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Authors: *Tilburg, CITY, POLIMI, UPM, FBK, USTUTT, UniDue*

Editors: *Christos Nikolaou, Marina Bitsaki, University of Crete*

Reviewers: *Scharam Dustdar, Vienna University of Technology*
Dimitris Plexousakis, University of Crete

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Management Summary

The aim of this report is to describe the S-Cube strategy for community outreach through two parallel trajectories: worldwide community outreach and community outreach within Europe. In order to perform outreach through these routes this document describes policies that will ensure these activities meet the overall goals and objectives of the S-Cube SoE activity.

The report identifies end-user communities, research organizations, industries and policy makers in both Europe and worldwide as the targets of community outreach. It also identifies FP6 and FP7 funded projects through the SSAI&E working groups as the ideal vehicle for spreading S-Cube research results to other communities. The report emphasizes that S-Cube strives to become a worldwide point of reference as software services research and stipulates that target communities must have high-visibility, excellence and influence in the field. Several candidate communities are identified and details regarding how to collaborate with policy makers and research funding agencies are outlined.

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Members of the S-Cube consortium:

University of Duisburg-Essen (Coordinator)	Germany
Tilburg University	Netherlands
City University London	U.K.
Consiglio Nazionale delle Ricerche	Italy
Center for Scientific and Technological Research	Italy
The French National Institute for Research in Computer Science and Control	France
Lero - The Irish Software Engineering Research Centre	Ireland
Politecnico di Milano	Italy
MTA SZTAKI – Computer and Automation Research Institute	Hungary
Vienna University of Technology	Austria
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University of Crete	Greece
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University of Hamburg	Germany
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These documents are all available from the project website located at <http://www.s-cube-network.eu/>

The S-Cube Deliverable Series

Vision and Objectives of S-Cube

The Software Services and Systems Network (S-Cube) will establish a unified, multidisciplinary, vibrant research community, which will enable Europe to lead the software-services revolution, helping shape the software-service based Internet which is the backbone of our future interactive society.

By integrating diverse research communities, S-Cube intends to achieve worldwide scientific excellence in a field that is critical for European competitiveness. S-Cube will accomplish its aims by meeting the following objectives:

- Re-aligning, re-shaping and integrating research agendas of key European players from diverse research areas and by synthesizing and integrating diversified knowledge, thereby establishing a long-lasting foundation for steering research and for achieving innovation at the highest level.
- Inaugurating a Europe-wide common program of education and training for researchers and industry thereby creating a common culture that will have a profound impact on the future of the field.
- Establishing a pro-active mobility plan to enable cross-fertilisation and thereby fostering the integration of research communities and the establishment of a common software services research culture.
- Establishing trust relationships with industry via European Technology Platforms (specifically NESSI) to achieve a catalytic effect in shaping European research, strengthening industrial competitiveness and addressing main societal challenges.
- Defining a broader research vision and perspective that will shape the software-service based Internet of the future and will accelerate economic growth and improve the living conditions of European citizens.

S-Cube will produce an integrated research community of international reputation and acclaim that will help define the future shape of the field of software services which is of critical for European competitiveness. S-Cube will provide service engineering methodologies that facilitate the development, deployment and adjustment of sophisticated hybrid service-based systems that cannot be addressed with today's limited software engineering approaches. S-Cube will further introduce an advanced training program for researchers and practitioners. Finally, S-Cube intends to bring strategic added value to European industry by using industry best-practice models and by implementing research results into pilot business cases and prototype systems.

S-CUBE materials are available from URL: <http://www.s-cube-network.eu/>

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1 Introduction

Community outreach addresses the spread of research outcomes, innovation and knowledge across the wider scientific community, special subsections of industry and user communities, while considering opportunities of applying S-Cube to novel or emerging application fields. It entails a full programme of dissemination activities designed to spread excellence both inside and outside the network of excellence to discuss results, innovation and work in progress. In this way, S-Cube aims to contribute to the visibility of European research activities in the area of service-based systems and applications on a worldwide scale, fostering closer collaboration and scientific exchanges with similar networks in other countries.

The Community Outreach Strategy for selecting which individuals, organisations and institutions within a set of identified target groups is given in Section 2 of this document. This strategy considers potential collaborative linkages, including joint ventures between researchers involved in S-Cube and other special interest groups, universities, research schools, institutes, and research projects. These potential collaborations will be assessed and outlined in this document.

This objective of this deliverable is to propose a strategy for community outreach actions through the definition of policies for interaction with the communities we have identified as being important to the task of community outreach task. In particular this deliverable aims to:

- Describe the rationale for selecting individuals, organisations and institutions we have chosen and will choose to work with.
- Outline the methods and means of communicating with these organisations and individuals.
- Identify potential links between diverse communities and related projects that would benefit from close (or closer) collaboration with S-Cube.

This deliverable specifies the targeted communities for outreach, criteria for strategic partners, especially those outside the EC in Asia, North America and Australia, and describes the policies for the effective spreading excellence to these communities, partners and collaborators.

The remainder of this document is structured as follows:

- Section 2 describes the overall aim of the SoE activity together with the set of user communities we will collaborate with and the policies for interaction with each community.
- Section 3 describes current and candidate worldwide research organisations, institutes and policy makers we have identified as targets for ‘outreach’ and how they fit with the S-Cube SoE strategy.
- Section 4 describes European-only communities we have singled-out for community outreach, such as SSAI&E co-operating projects and national funding bodies.
- The plan of actions necessary to make these actions a success is described in Section 5 of this document, which describes how S-Cube will follow this policy for the next reporting period.

2 S-Cube Strategy for Community Outreach

Within the context of this document, a strategy is defined as “a plan of actions or policy designed to achieve a major or overall aim” [1]. This section sets out to define the strategy for the Spread of Excellence (SoE) activity of the S-Cube project, whose general aim is to [2]:

“...focus on the spread of research outcomes, innovation and knowledge orientation across the wider scientific community, special subsections of the industry and user communities, and consider opportunities of applying S-Cube innovation to novel or emerging application fields.”

With this in mind, we describe S-Cube’s SoE strategy for community outreach by explaining the policies for interaction with a set of clearly defined user communities. These policies will guide the direction of the SoE activity’s community outreach activities for the next reporting period.

However, before we can define the policies we must first identify the types of user communities, organizations and institutions we plan to collaborate with. After carefully reviewing the worldwide activities of various highly visible scientific communities, special subsections of the industry, and user communities and policy makers, we identified the following opportunities and targeted communities for promoting S-Cube’s research and influencing the course of research and development in areas central to the interests of S-Cube:

Worldwide (including Europe):

- End-user communities, including industry.
- Research Organizations and Institutes.
- Policy Makers.

Within Europe only:

- FP6/FP7-funded relevant Projects (through SSAI&E).
- Government / National Funding Bodies.

Why each of these communities was identified, the policy and/or actions for interaction for each of these communities and how the policy helps meet the S-Cube SoE strategy is now explained.

2.1 Policies for Community Outreach

Before listing the individual policies for each of the user communities identified, there are general policy criteria for community outreach that applies across these groups. When ‘reaching out’ to a particular community, institution/organisation or individual, the S-Cube network of excellence should:

- Attempt to maximise the potential exposure of our project by ensuring the target community has many links itself and/or has a high visibility, excellence and influence in the field.
- Where possible, use S-Cube-organized events and activities as instruments to create or strengthen links with the target communities, organisations or individuals identified. For example, we will use the S-Cube-organised Summer School, and the ICSOC and ServiceWave conferences as instruments to intensify joint work and mutual understanding between the communities identified. These events and activities will provide the opportunity for these communities to present their research results, interact with members of the S-Cube community and strengthen existing links and forging new collaborations for the future.

2.1.1 End-user Communities, including Industry

We define end-users as people who will use outputs of the S-Cube Network of Excellence. This output includes research outcomes, such as research papers and articles, deliverable documents and the

Knowledge Model. Outputs also include the products of supporting S-Cube activities, such as the Virtual Campus platform, the joint Masters and PhD programs and the content developed for them.

Thus, we consider researchers in non-collaborating institutions, and students enrolled in the joint Masters and PhD programs some of the ‘end-user’ communities of S-Cube since they can/will benefit directly from the outputs of the Network. Examples of other communities may be the business community, the software engineering community and the Service Science, Management and Engineering (SSME¹) community.

‘Reaching out’ to end-users such as those listed above is important since it promotes S-Cube’s work in communities not directly involved or associated with our work but who would benefit by being exposed to our research and the ideas and concepts driving it.

To become involved with these communities we will use the following policy objectives:

- Organize and participate in events (including education, training, collaboration and networking events) for the wider community. Examples of such events, how S-Cube has helped end-user communities to date and our involvement with industry are given in Section 3.1 of this document.
- Where possible, we will use novel methods of disseminating S-Cube’s outputs information in an attempt to reach people not normally covered in our existing dissemination activities. An example of this is how the Virtual Campus (WP-SoE-1.1) is investigating using the iTunesU program (a free service hosted by Apple that allows instructors, administrators and affiliates to manage, distribute and control access to educational material) to make course content publicly available.

2.1.2 Research Organisation & Institutes

As explained in the DoW [2], the subject of service-based systems and applications is vast and spans a spectrum of diverse disciplines. A problem with this is that research across institutions becomes fragmented. Since S-Cube is the Network of Excellence for the ICT activities of the EC, the project must play an important role in working with other (non-S-Cube member) organisations and institutes that demonstrate excellence to influence and align fragmented research. Similarly, we must work with organisations and institutes to ensure that the research of S-Cube is aligned with theirs. However, because time is limited, to maximise the effectiveness of working with research institutes and organisations we have developed the policy criteria for selecting which organisations and institutes to work with.

S-Cube partners should ensure the following policy points are met before or when working with research organisation and institutes.

- The organisation or institute must be within the Service Science or related community.
- Organisations/Institutions must have a recognised track record or must have demonstrated excellence in the area. This may be demonstrated through, for example, the awards received and the quality and visibility of their publications, etc.
- They must have demonstrable external links to other high-quality institutions and/or industrial partners.
- They should preferably be close to policy makers and/or research agencies and councils (e.g., NSF) in their country or region.
- An organisation or institutes members should demonstrate active participation in program boards, advisory boards and evaluation committees of local and regional funding agencies.
- S-Cube’s international goal is to attempt to span as much of the globe as possible with links to international research organisations and institutes. However a presence in every country is not possible, therefore organisations and institutes with a strategic location or long-term promise should be preferred: e.g., CSIRO is strategically positioned for the Asia-Pacific region.

¹ <http://www.ibm.com/developerworks/spaces/ssme>

Examples of the research institutes and organisations we are collaborating with and how they meet these policy points are given in Section 3.2 of this document.

2.1.3 Policy Makers

The intention of this activity is to create, strengthen and sustain close links with policy makers at the European, national and international levels. More specifically, we aim to:

- Help emphasize services research and create bilateral research links with influential policy bodies (e.g., NSF, Australian Research Council, Japan Society for the promotion of Sciences, etc.) so that S-Cube becomes a worldwide point of reference in the field of services research.
- Assist EC policy makers in identifying key technological challenges and research priorities, and in establishing a European research agenda for future research, in particular in the field of Internet of Services.

Examples of our interactions with Policy Makers are given in Section 3.3 of this document.

2.1.4 FP6/FP7-funded Projects (through SSAI&E)

In the S-Cube Description of Work we proposed the creation of the Project Liaison Advisory Board (PLAB), which:

“...is composed of members of the boards of projects associated with S-Cube (for example, SeCSE – Service Centric Systems Engineering, CoreGRID – European Research Network on Foundations, Software Infrastructures and Applications for large scale distributed GRID and Peer-to-Peer Technologies; NESSI-GRID – Networked European Software and Service Initiative – GRID, NESSI-SOFT – Networked European Software and Service Initiative Support Office Team) as well as S-Cube beneficiaries. The Project Liaison Advisory Board advises the Steering Committee on strategic orientation in its association with related national and international projects, as well the special user interest groups funded within S-Cube. It will therefore play a central role in the achievement of synergies between different projects and networks. It will give advice on how to ensure optimal synergy effects between all these various entities. The Board will meet once or twice a year and it will be chaired by the Scientific Director.”

However, the goal of the PLAB has been superseded by the EC Information & Communication Technology's (ICT) SSAI&E Collaboration Working Groups (CWGs), each of which concentrates on a topic of common interest to FP6 and FP7 projects and provides a forum for these projects to collaborate. The European Commission has placed much emphasis in achieving collaboration and durable links between European projects in the area of software and services through the CWGs. This will lead to an improved sharing and understanding and ultimately to an improved impact of the results of participating projects. The overarching aim of the CWGs is to accommodate collaboration between projects and leverage knowledge sharing and joint learning, apply each other's (intermediate) research results, and increase awareness of novel developments beyond projects to harmonize and adjust their goals accordingly. CWGs are an ideal vehicle for spreading S-Cube research results to other communities.

The policy for effective spreading of excellence through the SSAI&E CWGs comprises of the following actions:

- Critical assessment and continuous re-assessment of each open and proposed CWG with respect to their impact and applicability to the S-Cube research agenda.
- Active leadership, contribution participation in SSAI&E events, such as the Summer Schools in Palermo and Crete and IOS/FOI meetings.

- Using recognized forums/channels for collaboration and dissemination (such as the recently developed ICT SSAI&E forums²).
- Striving to establish informal and formal links with as many individual FP7 projects as possible working on aspects of services and/or software relevant to S-Cube in SSAI&E.
- Inform our research work in S-Cube with developments in other FP7 projects and vice-versa.

S-Cube will also attempt to link to as many other FP7 projects outside SSAIE as possible.

2.1.5 Government / National Funding Bodies

We wish to ‘reach out’ to national funding bodies in an attempt to ensure the promotion and sustainability of long-term research in software services and systems. Of special interest to S-Cube are the national funding bodies, which already have a long-term research program aligned with software services and systems and must be in the same country as one or more of the S-Cube participants.

The essence and general objective of our policy with respect to European government and national funding bodies can be summarized as follows:

- Create awareness of services research and raise interest at the level of national research bodies and funding organisations. This applies in particular to those European countries where services research is not featuring prominently.

² Links to these forums can be found at <http://www.eu-ecss.eu/contents/collaboration-working-groups>

3 World-wide (including Europe) Communities Targeted for Outreach

S-Cube is looking both within and beyond the borders of Europe to collaborate with high-quality research communities. This section describes the worldwide (including Europe) communities we have chosen to collaborate with and provides candidates for collaboration and/or examples of our collaboration with each group and how these potential and/or existing collaborations help S-Cube meet the general strategy for community outreach described previously in Section 2.

3.1 Candidate End-User Communities including Industry

Examples of how S-Cube has used its position to help end-users (or users of the outputs of the network) include:

- Obtaining SIKS sponsorship for Netherlands students to attend the summer school. This allowed more students from Tilburg University to attend the summer school than would have otherwise been possible (and reduce the impact on the institute's travel budget) and will help ensure the success of the school through increasing overall participation and diversity of attendees.

Specific examples of collaboration with industry include:

- The industrial program at the ServiceWave conference: companies working on service engineering can inform the community (and therefore the S-Cube partners) about their progress and best practices in the field. Through this program S-Cube partners can engage industrial researchers and developers in discussions and explain their progress in the field. As a result, it is hoped that cooperation in specific research areas may emerge.
- Identification of use cases through the Industrial Advisory Board (IAB) and S-Cube's IA-2.2 (Alignment with European Industry Practices) activity. Use cases help S-Cube partners test if their new research ideas are valid in real-world situations. If the ideas are innovative and have value, it will be easier to be taken up by industry since their usefulness will be demonstrated through the use cases.
- Continued Interaction with the NESSI³ ETP: the Networked European Software and Services Initiative (NESSI) aims at providing a unified view for European research in Services Architectures and Software Infrastructures and has many industry members. In order to support our relationship with NESSI and strengthen S-Cube's industry relations, key individuals of NESSI serve on S-Cube's Industrial Advisory Board (IAB). In addition to this we will continue to participate in NESSI organised activities, such as the FIA meetings, where industry will be present.
- A call for industrial participation was distributed to over 300 NESSI members as part of Task IA-2.2.1 ('Identification of Potential Industrial Collaborators'). This call yielded several companies who were compatible with the S-Cube research agenda. S-Cube deliverable CD-IA-2.2.1 ('Identification of Potential Industrial Collaborators') provides a list of industry partners with which S-Cube aims to collaborate [6].
- Industry participation in the S-Cube Summer school: graduate students and young researchers (not only from S-Cube) have a chance to be informed about new research results from all SSAIE projects and network with other young researchers and industry. We expect that new collaborations and project will emerge as a result of this networking.
- The research organizations and institutes described in Section 3.2 have strong links with industry (this is indirect collaboration with industry but ensures that our research partners are also aligned to industrial needs). Therefore, our cooperation with these organizations will strengthen links to industry outside the EU, as required by the strategy.

³ www.nessi-europe.eu

3.2 Candidate Worldwide Research Organizations & Institutes

3.2.1 CITRIS, University of California at Berkeley, USA

The Centre for Information Technology Research in the Interest of Society (CITRIS) creates information technology solutions for many of the most pressing social, environmental, and health care problems.

CITRIS facilitates partnerships and collaborations among more than 300 faculty members and thousands of students from numerous departments at four UC campuses (Berkeley, Davis, Merced and Santa Cruz). CITRIS thinks about IT in ways that have not been thought of before; they see solutions to many of the concerns that face all of us today, from monitoring the environment and finding viable, sustainable energy alternatives to simplifying health care delivery and developing secure systems for electronic medical records and remote diagnosis, all of which will ultimately boost economic productivity. CITRIS represents a bold and exciting vision that leverages one of the top university systems in the world with highly successful corporate partners and government resources.

CITRIS are the originators of the ‘service science’ discipline that has software services and systems at its heart, and are extremely well placed and well connected within that community. It is hoped our relationship with them can serve as a conduit for S-Cube partners disseminating and receiving leading edge research in this field. Because of the history and importance of CITRIS, they have a number of blue-chip corporate partners, including BroadVision, Ericsson, Hewlett-Packard, IBM, Infineon, Intel, Marvell, Microsoft, Nortel Networks, STMicroelectronics, and Sun Microsystems. This illustrates their clear participation in and ongoing collaboration with industry and the significance they place on having industrial input into their research. As further demonstration of the importance they place on industrial participation within CITRIS, industrial researchers from over 60 corporations collaborate closely on research, co-teach new courses and sponsor internships for students.

As CITRIS demonstrably meets several of our policy criteria for collaboration, several S-Cube partners (in particular Tilburg University, University of Crete and University of Stuttgart) are currently in discussions with the CITRIS management and researchers about possible collaborative projects in the area of service science.

3.2.2 CSIRO, Australia

The continued importance of the Asia-Pacific region as a source of world economic growth means Australia is a strategic location for opportunities in this region and CSIRO, the Commonwealth Scientific and Industrial Research Organisation, is Australia's national science agency and one of the largest and most diverse research agencies in the world.

The ICT Centre is CSIRO's hub for innovative information and communication technologies. In particular, the ICT Centre is providing the technologies and architectures to support the growing services sector with the aim to provide a seamless user experience when using broadband, wireless edge or sensor network; deliver useful (actionable) information based on users' needs and context. Through the ICT Centre CSIRO is also developing novel sensors and sensor network technologies to increase the quality and reduce the cost of collecting environmental data, particularly from ecological systems supporting Australia's agricultural, resource and process-based industries.

The technologies being produced in the ICT Centre are being applied across the breadth of CSIRO's engagement with industry and society within the Water for a Healthy Country National Research Flagship (WfHC) partnership.

As CSIRO demonstrates a research agenda clearly aligned with S-Cube's, several S-Cube partners are in discussions with CSIRO executives to define possible collaboration areas, such as services for water resource management. CSIRO's WfHC is the largest research partnership focussing on water in Australia and involves CSIRO with leading Australian scientists, research institutions, private enterprise, community groups, government, non-government organisations. CSIRO clearly demonstrate their significance in both the research and industrial world through these partnerships and meet the policy criteria for working with S-Cube.

3.2.3 SINEI, Suzhou University, China

The Service Innovation and Engineering Centre (SINEI) is located in the 288km² Suzhou Industrial Park in the province of Jiangsu on the east coast of China. Although SINEI has only been recently inaugurated the centre is associated with many prominent universities in China, such as Tsinghua University and is focussing on multi-disciplinary research on service-oriented systems, bringing together faculty from their school of business and department of computer science.

Since Europe's future relationship with China is critically important both for itself and because of the vast opportunities the China presents, any contact and interaction with quality Chinese research organizations like SINEI is to be encouraged because of the strategic importance and implications such connections have. The Chinese Government's attitude to collaboration with European academic institutions is also encouraging; in May 2006 Suzhou Industrial Park also became the location for the first Sino-British University to be approved by the Chinese Ministry of Education when, in partnership with Xi'an Jiaotong University, the University of Liverpool opened a joint University known as the Xi'an Jiaotong-Liverpool University. Although S-Cube is not intending in opening a University in China, this demonstrates the favorable conditions for initiating and continuing work with Chinese researchers.

As an S-Cube partner, Tilburg University is in discussion with the management of the research institute about establishing long-lasting research links, including a joint research program and exchange program around service design and engineering.

3.2.4 IBM Almaden Research Centre, USA

IBM's Almaden Research Centre located near San Jose in California is one of eight worldwide laboratories that together make up IBM Research. One of the major areas of investigation at Almaden is Service Research⁴, which "seeks to understand the science and technology that underlie Business Services and bridge the gap between Business Services and IT Services"⁵.

What is particularly relevant about this centre for S-Cube and the strategy for community outreach is that the Service Research group has pioneered an interdisciplinary curriculum called Service Science, Management and Engineering (SSME), and is currently working with 250 universities around the globe⁶. Some of these Universities are located in parts of the world S-Cube has yet to reach (e.g., South America, the Indian subcontinent and South-east Asia).

The director of Service Research at Almaden made contact with the Spread of Excellence WP leader⁷ and Tilburg University has followed this up with a face-to-face meeting with him in-part to discuss their program with a view to promoting S-Cube research outputs and expanding our mutual connections and to fill the missing geographical regions in S-Cube's strategy for community outreach. We intend to follow this up further in the coming months.

3.3 Policy Makers

By virtue of S-Cube being the only Network of Excellence in software and services, and due to S-Cube partners interaction with so many other projects, communities, companies, as described in this document, S-Cube carries a unique global perspective of how software and services research and development is progressing, what directions it is taking, and also of what the real world problems on software and services are that need to be addressed. S-Cube is therefore in a unique position to advise policy makers on what kind of research and development should be funded, what kind of new technologies for services can be used in government and the industry, and where innovation and best practices should be encouraged.

⁴ <http://www.almaden.ibm.com/ast/>

⁵ <http://domino.research.ibm.com/comm/research.nsf/pages/r.servcomp.html>

⁶ http://forums.thesrii.org/srii/blog/article?blog.id=main_blog&message.id=204

⁷ Email to all members of S-Cube network on 'Service Science: An Emerging Discipline & Profession', 9th January 2009 from Christos Nikolaou.

Of particular interest are two important advisory bodies at the European level in which members of S-Cube feature prominently and help shape recommendations regarding services research:

- The IST Advisory Board (ISTAG).
- Long Term Research in the Internet of Services – subareas of Service Engineering and Cloud Computing.

Through our involvement with these advisory bodies and boards we hope to promote the field of service science research, as required by the strategy.

4 European-only Communities Targeted for Outreach

This report makes the distinction between worldwide (including Europe) and European-only communities for outreach because some collaboration groups and funding bodies are specific only to the European Community. For example, a government and their associated national scientific funding body (usually) will only fund institutions from within their own borders. As S-Cube partners are members of the EC, then we feel it makes sense to only look at funding bodies S-Cube partners can take advantage of, i.e. within Europe, separately.

4.1 ICT SSAI&E Collaboration Working Groups

4.1.1 Relevant ICT SSAI&E Collaboration Working Groups

Under the policy defined in Section 2.1.4, S-Cube members have taken a leading role in 6 of the SSAI&E CWGs and chair the following CWGs [4]:

- Service Architectures.
- Service Engineering.
- Collecting of Use Cases.
- Books & Other Publishable Material.
- Joint Dissemination Activities.

We also continue to have high-visibility in the Software & Knowledge Repositories CWG due to our work on the S-Cube Knowledge Model.

Joining and leading these CWGs helps us meet the strategy for community outreach as in these groups we work with industry on service architecture and service engineering issues that are also S-Cube research issues. This collaboration with industry also feeds into the results of WP-IA-2.2 (Alignment with European Industry Practices). The Collection of Use Cases CWG is relevant to S-Cube as use cases drive the S-Cube research agenda. The creation of the Software and Knowledge Repositories CWG is an important collaborative effort for the SSAIE community at large, and their dissemination activities (such as the Summer School) when done with the other SSAIE projects have a synergistic multiplicative effect.

4.1.2 Candidate SSAI&E Projects for Outreach

Our selection criteria and policy for collaboration with a particular FP6/7 project through the SSAI&E CWGs was given in Section 2.1.4. What follows is a list of FP6 and FP7 projects of the SSAI&E unit within which the S-Cube community has already established links in the CWGs, how these projects meet those selection criteria, what we hope to gain by working with them and the S-Cube person, people or institution collaborating with the project.

4.1.2.1 FP6 Projects

- The *TRACEBACK*⁸ project is developing service-oriented systems and reference architectures for food information traceability in Europe and is therefore of strong interest to S-Cube due to their service orientation and emphasis on service architecture. S-Cube collaborator: Neil Maiden (City University).
- *SeCSE*⁹ is a project providing free and open source instruments to enable the engineering of service-centric systems. Its goal is to provide tools, methods and techniques supporting the cost-effective development and use of dynamic, customizable, adaptable and dependable

⁸ <http://www.traceback-ip.eu/index.php>

⁹ <http://www.secse-project.eu/>

services and service-centric applications. Clearly, its research focus aligns with S-Cube's and meets the policy for community outreach. S-Cube collaborator: Neil Maiden (City University).

- *ONE*¹⁰ aims to define a negotiation framework for virtual enterprises. Virtual enterprises are closely connected to service networks, a major research topic in S-Cube. S-Cube collaborator: FBK.

4.1.2.2 FP7 Projects

- University of Duisburg-Essen is a member of the *NEXOF-RA*¹¹ consortium/project. Part of *NEXOF-RA*'s work is to define and maintain a reference model and glossary for 'service platforms'. S-Cube hopes to foster a strong link between S-Cube and *NEXOF-RA*, particularly through work in the Software & Knowledge Repository CWG, particularly through the sharing of knowledge contained in their glossary. S-Cube collaborator: UniDue.
- The *SOA4ALL*¹² project explores a scenario where "billions of parties are exposing and consuming services via advanced Web technology". Clearly, this scenario has much in common with S-Cube's idea of service networks (though the two are not the same) and it is hoped that *SOA4ALL* and S-Cube can share research in the field of large-scale service environments. S-Cube collaborators: Neil Maiden (City University), Elisabetta di Nitto (Polimi) and Manuel Carro (UPM).
- *SLA@SOI*¹³ seeks to investigate Service Level Agreements (SLAs) to enable a business-ready service-oriented infrastructure and empower the service economy in a flexible and dependable way. S-Cube's research activity in end-to-end quality provision and SLA conformance will benefit from collaborating with this project in this area. S-Cube collaborators: Elisabetta di Nitto (Polimi), Manuel Carro (UPM) and Marco Pistore (FBK).
- The *EzWeb*¹⁴ project focuses on the development of technologies employed in building the front-end layer of a new generation SOA architecture where interaction is adapted to the user's context. S-Cube research into HCI, adaptation and service architectures would all benefit from collaboration with this project. S-Cube collaborator: Manuel Carro (UPM).
- *RESERVOIR*¹⁵ concentrates on resource and service virtualization "without Barriers", particularly with respect to how virtualization can enable massive scale deployment and management of complex IT services across different administrative domains, IT platforms and geographies. Similarly to *SOA4ALL*, this research topic aligns with S-Cube's concept of an agile service networks and any collaboration will be focused in this area. S-Cube Collaborator: Manuel Carro (UPM).
- *MASTER*¹⁶ aims to provide methodologies and infrastructures that facilitate the monitoring, enforcement, and audit of quantifiable indicators of the security of a business process. S-Cube's particular interest in this project is in the area of monitoring; the *MASTER* project deals with the definition of compliance and a runtime infrastructure for enforcing compliance. Monitoring is a central aspect of their work and S-Cube's (through the Adaptation & Monitoring research activities) and collaboration will centre on this topic. S-Cube Collaborators: Manuel Carro (UPM) and Frank Laymann (USTUTT).
- *COMPAS*¹⁷ pursues a model driven development (MDD) approach to the problem of proving and enforcing compliance in systems of software services. *COMPAS* and S-Cube may

¹⁰ <http://one-project.eu/>

¹¹ <http://www.nexof-ra.eu/>

¹² <http://www.soa4all.eu/>

¹³ <http://sla-at-soi.eu/>

¹⁴ <http://ezweb.morfeo-project.org/>

¹⁵ <http://www.reservoir-fp7.eu/>

¹⁶ <http://www.master-fp7.eu/>

¹⁷ <http://www.compas-ict.eu/>

establish a research collaboration to investigate and reinforce the software engineering aspects of this approach. S-Cube collaborators: Schahram Dustdar (TUW), Frank Leymann (USTUTT) and Mike Papazoglou (Tilburg)

- The *ALLOW*¹⁸ project has a target outcome to provide technologies and design paradigms for massive-scale pervasive information and communication systems capable of autonomously adapting to highly dynamic and open technological and user contexts. Clearly, this fits with the S-Cube research topics in adaptation and our hope is that we can reach the pervasive systems community through collaboration with this project. S-Cube collaborators: UTSTUTT, Marco Pistore (FBK).
- *HATS*¹⁹ (Highly Adaptable and Trustworthy Software using Formal Methods) conducts research into the use of formal methods to achieve highly adaptable and trustworthy systems. This project can provide the springboard to create links with the formal methods community. S-Cube collaborators: Marco Pistore (FBK) and Manuel Carro (UPM).
- See-Grid²⁰, Etics-2²¹ and EDGeS²² are all Grid/infrastructure projects oriented towards developing and improving grid-related concepts and technologies. With the move to service-orientation by the Grid community [5] and S-Cube's work at the infrastructure level (in JRA-2.3) it is hoped that our collaboration with these projects will provide us with a lead into the Grid/infrastructure community. S-Cube collaborator: Zsolt Nemeth (SZTAKI).
- PlugIT²³ aspires to develop an IT-Socket that will realize the vision of businesses "plugging-in" to IT, for the purpose of aligning business requirements with IT services. The research challenge is to link human interpretable graphical models – partly semi-formal - with machine interpretable semantic formalisms to enable a tighter involvement of domain experts when expressing formal knowledge specifying business requirements on IT infrastructure and services. S -Cube collaborator: Dimitris Plexousakis (UOC).

4.2 Government / National Funding Bodies

4.2.1 NWO – the Netherland's Organisation for Scientific Research

The Netherlands Organisation for Scientific Research (NWO) is responsible for enhancing the quality and innovative nature of scientific research as equally initiating and stimulating new developments in scientific research by allocating resources to research groups, while facilitating, for the benefit of society, the dissemination of knowledge from the results of research that it has initiated and stimulated. Recently, NWO has started to explore and coordinate research possibilities on the international level. To do this NWO participates in international networks and programmes and promotes international knowledge exchange and mobility. In addition, NWO has established JACQUARD as the Netherlands premier funding programme to stimulate software engineering research and collaboration in Dutch academia and industry. JACQUARD aims to promote co-operation amongst professionals from both industry and academia who are working in various areas of software engineering, for example software architecture, configuration of software components, alignment of business processes and quality aspects of software. Particular emphasis has been given in the past few years in the concept of software as a service.

Members of the S-Cube consortium are actively involved in advisory capacities in various programs of NWO, including program boards, review boards and advisory boards. Through these capacities we hope to raise the profile of software services and systems research. In addition, members of S-Cube

¹⁸ <http://www.allow-project.eu/>

¹⁹ <http://www.cse.chalmers.se/research/hats/>

²⁰ <http://www.see-grid.org/>

²¹ <http://etics.web.cern.ch/etics/>

²² <http://www.edges-grid.eu/>

²³ <http://plug-it-project.eu/>

advise NWO in pursuing and advancing internationalization of research in the field of software services and systems.

We feel NWO's research agenda and goals have much in common with S-Cube's, such as the emphasis on software as a service and international co-operation, and they meet the policy criteria for not only being considered a national funding body but also a policy maker in this field.

4.2.2 BMBF – Bundes Ministerium fuer Bildung und Forschung

In the field of innovation management Germany has had much success, particularly in the manufacturing sector. The German government aims to duplicate the high quality in innovation management throughout the service sector and is working to improve both investment in and conditions for new types of services coming from the increased interplay between advances in service research and developments in technology. The BMBF plays a leading role in achieving this vision in Germany.

In particular, the BMBF has identified the software services sector as one of its strategic instruments for future research and development. It is predicted that there will be a trend the German market to move towards the service sector in the future, and this raises opportunities for research in the areas of service oriented architecture and service engineering in particular.

S-Cube network members from Germany are closely associated with the BMBF activities in the area of services research and will be able to form a close partnership with the BMBF in the future because of this shift towards services and the opportunity it presents to promote S-Cube's work and software services and systems research in general.

Like the NWO described previously, the BMBF can also be considered a policy maker and S-Cube intends to strengthen its association with the BMBF to meet the policy objective of promoting and ensuring the sustainability of research in service-based systems and applications.

5 Summary of activities and epilogue

S-Cube is committed to spreading of excellence developed by the network's beneficiaries through dissemination activities with the scientific, industrial and other communities. In fact, it regards dissemination as an important lever for exploiting of research results at a global scale, while establishing enduring European excellence in research on the next generation of software services and systems.

Community outreach aims at identifying potential collaboration links between diverse communities, assessing them, and establishing long-lasting inter-community collaboration links from them. This will allow for effective transfer, sharing and enhancement of knowledge created in the S-Cube network.

In this document, we have described S-Cube's ambitious and sound strategy for Community Outreach. This strategy has several complementary dimensions: intensive collaboration with other EU FP-6/7 projects through SSAI&E, and, establishing enduring and active linkages with several European and International research centres, funding agencies and research communities with related interests and activities.

It can be concluded that – despite the fact that the network is only in its first year – already some very promising initial links with academic and industrial research bodies have been identified, and either under negotiation or in the process of being established. For example, we have identified and are setting up intensive collaborative links with research organizations such as NWO, CSIRO, CITRIS, and project and initiatives such as COMPAS and NEXOF-RA.

In addition to the above achievements, it should be noted that S-Cube has also undertaken some dissemination efforts that are closely related to community outreach. In particular, S-Cube has organized international workshops, conferences and research seminars bringing together researchers from various scientific disciplines. For a detailed overview of these related dissemination activities we refer to deliverable CD-SoE-1.2.4 [4].

Lastly, we wish to point out that this document is a first effort of shaping S-Cube's strategy for community outreach. We plan to extend, refine and report on follow-ups to this strategy each year in CD-SoE-1.2.4 as more research results can be shared with the wider community and the field of service-based systems and applications develops.

References

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