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### **Management Summary**

This deliverable describes the procedure for producing and publishing planned publications and lists the planned publications for M15-21 of the S-cube network. Updates of this deliverable in the next time period will show to what extent this plan is being followed, what the deviations are, and how we deal with them by adjusting our internal cooperation plan.

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**Published S-Cube documents**

All public S-Cube deliverables are available from the S-Cube Web Portal at the following URL:

<http://www.s-cube-network.eu/results/deliverables/>

## 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 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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# **1 Introduction**

The objective of S-Cube is to create an integrated European research community in the area of software and service engineering. Today, this community is fragmented and dispersed in across several European countries and it is another S-Cube objective to actively encourage joint research in order to foster the integration of this community. The Spread of Excellence (SoE) activity ensures a broad dissemination of research results as well as to enhance the public visibility of the research conducted within the network, which includes an awareness program that targets both European industry and academia.

## **1.1 Objectives of this Workpackage**

The community outreach workpackage, WP-SoE-1.2, will focus on the spread of research outcomes, innovation and knowledge across the wider scientific community, special sections of industry and user communities, and consider opportunities to apply S-Cube's outputs to novel or emerging research fields.

The workpackage will also encourage the dissemination of S-Cube research through, together with other activities, the co-authoring of books and scientific papers for journals, conferences and workshops, as well as articles for technical magazines. Guidelines regarding where and how to disseminate information has been given in the S-Cube deliverable CD-SoE-1.2.3 "Definition of Strategy for Community Outreach". This deliverable (CD-SoE-1.2.5) provides a procedure for writing and registering a joint publication with the S-Cube SoE activity and also records the joint publications S-Cube partners plan to undertake in the next six months. The analysis of this information will be used to develop and refine the current procedure and guidelines for future collaborations and joint publications.

## **1.2 Structure of this Report**

Our experience in the first twelve months of the project has led to the development of the plan for joint publications procedure described in Section 2. The planned joint publications for the next six months of the project are given in Section 3. The information in this section was gathered from all S-Cube partners in the period of May-June 2009 (approximately). Each partner was asked to provide a description of planned S-Cube publications and this data was compiled, grouped by workpackage and task with duplicates removed, to form the final report shown.

## 2 Plan for Join Publications

The following is the two-step plan for the production and submission of an S-Cube joint publication. It was developed as part of the SoE activity to ensure publications follow a common format and qualify as an “S-cube publication”.

When producing a joint paper, the primary author(s) should:

1. Check the publication contains the correct S-Cube acknowledgement. The acknowledgement is: “The research leading to these results has received funding from the European Community’s Seventh Framework Programme FP7/2007-2013 under grant agreement 215483 (S-Cube).”
2. Upon acceptance of your publication, the following information should be sent to [publications@s-cube-network.eu](mailto:publications@s-cube-network.eu):
  - a) The camera-ready copy of the paper including S-Cube acknowledgement.
  - b) The full reference.
  - c) The list of S-Cube partners who are authors of the paper.
  - d) The subjective ranking of the paper by the authors (see Section 2.1).

Following receipt of a publication the SoE activity will check the publication for the S-Cube acknowledgement, update the bibadmin database/website<sup>1</sup> accordingly and acknowledge the publication. To protect copyrights, the pdf files will only be made internally available to the project via the S-Cube portal.

Each quarter the management activity will compile a list of published papers from the bibadmin database to remove the duplicated reporting from each partner. The bibadmin database will also be used to produce the annual deliverable CD-SoE-1.2.4 “Report on the Dissemination of Network Results & Collaboration with ICT SSAI&E Projects”.

These instructions are also documented at <http://www.s-cube-network.eu/working-area/activities-and-workpackages/mgt-1/publications/publication-handling-in-s-cube>.

### 2.1 Ranking of Publications

In July 2009 the steering committee decided to give a subjective ranking to all published S-Cube papers. The ranking is done by the authors themselves and should use the following classification:

Publication Ranking	If Published in
A	Top conference or journal
B	Well established conference or journal
C	Peer reviewed conference or journal Top workshop
D	Peer reviewed or well-established workshop
E	Peer reviewed workshop or book chapter
F	Publication without peer-review

<sup>1</sup> <http://bibadmin.s-cube-network.eu/>

This classification scheme should be used when an accepted paper is submitted to the bibadmin database via publications@s-cube-network.eu as described above.

### 3 Planned joint publications

The following are the planned research publications for months 15 to 21 of the S-Cube Network of Excellence. Each publication is directly related to work planned in a specific S-Cube Workpackage and the planned publications are grouped accordingly. Anticipated rankings based on the classification scheme given in Section 2.1.

The collaborations necessary to complete these publications will be carried out through a variety of methods: student visits through the S-Cube mobility program, conference calls, S-Cube meetings, meetings at conferences and workshops, etc. and contribute to the integration of each partner's research agenda.

#### 3.1 JRA-1: Engineering & Adaptation Methodologies for Service-based Applications

##### 3.1.1 WP-JRA-1.1: Engineering Principles, Techniques & Methodologies for Hybrid, Service-based Applications

WP-JRA-1.1 will integrate design and discipline knowledge from the related fields that impact on engineering of service-based applications. The workpackage has three individual tasks to coordinate design knowledge about software-based systems (T-JRA-1.1.1), codify human-computer interaction (HCI) discipline knowledge relevant to service-based application engineering (T-JRA-1.1.2) and to codify contextual discipline knowledge relevant to service-based application engineering (T-JRA-1.1.3).

Collaborations to contribute to these tasks are described in detail below. Furthermore, in a broader perspective, USTUTT, UniDue, Lero@UL, and Tilburg have had preliminary discussions (Polimi is planned to participate in the future) with the intention to work on a unified life cycle of SBAs aligned with the existing life cycles on all functional levels in S-Cube. A paper with the results is planned that will contribute to both WP-JRA-1.1 and WP-JRA-2.2.

##### T-JRA-1.1.1: Coordinating Engineering Knowledge for Service-based Applications

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
Lero@UL UniDue City FBK POLIMI VUA	CD-JRA-1.1.4 "Coordinated design knowledge models for software engineering and service-based computing" will be written as a collection of 3 papers, focusing on requirements elicitation during design- and run-time (UniDue/City), Design (FBK/POLIMI) and software process (Lero@UL/VUA).			M18
Tilburg UCBL	Service evolution is the continuous process of service development through a series of consistent and unambiguous changes, and focuses on shallow changes, i.e. changes that do not affect their context and therefore do not require the adaptation of the interacting with the service parties. This publication will formalize aspects of service description and demonstrate how the principles and best practices of software	WP-JRA-1.2 "Service Adaptation & Monitoring".	A/B	M15

	evolution apply to them. A series of publications have already been produced and more have been planned for submission in the immediate future, starting with the ICSOC conference and the IEEE TSE journal.			
Lero@UL VUA CITY	The collaboration will focus on how to take software process quality into account when developing services. This work will investigate the gaps that currently exist between software process quality (focusing particularly on the maintenance of the software product) and the adaptability of services software (as shown in the S-Cube life-cycle left-hand side in deliverable CD-IA-3.1.1). A software process model will be developed for the services maintenance cycle based on the gap analysis.	CD-JRA-1.1.4 “Coordinated design knowledge models for software engineering and service-based computing”.		
USTUTT UniDue	USTUTT and UniDue are planning a paper on the topic of "Requirements Engineering & Modeling of Service Compositions" to explore the requirements engineering for workflows. The main objective is to understand the relationships, dependencies and gaps that need to be resolved in the field.	WP-JRA-2.2: “Adaptable Coordinated Service Compositions”.		
FBK Leo@UL	<p>Identification and presentation of the challenges in defining appropriate quality models for SBA engineering. Some preliminary work was already initiated during the work on the integrated research framework (IA-3.1).</p> <p>While various researchers have proposed services lifecycles for the development of adaptable service-based applications, none appear to incorporate key activities such as project management, requirements management or configuration management; they are thus not able to meet any of the state-of-art process quality models. Therefore it is crucial to meet those standards by implementing quality processes within the SBA development lifecycle.</p>	IA-3.1 “Integration Framework: Baseline & Definition”.		
POLIMI USTUTT	Within the JRA-1.1 life cycle, USTUTT and POLIMI are developing techniques for the incorporation of compositions (part of JRA-2.2). Initial work on comparing two different approaches for adaptation of compositions has been already started during a research visit. Other research visits will be planned in the near future to complete this publication.	JRA-2.2 “Adaptable Coordinated Service Compositions”.		
POLIMI UOC	KPI improvement in Agile Service Networks. This is work towards challenge number 5 in the vision paper and will result in a research thesis of a PhD student from POLIMI. This research is based on the idea of analyzing existing networks in the literature to derive patterns for KPI improvement that can then be applied to concrete situation. A research visit is planned to take place by December 2009 to finalize this activity.			
POLIMI VUA	Analysis of the impact of service-specific aspects on the life cycle of SBAs and on identifying proper viewpoints for the design of adaptable service-based applications. Such viewpoints serve as guidelines to support designers in the development process.			
POLIMI CITY	Service-based applications start to be preferred by organizations since they are able to offer complex		D	M18



	<p>functionalities by guaranteeing interoperability and flexibility. However, the design of such applications is not a trivial task since developers have to guarantee the alignment between the designed business process and the available services. In fact, these applications are executed by composing and invoking a number of available web services, which are often not under the control of systems developers. Services are simply exploited to obtain a specific functionality and they can be unavailable or change without notice. At the same time, any change in business processes will also cause a conflict between the business process and its supporting services. All the unforeseen changes might cause critical failures in the service discovery phase. In this paper, which will be submitted to the MONA'2009 workshop, we propose a framework that supports the alignment between the design of the process and the available knowledge about services in order to support the design of adaptive service-based applications and improve their dependability.</p>			
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### T-JRA-1.1.3: Exploiting Contextual Knowledge for Service-based Applications Engineering

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
POLIMI FBK	Identification of approaches to support design for adaptation in the presence of contextual information.	CD-JRA-1.1.5 “Analysis on How to Exploit Codified HCI & Context Knowledge for SBA Engineering”.		
FBK UniDue CITY	Definition of an approach for eliciting and modeling context assumptions and adaptation requirements to support the adaptation of SBS (see JRA-1.2).	CD-JRA-1.1.5 “Analysis on How to Exploit Codified HCI & Context Knowledge for SBA Engineering”.		

### 3.1.2 WP-JRA-1.2: Adaptation & Monitoring Principles, Techniques & Methodologies for Service-based Applications

This workpackage will define principles and techniques for the cross-layer monitoring and adaption of service-based applications. It is split into three tasks that analyze existing adaptation and monitoring principles, techniques and methodologies, their integration and the emerging area of contextual monitoring.

#### T-JRA-1.2.1: Analysis of Existing Adaptation & Monitoring Principles, Techniques & Methodologies

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
FBK POLIMI	A comparison of different approaches to monitoring and adaptation from a holistic point of view, aiming at their integration in a coherent whole.			

**T-JRA-1.2.2: Integrated Adaptation Principles, Techniques & Methodologies**

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
FBK POLIMI	This work will develop new design principles to target the design of applications capable of adaptation and which can be monitored. This work will investigate the approaches and methodologies for defining, specifying and realizing built-in adaptation. This includes the description in appropriate notations of foreseen and prescribed adaptation at design time, which at deployment-time the underlying framework transforms these adaptation specifications in executable code that already includes the necessary facilities for detecting problems and reacting to them. The consolidation of contributions will enable an SBA-specific view on the problem of monitoring and adaptation within the design principles of traditional software systems.	T-JRA-1.2.1 “Analysis of Existing Adaptation and Monitoring Principles, Techniques and Methodologies”.  T-JRA-1.2.3 “Comprehensive, Context-aware Monitoring”.		
INRIA UniDue	The objective of this work is to investigate how live-model evolution (using INRIA’s models@runtime) can be useful for incremental runtime testing. The idea is to trace the SBS evolution with models@runtime and detect the runtime tests that must be replayed. This line of work will help to validate SBS after or – in the context of pro-active adaptation – even before an adaptation is triggered.			

**T-JRA-1.2.3: Comprehensive, Context-aware Monitoring**

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
FBK CNR	This work is motivated by the strong expertise of the CNR in Data Mining & Information Retrieval and will focus on process monitoring to extract information useful for adaptation and monitoring principles and methodologies. FBK and CNR envision the application of classification techniques to highlight any deviation from the “normal” operating path. This technique has the potential to highlight emergency situations as soon as possible, meaning a shorter time to problem resolution. The results of this investigation will be published in major data mining conferences and journals, such as VLDB or IEEE Transactions on Knowledge & Data Engineering.		A	
Tilburg TUW	These partners will work on evaluating the impact of the evolution of services in the context of service networks. More specifically, the issue of monitoring the performance of various service versions from the provider's portfolio in a service network, measured by its popularity and use, will be investigated as the driver for deciding whether to adapt, replace or decommission a service version or even the service itself. This publication will be a workshop submission to the Joint ICSOC-ServiceWave 2009 conference.	CD-JRA-1.2.4 “Integrated Adaptation & Monitoring Principles, Techniques & Methodologies Across Functional SBA Layers”.	B	M15
FBK UniDue	Monitoring techniques will be augmented with formal verification techniques. The approach explicitly encodes assumptions that the constituent services of an SBA will			

	perform as expected (context assumption). Based on those assumptions, formal verification is used to assess whether the SBA requirements are satisfied and whether a violation of those assumptions during run-time leads to a violation of the SBA requirements.			
FBK POLIMI	This work is to design of the novel principles for the realization of architectures supporting an integrated monitoring framework. First steps have already been made: an integrated monitoring framework for BPEL monitoring was defined and presented in two ServiceWave'08 and ICWS'09 papers. However, the framework requires new design principles and new monitoring architectures, in particular for targeting advanced challenges such as cross-layer monitoring and distributed monitoring. This publication will describe these new principles.			

### 3.1.3 WP-JRA-1.3: End-to-End Quality Provision & SLA Conformance

This workpackage aims to define the principles, techniques and methodologies for specifying, negotiating and assuring end-to-end quality provision and SLA conformance. It will do this through defining the interfaces and interrelationships between the functional layers (i.e., between service infrastructure, service composition and co-ordination and business process management). This work is split into three tasks: T-JRA-1.3.1 will produce a quality reference model for service-based applications whilst tasks T-JRA-1.3.2 and 1.3.3 devise and ensure the principles, techniques and methodologies for specifying and negotiating end-to-end quality requirements and quality aspects of SLAs.

#### T-JRA-1.3.3: Assuring and Monitoring End-to-End Quality Provision and SLA Conformance

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
UCBL TUV POLIMI UPM CITY SZTAKI Tilburg	<p>“A Survey on Service Quality Description”</p> <p>Many partners involved in WP-JRA-1.3 have been preparing this journal paper under the supervision of Polimi. This paper is based on the deliverable PO-JRA-1.3.1 and has the goal of gathering and comparing service quality descriptions. The paper will be submitted to ACM Computing Surveys when a first draft is complete.</p>	PO-JRA-1.3.1 “Survey of quality related aspects relevant for SBAs”.	A	
USTUTT POLIMI	These partners are collaborating with the objective of investigating methods of analyzing key performance indicators (KPI) under uncertainty or incomplete data. The planned work will contribute to topics relevant across the tasks of this workpackage.	WP-JRA-2.2 “Adaptable Coordinated Service Compositions”.		
TUV USTUTT	In this collaboration means for predicting SLA violations at runtime (i.e., before the violations have actually happened) are investigated. This is done by analyzing patterns in historical data using Machine Learning techniques such as Neural Networks. In the middle term the goal is to actively use these predictions to automatically or semi-automatically prevent violations by adapting the composition for	JRA-1.3 (End-to-End SLA conformance).  JRA-2.2 (Adaptation of Service	A/B	

	compromised instances.	Compositions).  JRA-2.3 (Composition Monitoring, Local Adaptation).		
UCBL POLIMI	This work has the objective of aligning semantic service descriptions and descriptions of their quality of service. The aim is to use these descriptions to enhance matchmaking algorithms so that semantic and quality requirements can be simultaneously taken into account and fulfilled as much as possible.	WP-JRA-1.3 “End-to-End Quality Provision & SLA Conformance”.  WP-JRA-2.2 “Adaptable Coordinated Service Compositions” .		
Tilburg CITY UCBL	This collaboration will investigate pre-emptive SLA negotiation. Pre-emptive SLA negotiation has the objective of assuring SLAs are met through the cancellation or re-negotiation of an SLA when it becomes clear the existing SLA will not be met. This research will exploit the strengths of each institution to integrating monitoring techniques, negotiation protocols and negotiation strategies: City are developing monitoring software that can predict with certain probability that a negotiation is needed because a set of events have been received that indicate the current SLA will not be met, UCBL will provide algorithms that will steer the negotiation or re-negotiation protocol to an outcome that is beneficial to a party implementing the algorithm and Tilburg have developed negotiation and re-negotiation protocols. The results of this collaboration will be to integrate these three pieces of research and publish principles and methodologies, as well as experiences when providing pro-active SLA adaptation.			
INRIA UniDue	INRIA will investigate how to exploit and combine model-based testing techniques from UniDue with their complex event processing framework. The plan is to develop a framework for the specification of high-level test cases. Aligned with that INRIA will investigate how to maintain workflow consistency between the design-time model and run-time implementation. UniDue will review this work, with the aim exploiting existing results for maintaining models at run-time (through model/code synchronization) to determine test cases to be executed during run-time (in the sense of regression testing).			
UniDue FBK	This collaboration will concentrate on understanding how the results of verification based on assumptions during design time can be exploited during run-time to determine their validity A joint paper will be produced for submission to ICSSOC-ServiceWave 2009. See above under JRA-1.2 (collaboration crosses WPs)	WP-JRA-1.2 “Adaptation & Monitoring Principles, Techniques & Methodologies for SBAs”.	B	M15

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## **3.2    *JRA-2: Realization Mechanisms for Service-based Systems***

### **3.2.1    *WP-JRA-2.1: Business Process Management (BPM)***

The principle objective of WP-JRA-2.1 is to scrutinize and develop fundamental new concepts to drive service implementation from business models relating to software service providers and telecommunication service providers. The work is split into two tasks: developing requirements for services in Agile Service Networks (T-JRA-2.1.1) and producing a model on which to base business transactions (T-JRA-2.1.2).

**T-JRA-2.1.1: Agile Service Networks (ASNs)**

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
Tilburg UPM	<p>These partners are collaborating in the research on conformance and replaceability analysis of business protocols and choreographies. Business protocols describe the messaging behavior of participants into conversations, i.e. multiple correlated message exchanges, related by sequencing and time constraints, which take place among multiple participants. Conversations can be specified using choreographies in which each participant plays a role. Replaceability analysis for business protocols evaluates to which extent the modification in messaging behavior of one participant will affect the interoperability with the others. Conformance analysis studies to which extent the business protocol exposed by a participant matches the role it plays in a choreography. The envisioned contribution is a theory for conformance and replaceability analysis that is general enough to apply to multi-party conversations that explicitly model time constraints (e.g. “this message exchange must happen within 4 hours since the last one”) and to abstract from any particular specification language or notation for choreographies and business protocols. The intended target for publication is ICSOC 2009 (deadline mid June, publication in late November), possibly followed by a journal paper (the target journal has not been identified yet) by the end of 2009.</p>	CD-JRA-2.1.3 “Business Transaction Language”.	B	M15
Tilburg USTUTT UOC	<p>Service networks require methodologies and technologies for managing and improving the performance of a service network through continuous optimization of its constituent services, e.g., on the basis of performance, QoS, cost-reduction, lowering transaction costs, etc, in a closed loop cycle of modeling, design, simulation, execution and measurement. Work is being currently carried out between Tilburg, University of Stuttgart and University of Crete on precisely defining the characteristics of service networks, and on mechanisms for creating and reconfiguring service networks according to QoS and other relevant criteria.</p>	<p>CD-JRA-2.1.3 “Business Transaction Language”.</p> <p>CD-JRA-2.1.4 “Reference Architecture and Run-time Support for Business Transactions”.</p>		
Lero@UL Tilburg	<p>Lero@UL will carry out a short case study of service implementation with a Icompany in Ireland.</p> <p>for which Lero@UL has received complementary funding through Enterprise Ireland. Specifically, this case study will examine business processes from a human interaction management (HIM) point of view. HIM is a methodology that guides the modeling and management human-driven business processes and using supporting software. This new way of approaching business processes has encouraged the development of Human Interaction Management Systems (HIMS), a new type of BPM solution that includes support for the human interaction in business processes.</p> <p>The application of this novel approach to BPM will provide valuable insights into the identification and understanding of KPIs, which will feed into the objectives of the workpackage. The data from this case study will be used to develop a</p>			

	conference paper initially, and then advanced to a journal paper.			
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**T-JRA-2.1.2: Business Transaction Monitoring**

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
Tilburg UPM	This work has the objective of developing a framework and tools to accurately describe the causes of an incorrect implementation of high-level protocols. This work will produce a framework for the 'black-box' testing of services based on a formal specification of the protocol the service supports by exploring the state space of the protocol and converting these sequences into testable, repeatable message exchanges. Initially the framework will be used to test services implementing protocols for the negotiation of SLAs, but the tools, methodologies and principles will be generalised to be applicable to other protocols. Additionally, and since the testing is performed on an actual implementation, the developed techniques can be used to ensure that fragmentation / splitting on existing (possibly verified) compositions are still compliant with their specifications.	CD-JRA-2.1.5 "High-level Protocol Verification Mechanisms".		
UCBL Tilburg	<p>The monitoring and analysis of web service executions allows the verification of service properties. This work will specify monitoring expressions and extract the relevant information from these expressions to perform monitoring. This is not an easy task when the processes are specified in BPEL, however.</p> <p>In this work the partners will design a monitoring approach that makes use of business protocols as an abstraction of business processes specified by means of BPEL. High-level queries are expressed against this abstraction and then translated into SQL queries that are evaluated against a database that stores the execution traces of the services. A publication has already been produced and more have been planned for submission in the immediate future.</p>			

**3.2.2 WP-JRA-2.2: Adaptable Coordinated Service Compositions**

WP-JRA-2.2 has the objective of investigating various aspects of service composition and coordination to provide the mechanisms and technological underpinnings for adaptable, service-enabled business processes in multiple domains. This is performed in tasks that will create mechanisms for business process support in terms of coordinated service compositions and their technical realization (T-JRA-2.2.1) and identification of requirements towards the mechanisms and techniques enabling self-configuring, adaptable and dynamic service compositions as well as specification of foundations for technological support for such systems (T-JRA-2.2.2).

**T-JRA-2.2.1: Mechanisms & Models for Composition & Coordination of Services.**

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
Tilburg USTUTT UOC	This collaboration is concentrating on decomposition mechanisms of service networks into a meaningful set of business processes and reusable business process fragments. The collaborating institutes aim to write a journal paper and submit for publication in the coming six months.		A/B	M12-18
Tilburg USTUTT	These partners have collaborated to define initial business transaction concepts and mechanisms and mapping these into business processes, business process fragments and relevant QoS criteria as well as conditions stipulated in end-to-end SLAs. The partners plan to publish this material to a journal before the end of this year.	CD-JRA-2.2.3 “Algorithms and techniques for splitting and merging service compositions”.	A/B	M20
Tilburg UPM	The work relies on automatically generating orchestrations out of choreographies via <i>projections</i> in such a way that both the time constraints and the observable behavior of the system are respected. These are useful to derive conformance conditions that can be used to decide whether a partner can be replaced by another, which is one of the necessary conditions for seamless out/insourcing.			
UPM USTUTT	UPM is applying data-aware analysis to predict the relationships between activities in a system (both aiming at QoS-related relationships and other, more semantic relationships, such as task dependencies) by inferring the properties thereof. This will ultimately need descriptions to some level of abstraction of what these tasks do in order to derive properties concerning two or more tasks. A publication on the basic underlying techniques will be sent to ICSOC/ServiceWave 2009.	CD-JRA-2.2.3 “Algorithms and techniques for splitting and merging service compositions”.	B	M15
UPM POLIMI	This collaboration aims to align semantic service descriptions and descriptions of their quality of service. This is of interest to JRA-2.2 as semantic-based matchmaking will be enriched with QoS-based requirements.			
USTUTT UniDue FBK	These partners will perform further collaboration to understand and exploit the dependencies between requirements engineering, quality assurance (i.e., testing and monitoring) and service compositions for adaptive service-based systems.  Initial work has been published as a workshop paper at MONA+ 2008, and the refinement and improvement of the approach will be published as part of a forthcoming Springer book on “Service Engineering”, edited by S. Dustdar as part of the SSAI&E activities.			
UCBL UPM POLIMI	This work has the purpose of developing formal models for QoS/SLA-aware service compositions. The requirements for such models are twofold: they must be sufficiently expressive to describe a wide class of service compositions and QoS attributes, whilst being sufficiently constrained to ensure that standard reasoning tasks on such models are, at least in common cases, decidable and reasonably efficient. Moreover			



	they target the use of soft constraints for QoS modeling. Soft constraints can be used for avoiding failures to discover good-enough solutions with minimal penalty when it is not guaranteed that solutions that satisfy all constraints.			
UCBL USTUTT	The fragmentation of a Web service composition partitions the composition model (into fragments) that can be manipulated by multiple execution engines. These partners are working together on dynamic fragmentation and developing algorithms and techniques for splitting and merging service compositions in a dynamic manner. For this, they plan to use existing techniques developed for workflow fragmentation, process mining and fragmented graphs.	CD-JRA-2.2.3 “Algorithms and techniques for splitting and merging service compositions”.		

**T-JRA-2.2.2: Adaptable, QoS-aware Service Compositions**

<b>Collaborators</b>	<b>Description</b>	<b>Relates or contributes to</b>	<b>Anticipated Ranking</b>	<b>Anticipated Submission</b>
TUW UPM	<p>TUW has ongoing joint work with UPM in the area of modeling and analyzing QoS-aware service-oriented systems, in particular with regards to service choreographies and orchestrations. The goal is to devise a general approach to provide "what if" simulations with respect to the global QoS of a system and, in particular also for local partner orchestrations. This simulation will allow determining what QoS is required from each partner and also what can happen if the QoS of a specific partner decreases or partners have to be replaced by other partner services etc. The simulation is performed using choreography models that are transformed into timed-automaton annotated with QoS and timing information.</p> <p>As a medium term goal, the collaborating parties also plan to analyze existing systems by using a bottom up approach that semi-automatically derives choreographies and automatically annotates them with real-time QoS information retrieved from historical monitoring information. The collaboration was established during a visit of UPM (Irena Trajkovska) at the TUW and will be fostered by another visit of Florian Rosenberg (TUW) at UPM as part of the mobility program. Currently, the joint work is performed through e-mail and telcos. A paper is in preparation for ICSOC 2009 (or a closely related venue) and a further paper after the summer/autumn.</p>	<p>CD-JRA-2.2.4 “Models, Mechanisms &amp; Protocols for Coordinated Service Compositions”.</p> <p>CD-JRA-2.2.5 “Derivation of QoS &amp; SLA Specifications”.</p>	B	M15
USTUTT TUW	Collaboration between TUW and USTUTT on monitoring and dependency analysis of KPIs in service compositions is currently ongoing and a paper has been submitted to the EDOC 2009 conference. They plan to extend that approach towards KPI-based adaptation of compositions based on prediction techniques. The collaboration has been initialized during a research visit of Brimir Wetzstein (USTUTT) in Vienna, and has since then been continued using Skype and email. More work will be done during the S-Cube Summer School in Crete.	CD-JRA-2.2.4 “Models, Mechanisms & Protocols for Coordinated Service Compositions”.		
USTUTT FBK	This is collaboration in the area of adaptation of QoS-aware service compositions. A meeting will take place in May 2009			

	in Stuttgart; participants are Branimir Wetzstein and Dimka Karastoyanova from USTUTT; Marco Pistore and Raman Kazhamiakin from FBK.			
TUW POLIMI	TUW is working with Polimi on HPS (Human Provided Service) and Web service mashups. The goal of the collaboration is to create a lightweight mashup description with regard to QoS and context information and to integrate these it into executable BPEL processes. The collaboration has been established between the partners through S-Cube meetings at Amsterdam and Lyon and the consequent interaction through telcos and e-mails. A submission is planned to ICSOC 2009 and a follow up paper is planned for summer / autumn 2009.	CD-JRA-1.3.2 "Quality Reference Model for SBAs" CD-JRA-2.2.2/4 "Models, Mechanisms & Protocols for Coordinated Service Compositions"	B	M15

### 3.2.3 WP-JRA-2.3: Self-\* Service Infrastructure and Service Discovery Support

WP-JRA-2.3 will define policies, monitoring and redeployment techniques, for adaptive and self-healing services, specify and develop registry support for service metadata, QoS attributes, service composition, and federation of service registries and provide service ranking information on the basis of historical usage information. Work is structured in two tasks, to develop infrastructure mechanisms for the run-time adaptation of services (T-JRA-2.3.1) and in service registration and search (T-JRA-2.3.2).

#### T-JRA-2.3.1: Infrastructure Mechanisms for the Run-Time Adaptation of Services

Collaborators	Description	Relates or contributes to	Anticipated Ranking	Anticipated Submission
CNR TUW	CNR will work with TUW on exploiting information about how users interact with the infrastructure and in particular how users implicitly define business processes through the infrastructure itself. Some preliminary work has been already carried out by CNR itself on logs coming not from service-based infrastructures but from search engines. The aim for is to publish papers in relevant IR and DM conferences and journals such as VLDB and ACM TWEB.		A	
CNR TUW CNR INRIA SZTAKI	It is particularly important that for the infrastructure supports the self-* (i.e. self-organization, self-adaptiveness, self-management, self-monitoring, self-tuning, self-repair, self-configuration, etc.) execution of services and business processes. CNR has a strong expertise on this area and will work together with the other partners listed to definite novel self-* methodologies for service-based infrastructures. Work to develop autonomic computing techniques and bio-inspired algorithms for self-* will be performed.			
CNR SZTAKI	These partners will work together to develop nature-inspired algorithms for self-adaptation. Self-adaptive systems change with requirements and environments, and provide dependability, robustness and availability with minimal human interaction. The aim of this joint effort is to devise algorithms that, through the use of paradigms inspired by		A	

	nature, will enable the adaptation of services in different contexts. Results will be published in relevant conferences and journals, such as IEEE SASO, ACM TAAS, etc.			
SZTAKI TUW	This collaboration focuses on SLA based virtualized service provisioning with the aim of combining three different areas: negotiation, (meta)brokering and on-demand dynamic service deployment, so services with guaranteed performance can be deployed and invoked on the fly.	CD-JRA-2.3.4 “Decision support for local adaptation”.		
SZTAKI INRIA	<p>SZTAKI and INRIA will collaborate on nature inspired algorithms in self-* services. The aim of this work is to investigate how certain nature inspired models (e.g., “chemical computing”) can be applied for some aspects of self-* service features.</p> <p>There will be workshop entirely devoted to nature inspired algorithms and self-* in June, Vienna. The possible outcome of this workshop will be a jointly written position paper.</p> <p>Detailed joint research plans will be established at this meeting as well as the set of collaborating partners and the planned contributions. After that, occasional visits between participating partners are foreseen.</p>	CD-JRA-2.3.4 “Decision support for local adaptation”.		

## 4 Summary

Section 3, above, has provided a concrete cooperation and publication plan for the partners for the next six months to a year. Updates of this deliverable in the next time period will show to what extent this plan is being followed, what the deviations are, and how we deal with them by adjusting our cooperation plan.