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Authors: UniDue, UvT, CITY, CNR, FBK, INRIA, Lero, Polimi, SZTAKI, TUW, UCBL, UOC, UPM, USTUTT, UHH, VUA.

Editor: Michael Parkin (UvT)

Reviewers: Valentina Mazza (Polimi)
Attila Kertész (SZTAKI)

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Management Summary

The mobility of researchers within the S-Cube network of excellence is considered a stepping stone to achieving the sustainable integration of knowledge and to align the research of the different S-Cube network partner institutions. To facilitate this, the S-Cube mobility program encourages researchers to spend time in one of the beneficiary institutes to swap research ideas and carry out joint research through the reimbursement of travel and living expenses incurred whilst at the host institution.

This deliverable aims to identify research areas and beneficiaries of the mobility program by analysing overlaps in the competencies of the S-Cube partner institutes and through the pro-active identification of suitable candidates for the mobility program, thereby encouraging researcher mobility between these partners.



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Members of the S-Cube consortium:

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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
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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 world-wide 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 which 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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Chapter 1

Introduction

The mobility of researchers within the S-Cube network of excellence is considered a stepping stone to achieving the sustainable integration of knowledge and to align the research of the different S-Cube network partner institutions [2]. To facilitate this, the S-Cube mobility program encourages researchers to spend time in one of the beneficiaries institutes to swap research ideas and carry out joint research through the reimbursement of travel and living expenses incurred whilst at the host institution. This deliverable aims to identify research areas and beneficiaries of the mobility program by analysing overlaps in the competencies of the S-Cube partner institutes and through the pro-active identification of suitable candidates for the mobility program, thereby encouraging researcher mobility between these partners.

1.1 Objectives of this Workpackage

According to the S-Cube description of work [2], the intention of Workpackage WP-IA-2.1 ('Mobility of Researchers') is to:

- To create suitable scientific, administrative, financial, social and practical conditions for scientific stays of researchers, post-doctoral and PhD students
- To identify researcher mobility and re-location opportunities by analysing dependencies, overlaps, and possible synergies among beneficiaries as an outcome of the collaborations within the joint research activities (JRAs)
- To establish a transparent method and criteria for selection for mobility candidates
- To define and enact a suitable mobility plan of researchers, post-doctoral and PhD students within the network
- To establish sustainable agreements between the beneficiaries for recurrent mobility whose duration goes beyond the duration of the network

1.2 Objective & Structure of this Report

The previous deliverable in this Workpackage [1] defined the mobility program policies, procedures and 'administrative and social backbone'. This report has the purpose of identifying scientific subjects for mobility (i.e., defining common research areas) and maps those research areas to S-Cube partners and participants. In carrying out this process this deliverable will pro-actively identify suitable candidates for the mobility program by classifying them with respect to the identified scientific subjects, thereby encouraging researcher exchange visits between these partners.

The structure of this report is as follows: Chapter 2 describes the scientific subjects for mobility and how they were identified; Chapter 3 describes the mapping between the scientific subjects and S-Cube participants; Chapter 4 provides a conclusion to the report.

Chapter 2

Identification of Scientific Subjects for Mobility

This Chapter identifies the scientific subjects, or common research areas, suitable for the mobility program. The challenge in defining these subjects is not only to find *common research areas* of interest but also to find *complementary research topics* that will allow researchers from different backgrounds to work together who would not normally do so. In identifying complementary as well as common research areas we hope to increase the possibility for researcher mobility.

The first step to achieving this is to identify the scientific subjects. This report uses the *competencies*, or skills and abilities, of each S-Cube network participant as defined in the S-Cube Convergence Knowledge Model (KM), a product of the IA-1.1 Workpackage, to help define the scientific subjects. The KM captures terminology and also classifies competencies of partners and their research [2]. Thus, by gathering the competencies from the KM we have identified their common themes and grouped them accordingly in the scientific subjects.

2.1 Scientific Subjects for Mobility

As described above, the scientific subjects for mobility are the common research areas suitable for the mobility program. These subjects we describe below were found through mining the competency information that each partner had entered about themselves contained in the S-Cube KM in M12 of the project (see S-Cube deliverable [3]). The full list of competencies grouped by partner institution (the ‘raw’ data the scientific subjects are derived from) is given in Appendix B of this document (page 12). By using the information entered/given by each partner we hope that the common and complementary research areas identified will be as accurate and current as possible.

The ‘raw’ list of the competencies of each S-Cube member participant extracted from the S-Cube KM is shown in Table 4.2. Note that each partner is described using their short name to save space and a mapping between these short names and the full partner names is given in Appendix A of this document (page 11). Once we had the information in Table 4.2 we gathered common and complementary competencies declared by each S-Cube participant and these became the scientific subjects for mobility.

As an example of how this process was carried out, consider the competencies of *Software Engineering*, *Software Architecture*, *Software Quality Assurance*, *Software Processes* and *Software Product-Line Engineering & Variability Management*. These competencies were gathered together under the common research area of *Software Engineering-Lifecycle* as each of them is common or complementary to that area. Note also how competencies such as *Business Protocol Analysis*, *Monitoring & Auditing* and *Software Quality Assurance* can also fall into two (or more) common research areas; here we have classified *Business Protocol Analysis*, *Monitoring & Auditing* as also belonging to the research areas of *Business Processes* and *Monitoring*, while *Software Quality Assurance* can also be considered as belonging to the

Quality Assurance common research area.

The results can be seen in Table 2.1, below.

	Scientific Subject for Mobility	Common & Complementary Competencies
1	Adaptation	Self-Adaptation, Dynamic Adaptation of Parallel Programs, Engineering Adaptive Component-Based Systems, Adaptive Web Services, Adaptation in Business Protocols, Adaptation of Service Compositions, Engineering Adaptive Service-Based Systems, Self-Organising Systems, Self-Healing, Flexible & Self-Healing Web Services
2	Business Processes	Business Process Management, Distributed Business Processes Business Processes, Business Processes & Protocols, E-Business, Business Process Analysis, Monitoring & Auditing
3	Business Protocols	Business Processes & Protocols, Business Protocol Languages, Multi-Party Business Protocols, Adaptation in Business Protocols
4	Evolution	Service Evolution, Software Architecture Evolution, Dependable Evolvable Pervasive Service Engineering
5	Information Quality	Data & Information Related Quality, Data-Related Quality
6	Interaction	Interaction Design & Research Personalisation
7	Grid Computing	Grid Scheduling, Grid Workflow, Grid Brokering, Load Balancing & Scheduling, Knowledge Sharing Networks
8	Model-Driven Engineering	Requirements & Model-Based Testing, Model-Driven Service Composition, Model-Driven Engineering
9	Monitoring	Monitoring, Service-Oriented Monitoring, Monitoring Design Principles & Monitoring Framework, Business Process Analysis, Monitoring & Auditing, Monitoring of QoS Metrics of Web Services, Monitoring of Key Performance Indicators
10	Negotiation & QoS Agreement	Service Level Agreement (SLA) Negotiation, Quality Assurance Negotiation & QoS Agreement
11	Quality Assurance	Software Quality Assurance, Quality Assurance, Static Analysis
12	Quality of Service	Quality Assurance, Quality of Service, Quality of Service in Component-Based Systems, Web Service Orchestration & QoS Optimisation, Monitoring QoS Metrics of Web Services
13	Requirements Engineering	Requirements Engineering, Requirements & Model-Based Testing, User-Centred Requirements Engineering
14	Service Architectures	Service Architecture, Service-Oriented Architecture, Service Orientation
15	Security	Security, Authorisation, Authentication
16	Service Composition	Model-Driven Service Composition, Service Composition, Web Service Orchestration & QoS Optimisation, Service Choreography & Orchestration, Service Networks
17	Service Discovery	Semantically-Enriched Service Discovery Mechanisms, Web Service Retrieval, Service Registries, Context-Aware Invocation of Web Services, Dynamic Binding & Invocation of Web Services
18	Service Design & Modelling Methodologies	Service-Centric Systems Engineering, Service Design & Modelling Methodologies
19	Service-Oriented Computing	Service Orientation, Service-Oriented Computing, Service-Based Applications (SBAs), Service-Oriented Applications
20	Service Oriented Software Engineering	Dependable Evolvable Pervasive Service Engineering, Service-Oriented Software Engineering

21	Software Engineering Life-Cycle	Software Processes, Software Architecture, Software Engineering, Software Quality Assurance, Software Product-Line Engineering & Variability Management
22	User-Centred Requirements Engineering	User-Centred Requirements Engineering, User Centric Services

Table 2.1: Scientific Subjects for Mobility (listed alphabetically)

Chapter 3

Mapping of Scientific Subjects for Mobility to S-Cube Network Participants

Having defined the scientific subjects for mobility in Section 2.1, this Chapter identifies the S-Cube partners and individuals suitable for the mobility under each scientific subject. This is achieved through mapping the declared competencies of institutions in Table 4.2 to the scientific subjects in Table 2.1 through the common and complementary competencies. Because the competencies in Table 4.2 are also declared with competent individuals it was also possible to produce a list of competent S-Cube scientists suitable for mobility between institutions.

The result is Table 3.1, below. Note that a dash ('-') in the data means the information was not supplied by the S-Cube partner.

	Scientific Subject for Mobility	Competent S-Cube Institutions	Competent S-Cube Scientists
1	Adaptation	UniDue CNR FBK INRIA Polimi UCBL USTUTT UHH	Klaus Pohl, Andreas Metzger, Andreas Gehlert Nicola Tonellotto Marco Pistore, Raman Kazhamiakin, Antonio Bucchiarone, Annapaola Marconi Brice Morin, Grgory Nain, Olivier Barais, Fank Chauvel, Jean-Marc Jzquel, Franoise Andr Barbara Pernici, Maria Grazia Fugini, Pierluigi Plebani, Cinzia Cappiello, Danilo Ardagna, Marco Comuzzi, Anna Maria Rosati, Carlo Ghezzi, Elisabetta Di Nitto, Valentina Mazza, Luciano Baresi, Andrea Mocci, Luca Cavallaro, Daniel Dubois Selima Benbernou, Fabien DeMarchi, Francois Hantry, Emmanuel Caoqery, Mohand Said Hacid Frank Leymann, Dimka Karastoyanova, Branimir Wetzstein, Olha Danylevych Winifried Lamersdorf, Sonja Zaplata
2	Business Processes	UvT FBK Polimi Tuw USTUTT UHH	Michele Mancioffi, Mike Papazoglou, Willem-Jan van den Heuvel, Koah Nguyen, Benedikt Kratz Marco Pistore, Annapaola Marconi, Michele Trainotti Barbara Pernici, Cinzia Cappiello Schahram Dustdar, Florian Rosenberg, Philipp Leitner Frank Leymann, Dimka Karastoyanova, Branimir Wetzstein, Olha Danylevych Winifried Lamersdorf, Sonja Zaplata
3	Business Protocols	UvT	Michele Mancioffi

		UCBL	Selima Benbernou, Francois Hantry, Emmanuel Caoqery
		UPM	-
		USTUTT	Frank Leymann, Dimka Karastoyanova, Branimir Wetzstein, Olha Danylevych
4	Evolution	UvT INRIA Polimi	Mike Papazoglou, Vasilios Andrikopoulos Olivier Barais, Rgis Fleurquin Carlo Ghezzi, Elisabetta Di Nitto, Valentina Mazza, Luciano Baresi, Andrea Mocchi, Luca Cavallaro, Daniel Dubois, Giordano Tamburelli
5	Information Quality	CNR POLIMI	- Barbara Pernici, Cinzia Cappiello
6	Interaction	CITY CNR	- -
7	Grid Computing	UvT CNR INRIA SZTAKI Tuw VUA	Michael Parkin Nicola Tonello, Ranieri Baragli Jean Louis Pazat, Benoit Baudry, Sagar Sen Franoise Andr Attila Keresz, Zsolt Nemeth, Gabor Kecskemeti Philipp Leitner Patricia Lago, Hans van Vliet
8	Model-Driven Engineering	UniDue INRIA	Klaus Pohl, Andreas Metzger Brice Morin, Grgory Nain, Olivier Barais, Fanck Chauvel, Jean-Marc Jzquel, Maha Driss
9	Monitoring	FBK INRIA Polimi Tuw	Marco Pistore, Annapaola Marconi, Michele Trainotti, Raman Kazhamiakin Thomas Ledoux, Franoise Andr, Olivier Barais, Jean-Louis Pazat Barbara Pernici, Cinzia Cappiello Florian Rosenberg, Scharam Dustdar, Philipp Leitner
10	Negotiation & QoS Agreement	UvT CNR Polimi	Michael Parkin - Barbara Pernici, Danilo Ardagna, Pierluigi Plebani, Cinzia Cappiello, Marco Comuzzi, Kyriakos Kritikos, Maria Grazia Fugini
11	Quality Assurance	UniDue UvT Lero UPM	Klaus Pohl, Andreas Metzger Michael Parkin - -
12	Quality of Service	UniDue UvT INRIA Polimi Tuw	Klaus Pohl, Andreas Metzger Michael Parkin Nol Plouzeau, Jean-Louis Pazat Barbara Pernici, Maria Grazia Fugini, Danilo Ardagna, Pierluigi Plebani, Cinzia Cappiello Scharam Dustdar, Florian Rosenberg
13	Requirements Engineering	UniDue UvT CITY INRIA	Klaus Pohl, Andreas Gehlert, Andreas Metzger Oktay Turetken Neil Maiden, Angela Kounkou, Kos Zachos Benoit Baudry
14	Service Architectures	UvT Tuw	Vasilios Andrikopoulos, Willem-Jan van den Huevel, Mike Papazoglou, Michael Parkin Scharam Dustdar, Florian Rosenberg, Philipp Leitner, Martin Treiber

		UHH VUA	Winifried Lamersdorf, Sonja Zaplata Patricia Lago, Qing Gu, Hans van Vliet
15	Security	Polimi UCBL	Maria Grazia Fugini Selima Benbernou, Emmanuel Caoqery, Mohand Said Hacid
16	Service Composition	UvT INRIA Polimi UoC USTUTT UHH	Michele Mancioppi, Mike Papazoglou, Khoah Nguyen, Willem van den Huevel Maha Driss, Jean Marc Jzquel Barbara Pernici, Maria Grazia Fugini, Danilo Ardagna, Pierluigi Plebani, Cinzia Cappiello Dimitris Plexousakis, Kyriakos Kritikos, George Baryannis Frank Leymann, Dimka Karastoyanova, Oliver Kopp, Branimir Wetzstein, Olha Danylevych Winifried Lamersdorf, Sonja Zaplata
17	Service Discovery	CNR Polimi TUV UoC	- Barbara Pernici, Pierluigi Plebani Scharam Dustdar, Florian Rosenberg, Philipp Leitner Dimitris Plexousakis, Kyriakos Kritikos
18	Service Design & Modelling Methodologies	UvT CITY VUA	Willem-Jan van den Huevel, Khoa Nguyen, Mike Papazoglou, Vasilios Andrikopoulos Neil Maiden, Kos Zachos Patricia Lago, Qing Gu, Hans van Vliet
19	Service-Oriented Computing	FBK TUW UoC USTUTT UHH	Marco Pistore, Annapaola Marconi, Michele Trainotti, Raman Kazhamiakini, Antonio Bucchiarone, Piergiorgio Bertoli Scharam Dustdar, Florian Rosenberg, Philipp Leitner, Martin Treiber Dimitris Plexousakis, Kyriakos Kritikos, George Baryannis, Chrysostomos Zagainis Frank Leymann, Dimka Karastoyanova, Branimir Wetzstein, Olha Danylevych Winifried Lamersdorf, Sonja Zaplata
20	Service Oriented Software Engineering	Polimi VUA	Carlo Ghezzi, Elisabetta Di Nitto, Valentina Mazza, Luciano Baresi, Andrea Mocci, Luca Cavallaro, Daniel Dubois, Giordano Tamburelli Patricia Lago, Qing Gu, Hans van Vliet
21	Software Engineering Life-Cycle	UniDue UvT INRIA Lero UPM	Klaus Pohl, Andreas Metzger, Kim Lauenroth Oktay Turetken Olivier Barais, Benoit Baudry, Noel Plouzeau - -
22	User-Centred Requirements	CITY FBK	Neil Maiden, Angela Kounkou, Kos Zachos Marco Pistore, Raman Kazhamiakini

Table 3.1: Scientific Subjects for Mobility and Competent S-Cube Participants

Chapter 4

Conclusions

The S-Cube mobility program encourages researchers to spend time in one of the beneficiaries institutes to swap research ideas and carry out joint research. This deliverable seeks to pro-actively encourage mobility through the identification of partners and individuals most suitable for mobility through the identification of common research areas.

This was achieved by first identifying common scientific research areas for the mobility program (Chapter 2), which were found through analysing the competency information in the S-Cube KM and grouping the common and complementary competencies. We found the S-Cube partners had declared 106 competencies in the S-Cube KM from which we were able to determine 22 common research areas.

We were able to identify the S-Cube partner institutions and individuals suitable for mobility in each common research area (Chapter 3) by mapping the common research areas to institutions and individuals through the common and complementary competencies declared in Table 4.2. Table 3.1 shows the results.

The next step for Workpackage WP-IA-2.1 ('Mobility of Researchers') is to take the information produced in this report and produce a 'Call for Mobility' organised around the research areas listed in Table 2.1, specifically targeting individuals who are grouped together due to their common and complementary competencies. An initial report on the success of this 'Call For Mobility' will be presented in CD-IA-2.1.3, due in M21 of the S-Cube Network of Excellence.

Appendix A

S-Cube Network of Excellence Participants

	Name	Short Name
1	University of Duisberg-Essen	UniDue
2	Tilburg University	UvT
3	City University London	CITY
4	Consiglio Nazionale delle Ricerche	CNR
5	Centre for Scientific & Technological Research	FBK
6	French National Institute for Research in Computer Science & Control	INRIA
7	Irish Software Engineering Research Centre	Lero
8	Politecnico di Milano	Polimi
9	MTA SZTAKI — Computer & Automation Research Institute	SZTAKI
10	Vienna University of Technology	TUW
11	Université Claude Bernard	UCBL
12	University of Crete	UOC
13	Universidad Politécnica de Madrid	UPM
14	University of Stuttgart	USTUTT
15	University of Hamburg	UHH
16	VU University Amsterdam	VUA

Table 4.1: List of S-Cube Network Participants with their Short Name

Appendix B

Competencies by S-Cube Partner Institution

The following table is a list of the S-Cube network partner competencies entered in the S-Cube Knowledge Model on 12 March 2009. Where a dash ('-') is given no data is/was entered in the Knowledge Model. This data is used to derive the scientific subjects for mobility (in Section 2.1) and then to map the scientific subjects to S-Cube network participants (Chapter 3).

Participant	Competency	Who	Associated KM term	
1	UniDue	Quality Assurance	Klaus Pohl, Andreas Metzger	Analytical Quality Assurance, Design for Monitoring, Satisfaction, Reactive Adaptation, Software Quality Assurance, Verification, Fault, Validation, Monitoring Specification, Monitor, Monitoring, Static Analysis, Monitoring Mechanisms, User Error, Quality of Service Level, Service Fault, Proactive Adaptation, Software Software Service, Monitoring Aspect, Monitoring Architecture, Error, Monitored Event, Quality Attribute, Quality of Service Characteristic, Quality of Service Constraint, Quality of Service Dimension, Monitored Property, Monitoring Architecture Distribution, Formal Specification, Failure Semantics, Monitoring Requirements, Failure, Constructive Quality Assurance, Quality of Service-based Adaptation, Service Level Agreement (SLA)
		Engineering Adaptive Service-based Systems	Klaus Pohl, Andreas Metzger, Andreas Gehlert	Adaptation, Adaptation Requirements and Objectives, Design for Adaptation, Reactive Adaptation, Self-healing System, Service-based Application (SBA), Self-Configuration, Self-*, Service Based Application Construction, Self-adaptation, Proactive Adaptation, Software Service, Adaptable Service-based Application, Autonomic, Adaptation Mechanism, Adaptive, Service, Self-optimisation, Self-Protection, Self-healing, Service Specification, Post-mortem Adaptation, Adaptation Strategy, Evolution Quality of Service, Service-based Adaptation
		Requirements Engineering	Klaus Pohl,	Mediation, Stake-holder, Soft Goal,

		Andreas Gehlert	Scenario, Actor, Hard Goal, Plan, Elicitation, Requirements Engineering, Service Oriented Requirements Engineering, Service Specification, Formal Specification, Requirements Analysis, Context, Goal, Requirement	
	Software Architecture	Klaus Pohl, Andreas Metzger, Kim Lauenroth	Design for Monitoring, Service-Based Application (SBA), Software Service, Monitoring Architecture, Service Specification, Monitoring Architecture Distribution, Formal Specification	
	Software Product Line Engineering & Variability Management	Klaus Pohl, Andreas Metzger, Kim Lauenroth	Customisation	
	Requirements & Model Based Testing	Klaus Pohl, Andreas Metzger	Testing	
2	UvT	Quality Assurance	Michael Parkin	Non-Repudiation, Testing, Quality of Service Characteristic, Quality Attribute, Quality of Service-aware Grid Service, Network and Infrastructure-related Quality, Quality of Service Negotiation, Service Level Agreement (SLA)
	Service Infrastructure	Michele Manciacopi, Khoa Nguyen, Mike Papazoglou, Michael Parkin	Enterprise Service Bus (ESB), Monitoring Infrastructure	
	Service Architectures	Vasilios Andrikopoulos, Willem-Jan van den Heuvel, Mike Papazoglou, Michael Parkin	Software Service, Monitoring Architecture, Enterprise Application Integration (EAI), Service	
	Grid	Michael Parkin	Grid, Grid Brokering, Grid Workflow, Monitoring in Grid	
	Requirements Engineering	Oktay Turetken	Elicitation, Requirements Engineering, Requirements Analysis, Requirement	
	Service Networks	Willem-Jan van den Heuvel, Mike Papazoglou	Agile Service Network	
	Business Process Management	Michele Manciacopi, Mike Papazoglou, Willem-Jan van den Heuvel, Khoa Nguyen	BPM Software Suite, Business Protocol, Business Activity Monitoring (BAM), Business Protocol Projection, Business Process Integration (BPI), Business Process Modelling, Business Process Execution, Business Process, Business Protocol Language, Workflow	
	Service Composition	Michele Manciacopi, Mike Papazoglou, Khoa Nguyen	Service Choreography, Service Orchestration	
	E-Business	Benedikt Kratz, Mike Papazoglou	Business Transaction, Business Aware-Transaction	

		Service Design & Modelling Methodologies	Willem-Jan van den Heuvel, Khoa Nguyen, Mike Papazoglou, Vasilios Andrikopoulos	Service Design, Service Analysis, Design Principles, Design for Reuse, Service Realisation Strategy, Service Specification, Formal Specification, Service Description
		Service Evolution	Vasilios Andrikopoulos, Mike Papazoglou	Evolution
		Software Processes	Oktay Turetken	Software Quality Assurance, Software Process, Software Process Capability, Capability Maturity Model, Key Process Area, Software Process Assessment, Capability Maturity Model Integration
3	CITY	Inclusive Design & Social Aspects of Computing	Neil Maiden, Angela Kounkou	Culture, Persona, Stereotype, Accessibility, User Modelling, User Interface, Social Network Analysis Usability
		Interaction Design & Research	-	User Error, Usability, Accessibility, Task Modelling, Personalisation, User Modelling, Interface, User Experience
		User-Centred Requirements Engineering	Neil Maiden, Angela Kounkou, Kos Zachos	User-centred Requirements Engineering, Soft Goal, Scenario, Hard Goal, Requirements Engineering, Requirements Analysis, Requirement, Stereotype, Elicitation
		Service-Centric Systems Engineering	Neil Maiden, Kos Zachos	Service-Based Application (SBA), Semantic Web Services Composition, Service Based Application Construction, Software Service, Web Service, Service Discovery, Service Oriented Requirements Engineering, Semantic Web Services, Service Description
		Centre for HCI Design	Neil Maiden, Angela Kounkou	Human Computer Interaction (HCI)
4	CNR	Adaptation	-	Adaptation
		Self-Healing	-	Self-Healing
		Performance	-	Performance
		Service Discovery	-	Service Discovery
		Service Registry	-	Service Registry
		Self-Adaptation	Nicola Tonello	Self-Adaptation, Self-*
		Grid Scheduling	Nicola Tonello, Ranieri Baragli	Grid Scheduling
		Data-Related Quality	-	Data-Related Quality
		Service Level Agreement Negotiation	-	Service Level Agreement Negotiation

		Grid Workflow	Ranieri Baraglia, Nicola Tonellotto	Grid Workflow
		Personalisation	-	Personalisation
5	FBK	Service-Oriented Applications	Marco Pistore, Annapaola Marconi, Michele Trainotti, Raman Kazhamiakin, Antonio Bucchiarone Piergiorgio Bertoli	Service-Based Application (SBA), Static Analysis, Analytical Quality Assurance, Service Choreography, Semantic Web Services, Composition, Service Based Runtime, Planning, Service Based Application Construction, Service Oriented Software Engineering (SOSE), Web Service, Service Composition, Service Orchestration, Service, Service Oriented Requirements Engineering, Composition Schema, Requirements Analysis, Service Level Agreement (SLA), Automated Service Composition, Verification, Validation
		Adaptation	Marco Pistore, Raman Kazhamiakin, Antonio Bucchiarone, Annapaola Marconi	Self-Adaptation, Adaptation, Adaptation Requirements & Objectives, Design for Adaptation, Reactive Adaptation, Proactive Adaptation, Adaptable Service-Based Application, Adaptation Mechanism
		Service-Oriented Monitoring	Marco Pistore, Annapaola Marconi, Michele Trainotti, Raman Kazhamiakin	Monitoring Requirements, Monitoring Architecture, Monitoring Infrastructure, Monitor, Monitoring, Design for Monitoring, Monitoring Specification Monitoring Mechanisms, Monitoring in Service Compositions
		Distributed Business Processes	Marco Pistore, Annapaola Marconi, Michele Trainotti	Business Process Modelling, Business Process
		User-centric services	Marco Pistore, Raman Kazhamiakin	Context
6	INRIA	Load Balancing & Scheduling	Jean-Louis Pizat Benoit Baudry, Sagar Sen	Performance Verification, Validation, Fault, Error, Failure, Diagnosis, Testing
		Software Engineering	Olivier Barais, Benoit Baudry, Noel Plouzeau, Jean-Marc Jzquel	Life-Cycle Model
		Model-Driven Engineering	Brice Morin, Grgory Nain, Olivier Barais, Franck Chauvel, Jean-Marc Jzquel	Enterprise Application Integration (EAI), Design Principles
		Software Architecture Evolution	Olivier Barais, Rgis Fleurquin	Evolution
		Model-Driven Service Composition	Maha Driss,	Model-Driven Service Composition

			Jean-Marc Jzquel	
		Engineering Adaptive Component-based Systems	Brice Morin, Grgory Nain, Olivier Barais, Franck Chauvel, Jean-Marc Jzquel Franoise Andr	Adaptation Requirements & Objectives, Adaptation, Design for Adaptation, Adaptable Service-Based Application, Adaptation Mechanism, Autonomy Adaptability, Automatic Service Deployment, Dynamic Binding, Design for Reuse, Composition Schema, Self-*
		Monitoring Design Principles & Monitoring Framework	Thomas Ledoux, Franoise Andr, Olivier Barais, Jean-Louis Pazat	Monitoring, Monitored Event, Monitoring Execution, Monitoring, Monitoring in Grid
		Quality of Services in Component-Based Systems	Nol Plouzeau, Jean-Marc Jzquel	Quality of Service Characteristic, Quality of Service Constraint
		Dynamic Adaptation of Parallel Programs	Jean Louis Pazat, Franoise Andr	Adaptation
		Grid Computing	Franoise Andr, Jean-Louis Pazat	Grid Brokering, Grid, Monitoring in Grid
		Requirements Engineering	Benoit Baudry	Actor, Requirements Engineering, Requirements Analysis, Goal, Requirement
7	Lero	Software Quality Assurance	-	Software Quality Assurance
8	Polimi	Web Service Orchestration & QoS Optimisation	Barbara Pernici, Maria Grazia Fugini, Danilo Ardagna, Pierluigi Plebani, Cinzia Cappiello, Marco Comuzzi	Performance, Level of Service, Optimisation, Process, Plan, Ontological Quality of Service Models, Service Orchestration, Service Composition, Quality of Service-aware Service Composition, Service Level Agreement (SLA)
		Data & Information Quality	Barbara Pernici, Cinzia Cappiello	Data-Related Quality, Data Timeliness
		Negotiation & QoS Agreement	Barbara Pernici, Danilo Ardagna, Pierluigi Plebani, Cinzia Cappiello, Marco Comuzzi, Kyriakos Kritikos, Maria Grazia Fugini	Level of Service, Service Level Agreement Negotiation, Mediation, Service Orchestration, Quality of Service Negotiation
		Adaptive Web Services	Barbara Pernici, Maria Grazia Fugini, Pierluigi Plebani, Cinzia Cappiello, Danilo Ardagna, Marco Comuzzi, Anna Maria Rosati, Carlo Ghezzi, Elisabetta Di Nitto,	Adaptation, Adaptation Requirements and Objectives, Design for Adaptation, Adaptable Service-Based Application, Design for Monitoring, Reactive Adaptation, Fault, Monitoring Specification, Monitor, Monitoring, Service-Based Application (SBA), Monitoring Mechanisms, Actor, Quality of Service Level, Service

	Valentina Mazza Luciano Baresi, Andrea Mocci Luca Cavallaro, Daniel Dubois	Runtime, Self-*, Self-Adaptation, Service Based Application Construction, Service Fault, Proactive Adaptation, Software Service, Monitoring Subject, Monitoring Aspect, Monitoring Architecture, Error, Adaptation Mechanism, Autonomic, Adaptive Web Service, Monitored Event, Self- healing, Quality Attribute, Quality of Service Characteristic, Service, Quality of Service Dimension, Quality of Service Constraint, Monitored Property, Formal Specification, Service Specification, Failure Semantics, Service Description, Monitoring Requirements, Adaptation Strategy, Failure, Goal, Evolution, Recovery, Declarative Quality of Service Models, Quality of Service-Based Adaptation
Dependable Evolvable Pervasive Service Engineering	Carlo Ghezzi, Elisabetta Di Nitto, Valentina Mazza, Luciano Baresi, Andrea Mocci, Luca Cavallaro, Daniel Dubois, Giordano Tamburelli	Adaptation, Adaptation Requirements and Objectives, Actor, Adaptable Service-Based Application, Adaptation Strategy, Design for Monitoring, Software Quality Assurance, Service Composition
Business Process Analysis, Monitoring & Auditing	Barbara Pernici, Cinzia Cappiello	Business Process Analysis, Monitoring & Auditing
Security	Maria Grazia Fugini	Security
Context-aware Invocation of Web Services	Barbara Pernici, Pierluigi Plebani, Cinzia Cappiello, Marco Comuzzi	User Modelling, Quality of Use Context, Context, Customisation
Flexible & Self-healing Web Services	Barbara Pernici, Maria Grazia Fugini	Diagnosis
Web Service Retrieval	Barbara Pernici, Pierluigi Plebani	Service Discovery, Service Registry
Web Service Retrieval, Flexible & Self-healing Web Services & Context-aware Invocation	Barbara Pernici, Maria Grazia Fugini, Danilo Ardagna, Pierluigi Plebani, Cinzia Cappiello, Marco Comuzzi, Filippo Ramoni	Static Analysis, Self-Healing System, Analytical Quality Assurance, Accessibility
Web Service Retrieval & Adaptive BPEL Process Execution Based on Quality Constraints	Barbara Pernici, Danilo Ardagna, Pierluigi Plebani, Cinzia Cappiello, Marco Comuzzi	Service Binding, Dynamic Invocation, Dynamic Binding, Rebinding
Software Quality Assurance		

9	SZTAKI	Grid	Attila Kertesz, Zsolt Nemeth, Gabor Kecskemeti	Grid
		Grid Scheduling	Attila Kertesz	Grid Scheduling
		Grid Brokering	Attila Kertesz	Grid Brokering
		Grid Workflow	Attila Kertesz	Grid Workflow
		Service Deployment	Gabor Kecskemeti	Service Deployment, Automatic Service Deployment, On-demand Service Deployment
10	TUW	Measuring QoS metrics of Web Services	Schahram Dustdar, Florian Rosenberg	Availability, Monitoring
		Monitoring Key Performance Indicators	Schahram Dustdar, Philipp Leitner	Key Performance Indicator (KPI)
		Web Service Mediation	Schahram Dustdar, Philipp Leitner	Service Mediation, Mediation Context
		Business Process Management	Schahram Dustdar, Florian Rosenberg, Philipp Leitner	Business Process, Business Process Optimisation, Business Activity Monitoring (BAM)
		Dynamic Binding & Invocation of Web Services	Schahram Dustdar, Florian Rosenberg, Philipp Leitner	Rebinding, Dynamic Invocation, Dynamic Binding, Service Binding
		Grid	Philipp Leitner	Stateful Service, Grid
		Service-Orientation	Schahram Dustdar, Florian Rosenberg, Philipp Leitner, Martin Treiber	Web Service, Service, Stateless Service, Service Runtime, Service Registry
		Monitoring	Florian Rosenberg	Response Time
		Service-Based Applications	Schahram Dustdar, Florian Rosenberg, Philipp Leitner, Martin Treiber	Service-Based Application (SBA), Adaptable Service-Based Application, Testing Evolution
11	UCBL	Authentication	Salima Benbernou, Emmanuel Coquery, Mohand Said Hacid	Authentication
		Authorisation	Salima Benbernou, Emmanuel Coquery, Paul ElKhoury	Authorisation
		Business Protocol Language	Salima Benbernou, Francois Hantry, Emmanuel Coquery	Business Protocol Language
		Adaptation in Business Protocols	Salima Benbernou, Fabien DeMarchi, Francois Hantry, Emmanuel Coquery, Mohand Said Hacid	Adaptation

12	UOC	Service Oriented Computing	Dimitris Plexousakis, Kyriakos Kritikos, George Baryannis, Chrysostomos Zeginis	Level of Service, Quality of Service Level, Semantic Web Services Composition, Web Service, Service Orchestration, Service Composition, Service, Quality Attribute, Quality of Service Characteristic, Semantic Web Services, Formal Specification, Composition Schema, Automated Service Composition
		Service Composition	Dimitris Plexousakis, Kyriakos Kritikos, George Baryannis	Planning
		Formal Description Languages Providing Enriched Service Behaviour Specification Primitives (Pre & Post-conditions, Service Invariants, Quality of Service) with the Use of Ontologies for Complex Services	Dimitris Plexousakis, Kyriakos Kritikos, George Baryannis	Ontological Quality of Service Models, Quality of Service Constraint, Quality of Service Dimension, Service Specification, Service Description, Declarative Quality of Service Models
		Semantically-enriched Service Discovery Mechanisms Employing Semantic Similarity Measures for Matching Functional Goals & Non-functional Requirements	Dimitris Plexousakis, Kyriakos Kritikos	Service Registry, Service Discovery
13	UPM	Multi-Party Business Protocols	-	Business Protocol, Compatibility
		Static Analysis	-	Analytical Quality Assurance, Data-Aware QoS
		Resource Analysis	-	Data-Aware QoS
		Software Engineering	-	Data-Aware QoS
		Abstract Interpretation	-	Data-Aware QoS
14	USTUTT	Service Composition	Frank Leymann, Dimka Karastoyanova, Olha Danylevych, Branimir Wetzstein	Service Composition, Composition Schema, Quality of Service-Aware Service Composition, Service Wiring, Workflow, Service Level Agreement (SLA), Key Performance Indicator (KPI), Monitoring in Service Compositions
		Service Choreography & Orchestration	Frank Leymann, Oliver Kopp Dimka Karastoyanova, Branimir Wetzstein, Olha Danylevych	Service Co-ordination, Interconnected Interface Choreography Model, Service Orchestration, Interaction Choreography Model
		Adaptation of Service Compositions	Frank Leymann, Dimka Karastoyanova, Branimir Wetzstein, Olha Danylevych	Adaptation, Adaptation Mechanism, Proactive Adaptation
		Business Processes & Protocols	Frank Leymann, Dimka Karastoyanova Branimir Wetzstein,	Business Process, Business Process Modelling. Business Protocol, Business Activity Monitoring (BAM),

			Olha Danylevych	Business Process Execution, Business Process Reusability, Business Process Analysis, Monitoring & Auditing, Business Process Integration, Business Process Measurement, BPM Software Suite, Business Process Optimisation, Process Fragment
		Service Oriented Computing	Frank Leymann, Dimka Karastoyanova, Branimir Wetzstein, Olha Danylevych	Service, Web Service, Dynamic Invocation, Dynamic Binding, Rebinding, Enterprise Service Bus (ESB) Enterprise Application Integration (EAI)
15	UHH	Self-Organising Systems	Winfried Lamersdorf, Sonja Zaplata	Reactive Adaptation, Self-*, Self-Adaptation, Proactive Adaptation
		Decentralised Process Execution	Winfried Lamersdorf, Sonja Zaplata	Process Fragment
		Service Oriented Computing	Winfried Lamersdorf, Sonja Zaplata	Quality of Service Level, Web Service, Service Composition, Service Orchestration, Quality Attribute, Quality of Service Characteristic, Service, Dynamic Binding
		Service Composition	Winfried Lamersdorf, Sonja Zaplata	Service Choreography
		Service Oriented Architecture	Winfried Lamersdorf, Sonja Zaplata	Service-Based Application (SBA), Software Service
		Business Process Management	Winfried Lamersdorf, Sonja Zaplata	Process, Business Process, Workflow, Business Process Execution
		Context Management & Mobile Computing	Winfried Lamersdorf, Sonja Zaplata	Quality of Use Context, Context
16	VUA	Service-oriented Software Engineering	Patricia Lago, Qing Gu, Hans van Vliet	Architectural knowledge, Architectural Knowledge Management, Software Process Model, Service Oriented Software Engineering (SOSE), Service Aspect, Process Model
		Service Design & Modelling Methodologies	Patricia Lago, Qing Gu, Hans van Vliet	Design Principles
		Knowledge Sharing Networks	Patricia Lago, Hans van Vliet	Grid
		Service Architectures	Patricia Lago, Qing Gu, Hans van Vliet	Software Service, Service

Table 4.2: Competencies by S-Cube Partner Institution

Bibliography

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- [2] S-Cube Network Participants. Annex I — “Description of Work”, November 2007.
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