Chaired by John Domingue, The Open University)

15:00 - 15:10	Introduction. Goals and objectives	John Domingue, The Open University
15:10 - 15:45	Technical architecture including repository server, semantic representations (MicroWSMO and WSMO-Lite) engines and tools	Carlos Pedrinaci, The Open University
15:45 - 16.00	SOA4All Business Value: towards real applications	Nuria De Lama (Atos Origin)
16:00 - 16:20	SOA4All as Service Delivery Platform in the Public Sector	Juergen Vogel, SAP
16:20 - 16:30	Q&A	

Figure 1: Agenda of SOA4All parallel session in the NESSI Projects Summit

2.2 Internet of Services 2010: Collaboration meeting for FP6 & FP7 projects

As Chair of the Semantic Technologies WG John Domingue organized a Semantic Technology session at the Internet of Services collaboration meeting in October 2010. There, Carlos Pedrinaci presented the SOA4All tools which could be taken up by the new projects. Beniamino Di Martino, the Project Coordinator of mOSAIC[1], has made a specific request based on this. Also, the Envision[2] project aims at reusing SOA4All results.

In his role as FIA Caretaker John Domingue co-chaired the FIA session.

2.3 SOA4All and The Future Internet

SOA4All has followed the development of all the initiatives regarding The Future Internet.

2.3.1 Future Internet PPP

Atos Origin has included SOA4All results in the Future Internet Core Platform developed in the FIWARE project. In particular, semi-assisted process modelling features developed in SOA4All will be reused and extended. Atos is planning to complement mashup and business process modelling solutions included in FIWARE

[1] http://www.mosaic-cloud.eu/index.php

[2] http://www.envision-project.org/

CP with semi-assisted process modelling features provided by the SOA4All Design Time Composer (DTC). The DTC shall be integrated with the Oryx Process Editor, a Web 2.0 collaborative process editor that support BPMN 1.0, 1.2, 2.0 and other modelling languages. The DTC will automate various modelling features such as task binding, data flow generation, etc. Oryx supports BPMN conversion into BPEL, so process models created using Oryx-DTC will be executable. DTC will rely on semantic services and process descriptions stored within a metadata repository such as SOA4All iServe.

2.3.2 FIA Valencia

FIA took place in Valencia on 15-16 April 2010. The structure of the sessions had slightly changed with respect to previous meetings based on the preferences expressed by companies involved in FIA. Main topics discussed there were:

- ✓ Architectures: FI Reference model
- ✓ FI and smart energy
- ✓ Foundations of Trust
- ✓ What does Future Internet mean for enterprise?
- ✓ Architectures: which concrete results are already available?
- ✓ Smart Health
- ✓ Economics of information for citizens, communities and commerce
- ✓ Search in the future Internet: SMEs and citizen perspectives
- ✓ Architectures: how to move white papers and ideas to standardization?
- ✓ What does Future Internet bring to smart cities?
- ✓ FIRE

There were representatives of SOA4All attending in different sessions. Many of the projects with which SOA4All is already collaborating signed the Bled declaration and are already engaged in this initiative, too. Furthermore, John Domingue (OU) in his role as a Caretaker for FIA supported the design of the whole event and the selection of sessions. He also was a co-organiser of the session *Search in the Future Internet*.

2.3.1 FIA Ghent

FIA took place in Ghent on 16-17 December 2010. As before, in his role as a Caretaker for FIA John Domingue supported the design of the whole event and the selection of sessions. He was a co-organiser of the “Search as an Architectural Component Session”. As Caretaker for the software and services area he presented the connection between Services and Linked Data in the Linked Data session (other speakers in this session included Sir Tim Berners-Lee). John Domingue and Barry Norton presented two SOA4All position papers at the Linked Data session and these papers are now up at the Future Internet Linked Data WG at http://linkeddata.future-internet.eu/index.php/Main_Page.

With four other Caretakers John Domingue co-authored the initial drafts of the “What is FIA” document which is now up on the Future Internet Portal and has formed the basis for the formation of a FIA Steering Committee which he is part of.

John Domingue and Dieter Fensel were both on the Scientific Steering Committee for one of the Future Internet PPP core platform proposals.

Dieter Fensel and John Domingue are on the Steering Committee for the Future Internet Symposium (Dieter Fensel is the Chair of this committee). The symposium took place in Berlin in September 2010 with approximately 120 attendees and a keynote from Mario Campolargo, Director of the Emerging Technologies and Infrastructures at European Commission.

2.3.2 Future Internet Architecture Working Group

Since late 2010, SOA4All contributes via expert consultations to the Future Internet Architecture (FIArch) group. The FIArch Experts Reference Group’s main activity is currently in identifying and categorizing “Fundamental Limitations of Current Internet” technology. The limitations’ document focuses on a few key architectural issues, which are shared and agreed by the representatives of the working group, including various FP7 projects with the aim to contribute to an EC research roadmap towards Future Internet Architecture. The contributions of SOA4All to the group and the document were channeled via the FP7 CSA[3] project SOFI whose goal is to complement EU R&D projects in the area of Internet of Services, Software and Virtualisation (Objective 1.2) through specific support activities. SOFI aims to ensure the position of European research as a leader in the definition and realisation of the theoretical and technological foundations of the Future Internet of Services, as well as European industry's competitive advantage in the creation of value and new opportunities from its use. The SOFI project is one of the coordinating support actions to the FIArch WG and as such one of the main contributors to the definition of the reference architecture for the Future Internet, with the role of representing the Internet of Services.

The role of SOA4All was thus to support and strengthen the SOFI team, and to provide expert feedback and consultations to the “Fundamental Limitations of Current Internet” report, focusing on the services aspects of the Future Internet. As part of this collaborative activity with SOFI and the FIArch WG, SOA4All has participated in various phone conferences with the experts reference group, and was present with a statement at the Future Internet Architecture Session during FIA Ghent in December 2010.

2.4 W3C USDL Incubator Group

In September 2010 the USDL Incubator Group (XG) was initiated by Attensity, DFKI, SAP, and Siemens, later joined by the Open University. Its mission statement is given on http://www.w3.org/2005/Incubator/usdl/charter as follows: “The mission of the Unified Service Description Language (USDL) Incubator Group, part of the Incubator Activity, is to define a language for describing general and generic parts of

[3] Coordination and Support Action

technical and business services to allow services to become tradable and consumable."

The USDL incubator group has the following three goals:

1. Investigate related standards and approaches with respect to the compatibility and potential relation to the USDL,
2. Define a formal specification of the USDL, reusing existing standards where appropriate,
3. Define and implement reference test cases to validate the USDL.

The recommendation of SOA4All to the USDL XG was to investigate the established Web architecture and standards (languages, protocols and technologies) and to re-use existing service description vocabularies (e.g., from SOA4All) and existing ontologies for describing things like time, location or contracts. Concrete actions coming from this collaboration are the preparation of an RDFS version of large parts of USDL, and the participation of various SOA4All experts in the USDL XG (see Section 2.17). Although, the USDL meta-model is formally defined in Ecore (the meta-modeling language of EMF), SOA4All is working on bringing the service description language closer to Web standards. More details can be found in SOA4All deliverable D11.3.1.

2.5 SOA4All at ICT 2010

The ICT event is the most important event on ICT supported by the European Commission. In the 2010 edition (Brussels, 27-29 September 2010), projects and organizations could find:

- ✓ Discover latest research trends in information and communication technologies
- ✓ Learn about European priorities for 2.8 billion Euros research funding in ICT, 2011-2012
- ✓ Meet potential research and business partners at dozens of networking sessions
- ✓ Visit an exhibition with over 5000 square meters of Europe's latest cutting edge ICT research

SOA4All has created a proposal for the open call for exhibitions, which has been accepted by the organizing committee. SOA4All has used this chance to organize an outstanding stand showing the project and its results. The demonstration has focused on the SOA4All Studio demonstrating the SOA4All tools in the project use cases. In particular, the SOA4All team has demonstrated some of the main functionalities provided by the SOA4All Studio through its user interface (e.g., editors for annotating services, lightweight platform for the consumption of semantically enriched services, analysis platform for monitoring service performance and usage results) in the context of realistic scenarios developed in the project.

Figure 2: Vadim (TIE), Stuart (TIE), Elies (ATOS) and Alistair (BT) in front of the SOA4All stand

The SOA4All stand has been outstanding compared to the other projects. It has been created in the overall slogan "The Service Jungle" showing people how SOA4All can help them to path their way along different web service approaches. The stand has been completed by a set of plants, plastic animals and other decoration and has finally won a price of 3.000 € by the ICT 2010 organization team.

John Domingue presented SOA4All standardization work during the ICT 2010 Networking session: "Support to Future Internet research standardization" and he presented as well the SOA4All context work during the ICT 2010 Networking session: "Middleware services for context prediction and proactive adaptation".

2.6 SOA4All and NetChallenge

SOA4All has exchanged information and ideas with the EU NetChallenge project (http://www.netchallenge.org).

European SMEs will have to adopt new business models and to establish dynamic and non-hierarchical networks to respond to market opportunities, assuring quick response, fast time to market, differentiated offerings and competitive prices. Sustainability for SMEs will be found in high-variety low-volume businesses, related with complex products manufacturing.

However, there are currently no proven, effective methodologies, approaches or tools to support SMEs in creating, managing and dissolving this type of dynamic and non-hierarchical networks. NetChallenge covers this gap with the design and development of effective methodologies, processes and ICT decision support tools.

SOA4All and NetChallenge participants have met in order to examine how SOA4All tools may be used in the NetChallenge project to define service based processes in non-hierarchical industry networks. It is proposed to use some of the SOA4All tools for service composition and consumption allowing NetChallenge to connect the different sub-components of the project.

2.7 SOA4All and Omelette

OMELETTE (http://www.ict-omelette.eu) aims at researching on the development, management, governance, execution and conception of converged services with a specific focus on the telco domain. OMELETTE will create a sound model of mashups that follows the REST architectural style (also supported by standard widget technology), as well as a standard specification of a mashup-containing platform that may guarantee portability and interoperability among different vendors and versions. OMELETTE has recently been starting and a first meeting has been performed between members of SOA4All and OMELETTE to demonstrate the SOA4All results and to exchange views and ideas on the EU service landscape.

2.8 SOA4All and S-Cube

SOA4All and S-Cube have different nature and can be seen as **complementary initiatives**, where collaboration mainly materializes at scientific dissemination level.

S-Cube (http://www.s-cube-network.eu/) focuses on **long-term** research and on promoting the development of an **integrated and multidisciplinary community**, whereas SOA4All focuses on the **specific case studies** proposed by industrial partners by adopting a practical approach.

A first example of collaboration between S-Cube and SOA4All was the joint position paper “Adapting Service Requests to Actual Service Interfaces through Semantic Annotations”, written by L. Cavallaro, G. Ripa and M. Zuccalà, published at Principles of Engineering Service Oriented Systems (PESOS) 2009, workshop of the 31st International Conference on Software Engineering (ICSE) 2009, May 2009, Vancouver, Canada.

The continuation of that research work is described the following papers:

- “An Automatic Approach to Enable Replacement of Conversational Services”, written by our colleagues involved in S-Cube L. Cavallaro, E. Di Nitto, and M. Pradella, published at the International Conference on Service Oriented Computing (ICSOC) – ServiceWave 2009, November 2009, Stockholm, Sweden.
- “SAWSDL for Self-adaptive Service Composition”, written by T. De Giorgio, G. Ripa, and M. Zuccalà (CEFRIEL), published at Beyond SAWSDL, an OnTheMove (OTM) Workshop 2009, November 2009, Vilamoura, Portugal.
- “An Approach to Enable Replacement of SOAP Services and REST Services in Lightweight Processes”, written by T. De Giorgio, G. Ripa and M. Zuccalà, published at the 2nd International Workshop on Lightweight Composition on the Web (ComposableWeb 2010), of the 10th International Conference on Web Engineering (ICWE 2010), 7-9 July 2010, Vienna, Austria.

Moreover, the following position paper was produced: “Self-Organization and SOA for Networked Enterprises”, written by E. Di Nitto and G. Ripa, published at the First International Future Enterprise Systems Workshop, co-located with the 3rd Future Internet Symposium, 20 September, 2010, Berlin, Germany.

CEFRIEL also participated in discussions and exchanges of knowledge with S-Cube people about the definition of a Context Model for service based applications. CEFRIEL also provided feedback to the methodology for describing use cases developed by the Collecting Use Case CWG of the S-Cube NoE.

2.9 SOA4All and CHOReOS

The FP7 project CHOReOS – Large Scale Choreographies for the Future Internet (http://www.choreos.eu) will implement a framework for scalable choreography development. The goal is to enable domain experts to develop decentralized ultra-large scale (ULS) solutions composed of heterogeneous services that are adaptable and QoS (Quality-of-Service) aware. The project started in October 2010.

CHOReOS will deliver formally grounded abstractions and models, dynamic choreography-centric development processes, governance and service-oriented middleware manipulated via an Integrated Development Runtime Environment (IDRE) aimed at overcoming the ULS impact on software system development.

CHOReOS will implement service middleware support, effectively enabling the deployment of adaptable, QoS-aware choreographies in the ULS Future Internet, integrating and further evolving the latest research advances in the area of Grid and Cloud computing, Enterprise Service Bus (ESB), and pervasive computing. Service-oriented middleware enables adaptable choreographies over ESB-based middleware, Grids, Clouds, and technologies for the Internet of Things, thus overcoming scalability and heterogeneity issues of the Future Internet. In that case, Choreos will leverage the SO4All Distributed Service Bus as the service middleware.

CEFRIEL, PetalsLink/EBM and INRIA are involved in the CHOReOS project.

CEFRIEL, in particular, will contribute to CHOReOS as for: requirements analysis; modeling, analysis and assessment of dynamic reconfiguration and dynamic service substitution mechanisms; and development of new lightweight approaches for automatic service substitution based on semantic annotations. CEFRIEL proposals, based on the experience matured in SOA4All, already received a positive feedback from CHOReOS partners. At the time of writing, a joint SOA4All-CHOReOS collaboration session is being organized; it is planned to take place at the beginning of April 2011 during a CHOReOS technical meeting in Toulouse.

2.10 SOA4All and COIN

The relationship between COIN and SOA4All has been present since the beginning of the two projects, being SOA4All a representative project of the service layer from a very technology-driven perspective, and being COIN the flagship project of service collaboration and interoperability and thus looking at the service layer from the viewpoint of enterprise systems. The presence of common partners as TXT, CEFRIEL, STI and ATOS should facilitate the implementation of these plans.

A COIN GSDP (Generic Service Delivery Platform) which is an open source instantiation of a generic SESA (Semantically Enabled Service Architecture, namely WSMX), specialized in the EI/EC domain, and empowered with advanced capabilities

for trust & security, distribution & scalability, reasoning and negotiation.

Open Univeristy is now investigating whether iServe can be connected to above such that Enterprise Interoperability and Enterprise Collaboration services described in iServe can be discovered by the COIN GSDP.

2.11 SOA4All and LarKC

The FP7 Integrated Project LarKC project, Large Knowledge Collider (www.larkc.eu) aims at developing a platform for massive distributed incomplete reasoning that will remove the scalability barriers of currently existing reasoning systems for the Semantic Web. The LarKC platform is an open-source realization of an experimentation infrastructure for interleaving search methods with inductive and deductive reasoning. As such, there is a natural overlap between SOA4All and LarKC in their interest for novel reasoning methods and engines. During previous collaboration meetings focus was hence set on exploring synergies in this respect mostly. More recently, with the re-structuring of the LarKC platform architecture towards a pluggable and more modular infrastructure, recently presented service annotation models caught the attention of the LarKC team. Different plug-ins for the identification of sources, the selection of subsets or particular datasets, and of course for reasoning are plumed together in workflows before executed in the LarKC platform. Both, workflows and plug-ins are semantically described according to a lightweight RDFS schema which was inspired by service description models of SOA4All for the annotation of input and output messages and the consumed respectively produced RDF graphs. For the latter, LarKC borrowed ideas from Linked Open Services and its principles.[4]

Further synergies between SOA4All and LarKC are exploited in the continued effort of improving the wsml2reasoner framework and in particular the IRIS datalog engine. The core IRIS reasoned was implemented in course of SOA4All, and more recently extended with a relational database binding for improved scalability. Taking this IRIS release as starting point, LarKC is now working on a parallelized reasoning implementation of IRIS termed ParIRIS for the rule-based reasoning that profits from a MapReduce approach. The goal is to come up with a fully Web-enable RIF-BLD reasoner; in this respect LarKC also extends the work on RIF4J that was partly done in scope of SOA4All.

2.12 ESTC 2010

The European Semantic Technology Conference brings together the world's leading thinkers, innovators, developers, engineers, and senior practitioners within organizations responsible for information technology and systems in one place to learn about how to integrate this unparalleled technology into their operations. ESTC is Europe's most prominent and authoritative conference focusing on the growth of the ICT semantic technology markets, highlighted by showcased industry practices, advancements in the field of semantic technologies achieved in the past year, and

[4] http://www.linkedopenservices.org

successful marketing strategies in delivering semantic applications that generate new revenues.

SOA4All was a Platinum Sponsor with a booth at the 2010 conference in Vienna. The SOA4All workshop was two hours long with keynotes from John Domingue - The Internet of Services, and Alistair Duke - Open APIs & New Business Models in Telecommunications, Usman Wajid - Integrated Enterprise Service Delivery Platform and Internet of Services - Opportunities & Barriers. (http://www.estc2010.com/program-menu/workshops#soa4all).

As the reviewers have recommended, three ideas from the project were presented at the Venture Capitalist Seedcamp:

- SOA4All Lightweight Business Process Modelling and Execution Suite - Elies Prunes (Atos Origin, ES)
- SOA4All Platform - Alistair Duke (British Telecom, UK)
- iServe - Services Marketplace - Carlos Pedrinaci (The Open University, UK)

Figure 3: Elies Prunés (ATOS) in the presentation of SOA4All at the Venture Capitalist Seedcamp

The presentations are available through this link:
http://videolectures.net/estc2010_vienna/

2.13 Open University Semantic Media Group

Building upon the success of the semantic media annotation and semantic media search tools, the Open University Broadcasting Unit has now setup a Semantic Media Group which aims to promote the use of semantics to support the management and use of rich media throughout the OU. One part of this work will be to see how SOA4All and other semantic technologies can support the OU course production process.

2.14 Resonance

As part of collaboration with Resonance (see http://www.willyouhelp.co.uk/) on February 18th, John Domingue attended an art installation event at http://www.paramount.uk.net to discuss with other project members how SOA4All can support interlinked TV shows and other narrative platforms. This invitation-only party had a number of prominent attendees from the Media and Broadcasing industry including: Chris Fry the Producer of Spooks, Foz Allen the Executive Producer of Robin Hood, Matthew Bouch the Producer of Being Human, Colin Teague the Director of Dr Who and the actor Charles Dance. Other attendees included high level representatives from the Imperial War Museum, the BBC and Bletchley Park.

Resonance is a multi-platform broadcasting project which aims to create a new Sci-Fi series to be broadcast on TV, published as a graphic novel and also facilitate ambitious forms audience engagement - allowing the audience to create new characters and plot lines.

KMi's involvement in Resonance is centred around the outcomes of the SOA4All project where we are exploring how Linked Data and Web Services can enable a "semantic data track" for broadcast media to complement the existing video and audio tracks. It is envisaged that the creation of this new layer will enable the connection of disparate heterogeneous resources and support audience engagement.

2.15 Semantic Data Management (SemData) Initiative

The goal of this initiative is to support an event series that provides a platform for the investigation of various aspects of semantic databases and data management in the large. Fostering discussions and trans-disciplinary collaborations on issues such as semantic repositories, their virtualization and distribution, and interoperability with relational solutions, XML and others was the motivating target.

The initiative was inaugurated with strong SOA4All support and participation with a roundtable in Sofia, Bulgaria, hosted by SOA4All partner Ontotext.[5] SOA4All was represented during the two days with different contributions by UIBK, Ontotext, INRIA and KIT. The participants profited from high quality scientific and technical discussions with researchers from VU Amsterdam and CWI, or industry representatives from Openlink Software, IBM, DOCOMO Euro-Labs and SYSTAP.

Further workshops organized by the SemData initiative were an invitation-only get-together during ESWC in Crete (May 2010),[6] and an official workshop during the VLDB Conference in Singapore (September 2010).[7] In addition to the high profile participants to the roundtable in Sofia, SemData managed to get experts from the University of Zurich, Verizon, Oracle, Franz Inc., and DERI Galway to discuss their most recent results, insights and plans on semantic data management in Crete.

[5] http://semdata.org/events/2010/sofia

[6] http://semdata.org/events/2010/eswc

[7] http://semdata.org/events/2010/vldb

Overall, the first two SemData events were listing ten of the 15 most renowned companies and research institutes in RDF databasing and data management.

The VLDB workshop on Semantic Data Management attracted research but also industry position paper, and was able to welcome roughly twenty additional participants that were not listed as publishers or organizers. The feedback was very positive and lasting impact could be created beyond the initiative and the organizing projects. The workshop proceedings are published at CEUR-WS: http://ceur-ws.org/Vol-637.

Further activities resulting from the SemData initiative is a dedicated track during ESWC 2011 that will be taking place in May/June 2011.[8] The track managed to receive 41 submissions, showing the relevance of the topic and the interest created. In 2012 there will be moreover a Dagstuhl seminar taking place under the organizational umbrella of the SemData initiative.[9]

2.16 Augmented Web Services Initiative

The goal of the Augmented Web Services initiative is to bring Semantic Web service research, technology and developments further and to adjust the research roadmap and business strategies to recent technological achievements in related fields such as the Web, Semantic Web, Web2.0, or EAI. The initiative represents a series of events and as such offers a discussion platform for researchers and practitioners in order to adjust the research direction with the most recent developments in the aforementioned related fields.

Organized by SOA4All, the initiative has set up a first meeting in Frankfurt on June 15, 2010 on the matters of “Semantic Web Services - Status and Strategy”.[10] The topics of the workshop were concentrated around the transition from heavy weight top-down approaches to Semantic Web services to more lightweight solutions pushed by SOA4All and others. Other important issues that were discussed, were the increasing importance of REST services and Linked Data. In this respect, there was a presentation given by Amit Sheth and his group on SA-REST, a recent W3C member submission on annotating REST services. Although started before the meeting, the workshop in Frankfurt significantly influence the work on Linked Services in iService, Linked Open Services and the submission of WSMO-Lite to W3C.

A second workshop that was organized under the patronage of the Augmented Web Services initiative was a meeting at SAP Karlsruhe on “connecting USDL with existing Web standards”.[11] The goal of the workshop was to explore synergies and future possibilities of collaboration between SOA4All and the USDL contributors (see Section 2.18) such as SAP, Siemens and various other member companies and institutions of the THESEUS/TEXO project. This workshop was the initial trigger for

[8] http://semdata.org/events/2011/eswc

[9] http://www.dagstuhl.de/de/programm/kalender/semhp/?semnr=12171

[10] http://www.augmented-webservices.org/events/ws-sws-june2010.html

[11] http://www.augmented-webservices.org/events/ws-usdl-october2010.html

the participation of SOA4All members in the W3C USDL XG (Section 2.5) and marked the official start of the lately introduced SOA4All task T11.3 on USDL pre-standardization.

2.17 THESEUS/TEXO

TEXO is a research project, within the THESEUS research program initiated by the Federal Ministry of Economics and Technology (BMWi) that is coordinated by SAP Karlsruhe. The main goal of THESEUS is the development of a new Internet-based infrastructure in order to improve both the usability and practicability of knowledge available on the Internet. Within the THESEUS program, TEXO works towards novel service economies by creating infrastructure components for the Internet of Services; with a focus on business aspects. To this end, the task of TEXO is to provide a platform that makes services tradable on the Internet, composable into value-added services, and allows for the integration of customized services into the environment of service consumers.

The Unified Service Description Language (USDL), a platform-neutral language for describing services, is used in the TEXO Service Runtime to enable the transition from conventional business services to executable web services in business-critical environments. In the movement to push USDL towards standardization, the USDL team from TEXO and an expert group from SOA4All have met in Karlsruhe to discuss possible routes to take (see Section 2.5). The primary goal was to exchange experiences and knowledge on how to standardize service languages, in particular in view of the W3C incubator group that was put in place.

The recommendation of SOA4All to the USDL team was to take a very good look at the established Web architecture and standards (languages, protocols and technologies) and to re-use existing service description vocabularies (e.g., from SOA4All) and existing ontologies for describing things like time, location or contracts. Concrete actions coming from this collaboration are the preparation of an RDFS version of large parts of USDL, and the participation of various SOA4All experts in the USDL XD (see Section 2.17). Although, the USDL meta-model is formally defined in Ecore (the meta-modeling language of EMF), SOA4All is working on bringing the service description language closer to Web standards; more details are to be found in SOA4All deliverable D11.3.1.

2.18 SOA4All and PLAY

The PLAY project will develop and validate an elastic and reliable architecture for dynamic and complex, event-driven interaction in large highly distributed and heterogeneous service systems. Such architecture will enable ubiquitous exchange of information between heterogeneous services, providing the possibilities to adapt and personalize their execution, resulting in the so-called situational-driven process adaptivity.

The main goal is to provide an open highly distributed Platform for event-driven interaction between services that scales at the Internet level based on a federated architecture able to address the multiplicity and the heterogeneity of service networks

and address Quality of Service (QoS) requirements (such as dependability, security and scalability) in very large scale Internet based networks. In the nutshell, the Platform will enable combining events from any services and pushing to any service on a global scale.

In a more general terms, PLAY will lay the foundation for the event-driven, push-based Future Internet, which enables sensing the changes in the environment/context and respond correspondingly, including affecting running business process in an ad-hoc manner.

Thanks to the participation of EBM WebSourcing and INRIA / Proactive team, the PLAY project will leverage the SOA4All federated DSB as a building block for the service infrastructure. It will be used and developed in order to take in charge the service layer and the Cloud event layer based on the P2P semantic space technology.

2.19 Maximizing collaboration: opportunities driven by partners

Even if many collaboration opportunities exploited so far appeared thanks to partners working in several projects, we have realized that a more careful look into the strategy and portfolio of organizations working in SOA4All can enable further discoveries for potential future works. Some relevant examples have been included here as a matter of examples.

2.19.1 SAP “Internet of Services” Project Cluster

The “Internet of Services” is a major research area at SAP Research and subsumes different technologies and innovations that allow to realize a large-scale, open, and dynamic business network over the Internet. SAP expects that the Internet of Services allows for completely new SAP solution offerings and makes existing SAP Applications even more attractive. For instance, customers could benefit from the SAP partner network by reaching additional services and giving feedback in a community on provided and new services.

Together with many other publicly funded projects, SOA4All contributes to the joint, SAP- internal project cluster Internet of Services (http://internet-of-services.com) by investigating technologies for describing, provisioning, hosting, discovering, trading, consuming, composing, securing, and monitoring services on the Internet. Besides regularly exchanging new ideas and research results, the projects also follow a joint research agenda and work on joint demonstrators whenever possible. The largest effort currently lies in the definition, advancement, and standardization of the USDL. Here SOA4All could provide valuable input in the form of a first working prototype for an application of the USDL in a business scenario (see http://internet-of-services.com/fileadmin/IOS/user_upload/pdf/SOA4All_KPI_Based_Process_Modeling.pdf, D7.5, D7.6, and D7.7) as well as feedback for the actual definition of the USDL and its standardization (see D 11.3.1). Table 1below gives an overview of all projects involved in the Internet of Services activities.

While the Internet of Services initiative has been started as an SAP-internal activity, it has been made public in 2010 (e.g., at the FIA) and academic and industrial partners have been invited to join. For instance, the OU has joined the USDL W3C incubator

group for the standardization of the USDL (see section 2.5 and D 11.3.1).

Further information can be found at the Internet of Services homepage http://internet-of-services.com.

Table 1: SAP Internet of Services Project Portfolio 2009/2010

Project Name	**Initiative**	**Brief summary**
FAST http://fast.morfeo-project.eu/	EU FP7	Creating a new visual programming environment to facilitate the development of complex front-end gadgets, involving execution of relatively complex business processes that rely on back-end semantic Web services.
GEYSERS http://www.geysers.eu/	EU FP7	GEYSERS's vision is to qualify optical infrastructure providers and network operators with a new architecture, to enhance their traditional business operations. Infrastructure Providers will compose virtual infrastructures and rent them out to Virtual Infrastructure Operators, which will run cost-efficient, dynamic and mission-specific infrastructures by means of integrated control and virtualization management techniques.
ITAIDE www.itaide.org	EU FP6	Solving the increasing data complexity in the area of cross-border and cross-country trade by reducing the administrative overhead carried by commercial and public administration organizations.
MASTER http://www.master-fp7.eu/	EU FP7	The MASTER European research project aims at providing methodologies and infrastructures which facilitate the monitoring, enforcement, and audit of quantifiable indicators on the security of a business process and provide manageable assurance of the security levels, trust levels and regulatory compliance of highly dynamic service- oriented architecture in centralized, distributed (multi-domain), and outsourcing contexts.
MODELPLEX http://www.modelplex.org/	EU FP6	Addressing the challenge of scaling model-driven (MDD/MDA) technologies to support "complex" systems in terms of size, heterogeneity and the distributed nature of some systems, integrating them with legacy systems and extending the scope of MDA

		beyond software development into the operational phase of complex systems' lifecycles.
OEPI http://www.oepi-project.eu/	EU FP7	Development of a set of standardized Environmental Performance Indicators (EPI) and a software solution for collection, management and reporting based on EPIs. The solution is aimed to support enterprises and organizations on their way to an integrated and company-wide environment-oriented management and to allow for a completely new way of internal and external communication about environmental activities and impact of companies.
PICTURE http://www.picture-eu.org/	EU FP6	Enabling high-quality service delivery for European citizens and businesses by strengthening information and communication technology (ICT) diffusion in and across European Public Administrations. The key objective of the project is to develop a tool capable of measuring the potential impact of ICT on back-office processes in municipal Public Administrations in order to help decision-makers make strategic investments with sustainable impact.
PremiumServices www.premium-services.de	BMBF	Developing and provisioning both well-established and new, innovative pricing mechanisms to providers of Internet applications as software services. These mechanisms will support a broad range of application areas, including innovative pricing mechanisms in a ready-made, flexible and "out-of-the-box" manner.Developing a platform for offering pricing mechanisms as out-of-the
Reservoir www.reservoir-fp7.eu	EU FP7	Enabling massive-scale deployment and management of complex IT services across different administrative domains, IT platforms, and geographies. The project will provide a foundation for a service-based online economy, where − using virtualization technologies − resources and services are transparently provisioned and managed on an on-demand basis at competitive costs with high quality of service.
SecureSCM www.securescm.org	EU FP7	Enabling privacy-preserving collaborative supply chain planning without disclosure of

		sensitive data using applied cryptography.
ServFace www.servface.eu	EU FP7	Developing user interface annotations for Web services supported by methodologies and tools to allow easier and faster creation of service-based applications.
SHAPE www.shape-project.eu	EU FP7	Specifying and developing a tool-supported methodology for flexible business models and variable services on semantically enabled heterogeneous service architectures through model-driven approaches.
SLA@SOI www.sla-at-soi.eu	EU FP7	Developing a systematic service-level agreement (SLA) management framework that spans and translates across business and IT layers.
Smart Services CRC www.smartservicescrc.com.au	CRC	Developing innovation, foresight, and productivity improvements for the services sector, the Smart Services CRC is an AUD120m, commercially focused collaborative research initiative in Australia, with which SAP Research collaborates on different projects.
SOA4All www.soa4all.eu	EU FP7	Simplifying the handling of Web services such that they can be easily searched, executed, annotated, and composed by business users.
SoKNOS http://www.soknos.de/	BMBF	Developing concepts to support government organizations, private companies and other organizations active in the environment of public (homeland) security both within their day-to-day work and in the exceptional cases of large events and incidents, to act with foresight, quickly and safely as well as effectively.
Theseus / TEXO www.theseus-programm.de/en-us/theseus-applicationscenarios/texo	BMBF	Providing businesses with an infrastructure for new Web-based applications and services on the basis of service-oriented architecture (SOA). Texo is expected to provide an independent, flexible, and semantic-driven platform that makes services tradable on the Internet, composes services into more value-added services and integrates customized services into the environment of service consumers.
Virtex	InvestNI	Assessing how SAP can use virtualization technology to enable deployment of its

		application suite on a grid infrastructure with minimal or no modification.
XtreemOS www.xtreemos.eu	EU FP6	Developing a Linux-based operating system that provides for grids what a traditional operating system offers for a single computer: abstraction from the hardware and secure resource sharing between different users. The system thus simplifies the work of users belonging to virtual organizations by giving them the illusion of using a traditional computer while removing the burden of complex resource management issues of a typical grid environment.

2.20 Dissemination driven by STI International

With the purpose of opening new channels for disseminating project results and reaching scientific and industrial communities not necessarily associated to EC-funded projects, SOA4All included as third party the organization STI International.

The encounters where SOA4All concepts have been promoted in the last period span the research, technology transfer, community building, and training activity areas supported by STI International.

2.20.1 Research

STI International provides the semantic technology research community with several dissemination venues; SOA4All took advantage of several of these venues in 2010, particularly:

- Extended Semantic Web Conference Series (ESWC)

The 7th annual Extended Semantic Web Conference (formerly, European Semantic Web Conference) – ESWC – took place from May 30 – June 3, 2010 in Crete, Greece. The mission of the Extended Semantic Web Conference is to bring together researchers and practitioners dealing with different aspects of semantics on the Web. Starting with the 2010, the ESWC builds on the success of the former European Semantic Web Conference series, but seeks to extend its focus by engaging with other communities within and outside ICT, in which semantics can play an important role. As a 2010 conference sponsor, SOA4All exploited a fitting venue to present the successful results from the project. (http://www.eswc-conferences.org)

- Support for Semantic Technology International Research (STI Research)

Members of the SOA4All consortium participated in several events aimed towards sustaining the long-term research objectives in the field of semantic technologies, collaborating with potential research partners at the first STI International Successful Proposal workshop, followed by the Accessing Funding workshop.

- http://successfulproposal.sti2.org/2010/
- http://accessingfunding.sti2.org/

– https://research.sti2.org/

2.20.2 Technology Transfer

A core objective of STI International is to bridge the gap between academia and industry, ensuring the results and successes of the broad semantic technology community are received and adopted by industrial players. A key conference with exactly this focus is ESTC, held annually in Vienna, Austria (see section 2.13). As 2010 sponsor SOA4All hosted a workshop focusing on Linked Services, a key issue is how such services are to be discovered, composed into applications and deployed to end users, these topics were addressed by the SOA4All project. BT and SAP demonstrated how they use technology developed in the SOA4All project to more quickly develop, test and deploy novel applications built from services published in this open services ecosystem. Thus, the workshop showcased the key aspects of the SOA4All technology, its capabilities and its potential role in the Future Internet of Services. The BT and SAP presentations were followed by an interactive discussion and feedback session where the applicability of the technology and its benefits in a range of industry sectors was analyzed.

2.20.3 Community

In addition to supporting prominent universities, research institutes and companies in the field of semantic technologies, STI International encourages young researchers and individuals from the "bottom-up." The community which includes several members of the SOA4All consortium meets annually at the STI International Symposium to establish beneficial relationships with fellow researchers and developers in the field of semantic technologies. SOA4All also invested in supporting younger members of the community with a Student Travel Grant sponsorship at ESWC 2010.

• STI International Symposium

The STI International Symposium 2010 is the annual event where representatives from the STI Member organizations gather to share research achievements in the field of semantic technologies. The Symposium was a broadened version of the previously held STI Offsites with more invited talks, as well as extended poster and demo sessions providing participants with more interactive time focusing on sharing their accomplishments over the past year with fellows and colleagues from around the world (http://www.sti2.org/symposium2010).

• Student Travel Grant sponsorship at ESWC 2010

STI International also hosts the Semantic Technology YouTube channel which attracts several viewers from beyond the community. Placing the SOA4All video – which greatly focuses on the Internet of Services – on this channel increases chances for further organizations to begin collaborating towards fulfilling the European vision.

http://www.eswc2010.org/student-travel-grant
http://www.youtube.com/user/semantictechnology

2.20.4 Training

Collaborative STI training programs, such as summer schools and tutorials co-organized with other European research projects and standardized certification courses in semantic technology have provided a final channel for the dissemination of SOA4All project results. Two examples include the annual Summer School in Semantic Computing which takes place in Berkeley, CA and the Semsphere certification courses which are offered on a quarterly basis, and as well as on-demand.

- Summer School in Semantic Computing

The IEEE Summer School on Semantic Computing provides an introduction to this interdisciplinary field to senior undergraduate and graduate students. A mix of young and well-established researchers and educators will give tutorials on cutting-edge results in the aforementioned areas, complemented by keynote talks by renowned experts and hands-on exercises that showcase the application of the most important technologies in real-world situations. http://www.sssc2010.org/

- Semsphere – the semantic technology training company

Semsphere, a spin-off from STI International offers a comprehensive semantic technology training and certification program which has been developed in consideration of the needs and requirements of IT companies and professionals.

3. Assessment of all collaboration activities during the project

SOA4All has been very active in collaborating with other projects and initiatives. The table below summarizes all the collaboration activities during all the project:

PROJECT/ INITIATIVE	TYPOLOGY *(technical vs. Dissemination)*	DESCRIPTION	DURATION	ASSESSMENT
University of Seville	Technical	The contribution have been focused on the integration of service ranking techniques developed in Task 5.4, adapting their previous work on preference modelling in order to allow preference definitions from each specific ranking technique to be composed and mixed together.	On a continuous basis	Very successful as the collaboration of the University of Seville during the project duration has led to its effective inclusion as a partner of SOA4All for the third year of the project.
NEXOF-RA (and overall NESSI community)	Technical	Contributions to the OCP (Open Construction process) through submission of contributions to the Investigation Teams (Service Composition, Service Discovery)	Punctual: open calls for contributions (2008-2009)	SOA4All is represented in the overall set of patterns created by NEXOF-RA becoming a reference in areas like service description and service composition; nevertheless, final assessment will depend on the success of NEXOF-RA to exploit these results in the longer term (making these patterns “usable” by the S&S community)
NEXOF-RA (and overall NESSI community)	Technical	Sharing relevant SOA4All documents by uploading main deliverables to the NEXOF-RA website.	Punctual	The repository is a direct source for NESSI Strategic and Compliant projects, which make them more acknowledgeable by other actors; quantification of impact will depend –once again- on the capabilities of NEXOF-RA to project results to a wider community
NEXOF-RA (and overall NESSI community)	Technical	Participation to the Architecture Boards providing the SOA4All vision on both architectural approach and	On a continuous basis until end of NEXOF-RA in	Successful collaboration as SOA4All is one of the voices heard in the Board and therefore this helps our project to promote its results and make our developments more

PROJECT/ INITIATIVE	TYPOLOGY *(technical vs. Dissemination)*	DESCRIPTION	DURATION	ASSESSMENT
		technologies	summer 2010	widely known by other projects and organizations.
NEXOF-RA and NESSI	Dissemination	Presence of SOA4All in NEXOF-RA and NESSI websites, as well as in other dissemination channels (such as newsletters, presentations of the overall NESSI Strategy, etc)	On a continuous basis	These are additional channels for SOA4All dissemination that can be maintained and used with little effort; so far the assessment in terms of visibility has been very good. Nevertheless visibility through NEXOF-RA tools will not continue unless an alternative solution is put in place: the analysis of feeding the IT-Tude portal could be promising
NESSI	Dissemination	Active participation in ICSOC-Servicewave 2009 and 2010 SOA4All was actively promoted at the NESSI Projects Summit in Valencia	Nov. 09/Dec. 2010 April 2010	Great visibility for SOA4All: architectural vision presented through the closing panel, moderation of discussions, demos presented at exhibition session, poster at the NESSI stand;
Future Internet PPP	Technical	The FI-PPP addresses the need to make public service infrastructures and business processes significantly smarter through tighter integration with Internet networking and computing capabilities.	Dec. 2010	Very successful as Atos Origin has included various SOA4All results in the FI Core Platform developed in the FIWARE project. In particular, semi-assisted process modelling features developed in SOA4All will be reused and extended.
FIA	Dissemination	Participation to the two editions of FIA held in 2010 in Valencia and Ghent respectively	April /Dec. 2010	Successful dissemination. In terms of visibility, the FIA and other FI-related events have positioned SOA4All as one of the main projects within the pillar “Internet of Services”. John Domingue (OU) in his role as a Caretaker for FIA supported the design of the whole event and the selection of sessions.

PROJECT/ INITIATIVE	TYPOLOGY *(technical vs. Dissemination)*	DESCRIPTION	DURATION	ASSESSMENT
FIArch Working Group	Technical	Expert consultations via FP7 CSA SOFI to the FIArch limitations document	On a continuous basis since late 2010	Successful collaboration. Contributions to the experts group allows for positioning SOA4All results, insights and open issues within the Future Internet Architecture working group. This moreover helps in strengthening the Internet of Services research road map
Internet of Services and W3C USDL XG	Technical, dissemination (and potentially economic)	Collaboration on various different service related technologies and tools to allow large-scale, service-based business networks over the Internet.	Long-term collaboration	Successful collaboration. The Internet of Services initiative brings many different service-related research projects together and therefore has a high potential. As the first tangible output, a novel service description language, the USDL, has been specified jointly and is currently in the process of being standardized at W3C. Further activities may be the joint development of USDL-based tools for service provisioning and consumption.
ICT 2010	Dissemination	Organization of an SOA4All Stand including live demos of WP8 and WP9 use cases	September 2010	The SOA4All Stand won 3000 € for the stand and its special presentation. Hundreds of contacts have been made. The stand was a major success for the project.
NetChallenge	Technical	Technical exchange about usage of SOA4All service annotation, composition and social network integration results into NetChallenge	On a continuous basis from June 2010	Very detailed discussions have been made. NetChallenge will provide a good possibility of testing the “for all” aspect of SOA4All as it targets a different and less-technical user group than SOA4All currently does.
Omelette	Technical	Technical discussion about service composition and tools for service annotation	On a continuous basis from December 2010	Discussions are still at an early stage and can be described as technology exchange and analysis. Omelete has just started and a technical usage of SOA4All tools will therefore probably happen after the official end of SOA4All. However, this means that Omelette is a good chance to ensure the long term

PROJECT/ INITIATIVE	TYPOLOGY *(technical vs. Dissemination)*	DESCRIPTION	DURATION	ASSESSMENT
				visibility of the project results.
S-Cube	Technical	Identification of fields of interest benefiting a continuous flow of information between the two projects thanks to the involvement of CEFRIEL in both SOA4All and S-Cube; contribution to common scientific papers and discussion groups	On a continuous basis	Collaboration with S-Cube provides a link with the scientific community of Software and Services.
S-Cube	Dissemination, training	Tutorial of SOA4All at the Summer School (Heraklion, Crete)	June 2009	Very good visibility of the project and evaluation of the interest of our work in front of a different audience (professors and students). Very successful event
CHOReOS	Technical	Large Scale Choreographies for the Future Internet will implement a framework for scalable choreography development.	On a continuous basis since October 2010	CEFRIEL will contribute to CHOReOS as for: requirements analysis; modeling, analysis and assessment of dynamic reconfiguration and dynamic service substitution mechanisms; and development of new lightweight approaches for automatic service substitution based on semantic annotations.
COIN	Technical (but also dissemination)	Many technical fields of collaboration identified and summarized through concrete action plans	On a continuous basis (since COIN and SOA4All started the attempts to collaborate have not stopped)	In principle, working areas identified seem promising for COIN to use SOA4All technologies and for SOA4All to feed its results from a technical point of view; many views are also complementary enriching the approach of both projects; the presence of TXT, CEFRIEL, STI and ATOS should facilitate the implementation of these plans. We are now investigating whether iServe can be connected to above such that Enterprise Interoperability and Enterprise Collaboration services described in

PROJECT/ INITIATIVE	TYPOLOGY *(technical vs. Dissemination)*	DESCRIPTION	DURATION	ASSESSMENT
				iServe can be discovered by the COIN GSDP.
LarKC	Technical collaboration	LarKC aims at developing a platform for massive distributed incomplete reasoning that will remove the scalability barriers of currently existing reasoning systems for the Semantic Web	On a continuous basis	LarkC is using the SOA4All service annotation models. Further synergies between SOA4All and LarKC are exploited in the continued effort of improving the wsml2reasoner framework.
ESTC 2010	Dissemination	The European Semantic Technology Conference including the Venture Capitalist Seedcamp	December 2010	SOA4All had a great visibility as a Platinum Sponsor with a booth at the conference. The SOA4All workshop was 2 hours long and three ideas from the project were presented at the Venture Capitalist Seedcamp.
Resonance	Technical collaboration	Resonance is a multi-platform broadcasting project which aims to create a new Sci-Fi series to be broadcast on TV, published as a graphic novel and also facilitate ambitious forms audience engagement - allowing the audience to create new characters and plot lines.	On a continuous basis	KMi's involvement in Resonance is centred around the outcomes of the SOA4All project where we are exploring how Linked Data and Web Services can enable a "semantic data track" for broadcast media to complement the existing video and audio tracks. It is envisaged that the creation of this new layer will enable the connection of disparate heterogeneous resources and support audience engagement.
NoTube	Technical collaboration	The NoTube project aims to show how Semantic Web technologies can be used to connect TV content and the Web through Linked Open Data, as part of the trend of TV and Web convergence.	On a continuous basis	Successful as NoTube is using iServe. Open University is in the Consortium, which facilitate the collaboration.

PROJECT/ INITIATIVE	TYPOLOGY *(technical vs. Dissemination)*	DESCRIPTION	DURATION	ASSESSMENT
mEducator	Technical collaboration	Multi-type content Repurposing and Sharing in Medical Education	On a continuous basis	Successful as mEducator is collaborating with SOA4All as they are using iServe. Open University is in the Consortium, which facilitate the collaboration.
SemData Initiative	Technical collaboration	The goal of this initiative is to support an event series that provides a platform for the investigation of various aspects of semantic databases and data management in the large.	On a continuous basis	The initiative was inaugurated with strong SOA4All support and participation. Contributions by UIBK, Ontotext, INRIA and KIT. Further collaboration to discuss most recent results, insights and plans on semantic data management.
Augmented Web Services Initiative	Technical	The goal of this Initiative is to bring Semantic Web service research, technology and developments further and to adjust the research roadmap and business strategies to recent technological achievements in related fields such as the Web, Semantic Web, Web2.0, or EAI.	On a continuous basis	SOA4All organized and participated in some workshops, thanks to that, there are some SOA4All members in the W3C USDL XG and marked the official start of the lately introduced SOA4All task T11.3 on USDL pre-standardization.
THESEUS/TEXO	Technical, Standardization	In various joint meetings and phone conferences, SOA4All served as consultant for TEXO and the USDL team in preparing standardization efforts	On a continuous basis since September 2010; now ongoing in the W3C USDL XG	USDL provides a comprehensive framework for describing business services. The USDL is formally specified in Ecore and hence there is little re-use of established Web standards and vocabularies given. SOA4All works together with the USDL team on improving the chances of standards impact in the Web domain too
PLAY	Technical	The PLAY project will develop and validate an elastic and reliable architecture for dynamic and	On a continuous basis	Thanks to the participation of EBM WebSourcing and INRIA / Proactive team, the PLAY project will leverage the SOA4All federated DSB as a building block for the

PROJECT/ INITIATIVE	TYPOLOGY *(technical vs. Dissemination)*	DESCRIPTION	DURATION	ASSESSMENT
		complex, event-driven interaction in large highly distributed and heterogeneous service systems		service infrastructure. It will be used and developed in order to take in charge the service layer and the Cloud event layer based on the P2P semantic space technology.
STI International	Dissemination	Presence in different events mainly related to Semantic technologies, such as OCG Forum Semantic Systems and Semantic Data Management Initiative	March 2009 March 2010	Good visibility for the project and reputation in the Semantic Community (proof of acceptance of SOA4All concepts)
STASIS	Technical collaboration	Technical topics identified to enrich the two projects	Ongoing until the end of the STASIS project (TIE is a common partner)	Continuous flow of information has allowed us to identify many synergies that have been taken into consideration in some of the SOA4All WPs
STASIS (and other semantic projects)	Dissemination	SemanticWeek'09 (Amsterdam) and Research Connection event (Prague)	June 2009/ May 2009	Great visibility and very good opportunity to exchange experiences and knowledge with several projects directly involved in research in Semantic technologies.It was also used by SOA4All to organize an exploitation workshop and get feedback on business models./ The stand in a more general event did not facilitate collecting very concrete feedback, but opened up project results to a huge constituency, besides giving SOA4All the opportunity of exploring other projects that attended the same event.
FAST	Technical collaboration, exploitation, dissemination	A joint workshop on service front ends has been June 2008 in Madrid, Spain. Regular information exchange has been driven mainly by	On a continuous basis over the entire duration of the both projects	FAST and SOA4All address the same challenge, namely end-user development of business applications and business processes, from different angles (FAST: screen-based application design vs. SOA4All: business

PROJECT/ INITIATIVE	TYPOLOGY *(technical vs. Dissemination)*	DESCRIPTION	DURATION	ASSESSMENT
		SAP, resulting in the exchange of use cases for end-user development scenarios as well as joint exploitation and evaluation activities such as the SAP WorldTour 2009 and the CeBIT 2010.		process based application design). The exchange of material on the public sector use case scenario as well as the joint dissemination, exploitation, and evaluation activities shows that the collaboration between the both projects was very intense and successful.
SUPER	Technical	The major objective of SUPER was to raise Business Process Management (BPM) to the business level, where it belongs, from the IT level where it mostly resides now.	Terminated in March 2009.	Feed SUPER results (i.e Monitoring) and lessons learnt into SOA4All.
Service-Finder (FP7 project)	Technical	Service-Finder aims at developing a platform for service discovery in which Web Services are embedded in a Web 2.0 environment.	Terminated in Dec. 2009	Seekda used the generic service ontology that has been developed in the scope of Service-Finder to store the service meta-data resulting from crawling, such as for example the relationship type between services and related documents. Also the Service-Finder project shared with SOA4All its service category annotations, i.e. annotations that have been to a large extend automatically extracted and partially also manually gathered. These annotations could be used to improve the discovery of relevant services.
SLA@SOI	Technical	The scope of the SLA@SOI project is the definition, negotiation, and monitoring of SLAs between various layers of a service infrastructure. Such topics are not investigated in SOA4All. On the other hand, SLA@SOI focuses only marginally on service composition design and	2009	SOA4All has contributed to the SLA@SOI project by compiling a survey on requirements for their management framework (sent on January 30th, 2009). The goal of such survey has been in fact to collect requirements for a framework for (semi-)automatic management of services, on the basis of formally specified SLAs. Requirements have been organized in categories, divided in three groups: conceptual and/or

PROJECT/ INITIATIVE	TYPOLOGY *(technical vs. Dissemination)*	DESCRIPTION	DURATION	ASSESSMENT
		execution, which is a main goal in SOA4All. Thus the two projects can be seen as highly complementary.		informational models for SLA based management, functionalities of a SLA based management framework, and architecture of a SLA based management framework.
IT-Tude	Dissemination	IT-Tude.com connects emerging ICT research with business solutions, and offers your organization the opportunity to use this new and dynamic online platform for your own outreach.	Long term (even after the end of the project)	Being an associate partner in the IT-Tude web, gives to SOA4All more visibility. (http://www.it-tude.com/soa4all.html)

Table 2: Assessment of Collaboration activities in the second period

4. Conclusions

All projects involved in the collaboration process recognize how important is to keep the flow of information open to other European projects in order to facilitate the identification of synergies. In addition to this, the collaboration opportunities described here show clear impact of the SOA4All project in the research community.

This deliverable provided information at two levels:

- ✓ It reports main relevant collaboration activities carried out along the last year of project development
- ✓ It provides an assessment of all collaboration activities during all the project with the aim of identifying the real impact on SOA4All

SOA4All collaboration was very active during the entire project, and the project consortium got the achievements by addressing mainly the following projects/ initiatives/ sets of projects:

- ☐ **NESSI** European Technology Platform and its flagship project **NEXOF-RA**, besides the community of NESSI Strategic Projects, NESSI-driven events like ServiceWave and the NESSI Projects Summit.
- ☐ Initiatives around **Future Internet** such as **FIA, FIS** and **FIArch** and thus collaboration with many projects. The FIA have positioned SOA4All as one of the main projects within the pillar “Internet of Services”. John Domingue is Caretaker for FIA and he is on the Steering Committee for the FIS. Atos Origin had included some SOA4All results in the FI Core Platform developed in the FIWARE project.
- ☐ **University of Seville** joining the project as a result of discovering the clear synergies between some of the SOA4All technical works and the ones carried out by University of Seville.
- ☐ **STASIS**, addressing both technical contributions and joint dissemination events such as the Semantic Week pushed by STATIS with the collaboration of several projects in the Semantics area
- ☐ **S-Cube,** with a focus on scientific collaboration and training activities via the SSAIE Summer School
- ☐ **ESTC**, three ideas from SOA4All were presented at the Venture Capitalist Seedcamp.
- ☐ **STI** International, through which SOA4All can reach a wider constituency in the Semantics area and have a strong presence in numerous events like the OCG Forum Semantic Systems or the Semantic Data Management Initiative
- ☐ **COIN**, with which SOA4All has defined a concrete agenda of technical contributions to benefit the two projects. Now we are investigating whether iServe can be connected to COIN.
- ☐ Internet of Services and **W3C USDL XG**; Collaboration on various different service related technologies and tools to allow large-scale, service-based business networks over the Internet.
- ☐ Many other projects such asNetChallenge, Omelette, CHOReOS, LarKC, NoTube, FAST and mEducator to name a few.

It is worth paying attention to the fact that these collaboration activities always reflect either bilateral relationships (for example, if they happen between two projects) or multilateral relationships (when many initiatives are involved). In all these cases, there is always a benefit not only for SOA4All, but also for the other activity involved in the collaboration. Impact should thus be understood in this context. Benefits range from an increased visibility of project results to a reduction of costs to perform specific tasks (be they technical or related to dissemination) or to the achievement of more ambitious scientific or industrial goals that go far beyond the objective of a single project. Collaboration with other projects helps us to position SOA4All within a more general context of initiatives and projects contributing to a better understanding of our own project but also of the others.

All these collaboration activities show the activeness of SOA4All project. Many synergies have been discovered between other projects showing the greater SOA4All impact had in the research community.