Grant Agreement N° 215483

Title:	***Plan for Joint Publications***
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Identifier:	*CD-SoE-1.2.5d.*
Type:	*Deliverable*
Version:	*4*
Date:	*28th February 2011*
Status:	*Final*
Class:	*External*

Management Summary

This deliverable reports co-authored S-Cube publications that are in progress, submitted and accepted but not published at M36 of the S-Cube Network of Excellence. A commentary is also provided to describe deviations from the publication plan, and how we deal with them through internal cooperation.

The research leading to these results has received funding from the European Community's Seventh Framework Programme FP7/2007-2013 under grant agreement n° 215483 (S-Cube).

1 Planned Co-Authored Publications

The following are the planned research publications at M36 of the S-Cube Network of Excellence. For each publication this section reports the S-Cube work package for which the research was undertaken, other work packages, tasks an deliverables that the work also relates to, and the institutions of the co-authors of the publication. The planned publications represent research outputs in three states: (i) still in progress – being written; (ii) submitted for review; (iii) accepted for publication but not yet published. These states are reflected in the planned publications – some have clear titles and author lists, whilst others are simple descriptions of early collaborative research outcomes.

The collaborations undertaken to complete these publications have been and will continue to be carried out using different methods, ranging from 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.

The remainder of this section reports the planned research publications by activity, and by work package with activity, starting with work package JRA1.1.

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

At M36 the consortium is planning the production of **34** research publications in JRA-1.

1.1.1 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). The consortium is planning **19** research publications in JRA1.1. Of these 19, 12 are still in progress, 2 has been submitted and are pending the review decision, and 5 have been accepted for publication but not yet published.

Collaborators	Description	Also Relates or contributes to	Status
TILBURG UCBL/UPD	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 evolution apply to them. A series of publications have already been produced and more have been planned for submission in the immediate future.	WP-JRA-1.2	Accepted: Papazoglou, M., Andrikopoulos, V., and Benbernou, S. "Managing Evolving Services," in IEEE Software's SWSI: Component Software beyond Software Programming, May/June 2011 (to appear)

TILBURG UCBL/UPD	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 evolution apply to them. A series of publications have already been produced and more have been planned for submission in the immediate future.		Accepted: Andrikopoulos, V., Benbernou, S., and Papazoglou, M. "On the Evolution of Services," in IEEE Transactions on Software Engineering (TSE) (to appear)
LERO@UL VUA	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 devloped for the services maintenance cycle based on the gap analysis.	CD-JRA-1.1.4	Still in progress
FBK LERO@UL	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). 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.	IA-3.1	Still in progress
LERO@UL UniDue	Service based systems (SBS) are a combination of loosely coupled services. Different stakeholders are involved in these systems, e.g. service providers, service consumers, and business decision makers, having different types of concerns which may be dissimilar or inconsistent. Service Level Agreements (SLA) are playing a major role in ensuring the quality of SBS. They stipulate the availability, reliability, and quality levels required for an effective interaction between service providers and consumers. It has been noticed that because of having conflicting priorities and concerns, conflicts arise between service providers and service consumers while negotiating over the functionality of potential services. Since these stakeholders are involved with different phases of the life cycle, it is really important to take into consideration life cycle too for proposing any kind of SLA negotiation methodology. In this research, we propose a stakeholder negotiation strategy on Service Level Agreements, which is based on prioritizing their concerns depending on their frequency at each phase of the SBS development life cycle. We make use of Collaxa BPEL Orchestration Server Loan service example to elaborate the applicability of the proposed approach. In addition, we simulate the negotiation priority values to predict their potential impact on the quality of service attributes.	IA-3.2	Still in Progress
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	This WP only	Still in progress

	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.	This WP only	Still in progress
POLIMI CITY	Service-based applications start to be preferred by organizations since they are able to offer complex 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. This paper has been rejected from MONA 2009, will be revised to be resubmitted to another workshop. It proposes 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.	This WP only	Still in progress
LERO@UL CITY	End-users often communicate their needs and wishes using natural language. These statements are then used as input to start requirements elicitation and negotiation supported by requirements analysts. Although this approach allows overcoming several issues regarding natural language requirements descriptions (e.g., ambiguity, incompletes) it does not allow to react immediately on end-user needs in terms of software provision. Furthermore this time and resource intense approach often does not allow tailoring software to particular needs of individual stakeholders. This paper presents initial ideas towards using codified context knowledge to help elicit more contextual requirements, with the goal of configuring a service-oriented software systems without the help of analysts and software engineers. Our approach tries to bridge software product lines and requirements engineering to come up with a better understanding of the users' needs.	T-JRA-1.1.5	Still in progress
LERO@UL	Service-Oriented Development Processes: A Systematic Literature Review - The objective of this study is to systematically identify, review and evaluate existing service-oriented development processes and methods for building Service Based Applications (SBAs). This will provide a useful starting point for any further research in the area. In order to achieve this objective a Systematic Literature Review (SLR) of the existing software engineering literature is conducted.	JRA-1.1	Accepted for publication in Information and Software Technology Journal
Lero@UL CITY	Altio Case Study - This case study involved qualitative research, where key individuals within a service company were interviewed. The company involved were service providers and consumers as well as providers of other types of software systems. The case study was carried out jointly by the S-Cube partners listed. The aim of the case study was to interview individuals from varying roles through the company. In total there were three interviews with employees from the following roles: The Company's Chief Technology Officer (CTO), A	JRA-1.1	Still in progress

	Project Manager and a software Developer. We expect to enhance this case study work with a further case study and to publish our results.		
CITY UNIDUE	Using Scenarios to Discover Requirements for Service-Based Applications, to submit to SOCCER'2011 Abstract. [Context and motivation] The deployment of service-based systems that can react to different usage contexts is increasing. Whilst the development of such systems has been the subject of considerable research, the challenges of discovering and specifying requirements on such systems have not been suffi-ciently addressed. [Question/problem] The paper reports an investigation of context-aware requirements discovery and specification. It explores whether ex-isting models of context-awareness can be applied to improve requirements specification. [Principal ideas/results] The paper reports an extension of the ART-SCENE scenario walkthrough environment with knowledge about ab-normal behaviours and states associated with service-centric and context-aware systems and their use. [Contribution] Results demonstrate how knowledge about context and service-centric systems can be codified in a requirements dis-covery tool, and the utility of this knowledge in the requirements process.	CD-JRA-1.1.4	Still in progress
FBK, POLIMI	Context-driven Adaptation Process for Service-based Applications When building service-oriented systems the evolution of requirements and context is the norm rather than the exception. Therefore, it is important to make sure that the system is able to evolve as well without necessarily starting a completely new development process, and possibly on the fly. The literature offers technical approaches to manage the context-aware on the fly adaptation of service-based applications. However, to our knowledge, a comprehensive approach to design and develop adaptable Service Based Applications (SBAs) is still missing. Our work tries to fill this gap. In this work we focus on the role of the context in the adaptation activities. In a paper accepted at the workshop PESOS 2010 a proper context model has been proposed together with the definition of a preliminary framework that defines the situations that trigger the adaptation or evolution of a service-based application, and, at runtime, enables the identification and the collection of the proper context information. Currently, the work is focused on the definition of a mature framework able to support both quality- and context-aware adaptation of SBAs.	CD-JRA-1.1.5	After publication at PESOS '10, Still in progress to be submitted to journal
POLIMI, FBK, Tilburg, LERO	Service Engineering Service Engineering and Design (SED) aims at establishing, understanding and managing the entire service lifecycle, including identifying, nding, designing, developing, deploying, evolving, quality assuring, and maintaining services. SED principles, techniques and methods interweave and exploit the mechanisms provided by the S-Cube technology stack with the aim of developing high-quality service-based systems. For example, the SED plane provides specifications to the BPM and SAM layers that can guide the service composition and coordination layer in composing services in a manner that guarantees that the composition behaves as expected. This work focuses on the analysis of existing life cycle approaches for adaptable and evolvable service-based applications with an emphasis on how the lack of a life cycle that can handle adaptation lead to the definition of a reference service life cycle for the development of adaptable service based applications.		Accepted for publication as chapter in the S-Cube book

VUA Tilburg	Stakeholder support is critical to the success of any project, but it becomes much more important in SOA-related projects. Traditional software development methodologies no longer meet the requirements for developing service-based applications, or SBAs, due to the shift away from monolithic application development to service provision and composition. This shift introduces many more types of stakeholders, each of which can take multiple roles within the lifecycle of the SBA, and who have an interest in or are influenced by the service-oriented software process. To understand these stakeholder types and roles, this paper presents an initial set of stakeholder types and roles we solicited from within the Network of Excellence in Software Services and Systems (S-Cube). By describing these stakeholder types in the context of S-Cube's SBA engineering lifecycle, we demonstrate the lifecycle phases each stakeholder and role is involved in during the development and operation of SBAs. The stakeholder roles and types found and the methodology we describe for discovering them will aid the identification of the requirements for these stakeholders and contribute to future research in service engineering methodologies.	IA-3.1.4	Still in progress, to be submitted to ER'2011
VUA UPM	Service-Oriented architecture (SOA) as an emerging architecture style has been widely adopted in the industry. Due to the heterogeneous, dynamic and open nature of services, architecting Service-Based Applications (SBAs) poses additional concerns as compared to traditional software applications. Hence, for SOA architects it is of great importance that their concerns are appropriately addressed in the architecture description. However, an effective and systematic way of documenting SOA design is currently missing. In this work, we focus on the service automation aspect of SOA. We carried out two large case studies to learn the industrial needs in illustrating services deployment and configuration automation, from now on service automation. As a result, we broke down service automation into three important sub-aspects, and we developed a corresponding set of architecture views (automation decision view, degree of service automation view and service automation related data view) that expresses the different concerns of stakeholders who share interest in service automation. This set of views adds to the more traditional notations like UML, the visual power of attracting the attention of their users to the addressed concerns, and assist them in their work. This is especially crucial in service oriented architecting where service automation is highly demanded.		Accepted for publication as chapter in the S-Cube book
VUA UPM	Service-oriented Architecture is an emerging paradigm for the execution of business-oriented as well as technical infrastructure processes by means of services. Automating the execution of services is of paramount importance in order to fulfill the needs of companies. However we have found that automation -although important- is seldom addressed explicitly as a concern when stating requirements or designing the software architecture of the service-based applications (SBAs). In this paper we define three architectural viewpoints framing the concerns about service automation. These three viewpoints, called 3D (Decisions, Degree, Data), respectively: express architectural decisions about automation; help identifying the level (degree) of automation required, and represent the specific data required to support automation in services. They have been applied to threeindustrial case studies and one academic experiment. Results show that they successfully support both technical and non-technical stakeholders in understanding how, and communicating upon, their concerns related to service automation have been addressed. The		Submitted to Journal of Systems and Software

	application of the 3D service automation viewpoints to different domains exhibits promising reusability.		
Lero@UL, FBK, POLIMI	We are building on previous literature based research to generate a process model for adapting SBAs. The research includes qualitative data gathered through interviews with industry practitioners that have experience developing SBAs. Using data from experienced practitioners will ensure that the process model is valid and it will be further validated through an expert opinion workshop.	CD-JRA-1.1.6	Still in progress
POLIMI, TILBURG	Service retrieval holds a central role during the development of Web services and SBAs. The higher the number of available services, the more complex it becomes to locate the service closer to the developer needs. The complexity increases further with the number of available service versions that could also be suitable for this purpose. Existing approaches on service retrieval use a similarity measure between service interfaces to identify potentially relevant services. In this work we focus on introducing information about the compatibility of services while calculating their similarity as the means for providing more suitable results. For this purpose we update and extend an existing Web services matchmaker called URBE.	JRA-1.2	Submitted to ICWS 2011 conference.

1.1.2 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. The consortium is planning **6** research publications in JRA1.2, all of which are still in progress.

Collaborators	Description	Also Relates or contributes to	Status
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.	None	Still in progress
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.	This WP only	Still in progress
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.	This WP only	Still in progress
FBK	This work is to design of the novel principles for the realization of	This WP only	Still in progress

POLIMI	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.		
POLIMI, FBK, USTUTT, INRIA	In the scope of the cross-layer adaptation and monitoring, a specific work is targeting quality-driven SBA adaptation. Driven by the quality factors identified with the technique of USTUTT and FBK, the work aims to propagate the adaptation requirements to different adaptation activities including re-composition (FBK) and adaptation using grid OS (INRIA)	CD-JRA-1.2.5	Still in progress
UNIDUE FBK SZTAKI UPC CITY	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. The approach also instruments service repositories, negotiating SLAs proactively and agents, controlling the adaptation.	JRA-1.1, JRA-1.3	Still in progress

1.1.3 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. The consortium has planned **9** research publications in JRA1.3 for the last period. Of these 9, 4 are still in progress, 3 have been submitted and are pending the review decision, and 2 have been accepted for publication but not yet published.

Collaborators	**Description**	**Also Relates or contributes to**	**Status**
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	Still in progress
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 WP-JRA-2.2	Still in progress
UNIDUE, CNR POLIMI	Based on initial concepts for using online testing to predict the need for the adaptation of a SBS, this collaboration will set out to investigate the use of data mining techniques to ensure that pro-active adaptations will be performed with high confidence. The aim	JRA-1.2	Still in progress as follow-ups to SEAMS'10 publication

	is to demonstrate the feasibility of the approach using an application scenario (workflow) from the eGov domain.		
UNIDUE FBK, USTUTT	When building adaptive applications that address two or more adaptation goals (such as perfective or corrective adaptation), precautions must be taken to ensure that the interplay and the interactions between the different types of adaptations are considered. This collaboration has set out to define a framework to integrate and align perfective and corrective adaptations, while addressing the problems raised by the interactions between different kinds of adaptation. The applicability is illustrated by a scenario from the telecommunication domain.	JRA-1.1 JRA-1.2	Accepted as book chapter in forthcoming IoS Book
POLIMI, UCBL, VUT, UPM, SZTAKI, TILBURG	The goal is to compare the approaches to QoS description nowadays presented in the literature, where several models and meta-models are included. Our survey is done by inspecting the characteristics of the available approaches, to reveal which are the consolidated ones and to discuss which are the ones specific to given aspects, and to analyze where the need for further research and investigation is. The approaches here illustrated have been selected based on a systematic review of conference proceedings and journals spanning various research areas in Computer Science and Engineering including: Distributed, Information, and Telecommunication Systems, Networks and Security, and Service-Oriented and Grid Computing.	This WP only	Submitted to ACM Computing Surveys
MOST S-CUBE MEMBERS	Analytical Quality Assurance Services are often provisioned within short-term, volatile and highly dynamic (business) processes. These processes are designed in an abstract manner and when instantiated can involve service providers not known of during the design time of the service-based application. Thus, different from traditional software systems, service-based applications require the composition and coordination of services within highly distributed environments, cutting across the administrative boundaries of various organizations. This work provides a review of quality contracts, or more generally, those parts of Service Level Agreements (SLAs) which deal with statements about the services quality levels on which the service requestor and the providers have reached an agreement.	This WP only	Accepted for publication as chapter in the S-Cube book
UniDue, UPC	This joint work has set out in order to exploit the experience gained in usage-based testing of software systems and components and adopt those techniques to enable online test case selection and prioritization for service-oriented systems. The idea is to extend an existing monitoring and testing framework (SALMon framework) with components to collect usage profiles and select and execute usage-based online tests.	JRA-1.2 and JRA-2.2	Submitted to COMPSAC 2011
UniDue, IT Innovation	Future Internet applications will draw on the convergence of Services, Things, Contents and Networks. This means that the capabilities and features of FI applications will be provided – to a large extent – by third parties (e.g., through Internet-based software services, public sensor networks or cloud infrastructures). As a consequence, it will become of paramount importance to build FI applications in such a way that those applications can dynamically and autonomously respond to changes in the provisioning of services, availability of things and contents, as well as changes of network connectivity and end-user devices. Initial solutions for the dynamic adaptation of software and service systems exist. However, those solutions need to be significantly	JRA-1.*	Still in progress

	augmented, improved and integrated with a complete system perspective. Specifically, due to the very large scale of FI applications, this requires significant progress towards distributed and highly dispersed adaptation strategies and solutions. In this collaboration, the outcomes of three major EU projects (incl-S-Cube) in the different FI areas will be investigated to understand existing monitoring and adaptation capabilities. This will be driven by innovative, representative, cross-cutting FI application scenarios. Thereby, we achieve an understanding of the future research needs and gaps to be addressed to make FI applications become fully self-adaptive.		
UniDue, UPM, USTUTT, TUW, SZTAKI	Various quality prediction (QP) approaches work differently, in different settings and with different assumptions, and at different stages of the life-time of an SBA. Ideally, we would like to be able to choose from the best of all worlds for each situation, and, if possible, to dynamically switch between the QP approaches. However it can be argued that this will not be possible unless the approaches become compatible to a certain degree; e.g., on the level of their basic requirements or assumptions. Moreover, in order to effectively select the best approach for every scenario, we need to have a procedure to determine the conditions in which an approach can be applied and bring a competitive advantage over the others. This joint work investigates into a unifying framework which entails compatibility.	JRA-1.3, JRA-2.2	Submitted to JSS Special Issue on Adaptive Systems

1.2 JRA-2: Realization Mechanisms for Service-based Systems

At month M36 the consortium is planning the production of **26** research publications in JRA-2.

1.2.1 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). The consortium is planning **7** research publications in JRA2.1, Of these 7, 2 are still in progress, 4 have been submitted and are pending the review decision, and 1 has been accepted for publication but not yet published.

Collaborators	**Description**	**Also Relates or contributes to**	**Status**
LERO@UL TILBURG	The success of developing service networks rely on obtaining a correct understanding of the end-to-end business processes. However, there are major concerns as to the lack of research efforts to examine methods to successfully manage the complexity of service networks. The insufficient communication efforts between business and technical experts results in a dissatisfactory service delivery and the inability to predict and measure the service network performance. This literature survey is initiated with purpose of finding a novel way to represent business processes in service networks and analyses the process performance. Specifically, we discuss the need to conceive tools and techniques to manage the complexity of service networks without jeopardising the performance of service networks	JRA 2.1.5	Accepted in CLOSER2011, the Cloud Computing and Service Science Conference, Noordwijkerhout Netherlands.

	and provide an overview of current simulation-based modelling approaches and optimising business processes.		
LERO@UL	This research sets out to address the significant gap in our ability to measure and monitor the Key Performance Indicators (KPIs) across virtual organisations. This research will demonstrate how social network analysis (SNA) can provide us with the methodology to monitor agile service networks (ASN) across virtual organisations. This is of increasing importance as more businesses outsource many business processes and tailor collaborative networking strategies, therefore creating virtual networks structures. As competitive pressures increase, many organisations must now be in a position to report the 'true value' of adopting these strategies. The research explores how it can monitor service interaction and the value of process relationships and their contribution to organisational strategies. Reporting on such strategies allows managers to identify the network strengths, weakness, opportunities, and threats across many dimensions such as structural, functional, and behavioural. This research is largely concerned with Business Process Management (BPM) within a virtual environment which explores methods to 'deploy, monitor, and continuously update cross-enterprise functions within a mixed environment of people, content, and systems'. The overall objective of this research is to develop a framework which borrows extensively from SNA theory to extend our ability to measure and monitor KPIs within IT-enabled business processes. It is anticipated that the results of such analysis will allow us to clearly prescribe strategic direction for management decision making activities and offer methods to exploit network structuring and prediction within ASN.	JRA-2.1	Submitted to Journal of Service Science Submitted to International Conference of Business Process and Service Computing (BPSC) Submitted to International Conference of Service Science (ICSS) Submitted to International Conference on Web Information Systems and Technologies (WEBIST)
LERO@UL TILBURG	Develop and integrate the concepts of service network and business transactional language (BTL), with specific attention on performance analytics.		Still in progress
USTUTT UOC	This research deals with service network modeling and in particular investigates views in service networks modeling taking into account offering-centric views, participant views, and multilateral views.	JRA-2.1	Still in progress

1.2.2 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). The consortium is planning **14** research publications in JRA2.2. Of these 14, 12 are still in progress and 2 have been submitted and are pending the review decision.

Collaborators	**Description**	**Also Relates or contributes to**	**Status**

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-2.2.6	Still in progress
USTUTT UniHH	Partners will work on the mapping of business transaction concepts to service orchestration and service infrastructure.	CD-JRA-2.2.6	Still in progress
UPM USTUTT	Partners will work on applying data-aware analysis for inferring KPI and QoS properties of service compositions.	CD-JRA-2.2.4 CD-JRA-2.2.6	Still in progress
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.	This WP only	Still in progress
UCBL UPM	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.	This WP only	Still in progress
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-2.2.6	Still in progress
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 CD-JRA-2.2.2/4	Still in progress
UPM TUW	This work will concentrate on automatic derivation of dynamic, continuous-time QoS / resource consumption models for service compositions. Based on the preliminary results, this work will aim at (a) validation of the continuous-time models against the workflow modeling formalisms, and (b) automated derivation of the continuous-time model from executable workflow specifications. On that basis, the work will also aim at deriving dynamic QoS properties of the modeled service compositions.	This WP only	Still in progress
FBK USTUTT	A work targeting the novel service fragment composition and coordination is targeted using the automated composition	This WP only	Still in progress

	techniques developed by FBK.		
University of Manchester	The proliferation of web services has led to an increased number of approaches aiming to support service composition, reusing services within larger assemblies. Looking at composition fragments is one way to facilitate composition and reuse, known as macro-level composition. In this work, UNIMAN focuses on the discovery and selection of such fragments to achieve a given composition goal. Our approach aims at discovering fragments using their semantic descriptions based on Description Logic. The discovery is performed by applying different levels of semantic matchmaking between fragments and goals descriptions. A Multi-Agent-System is introduced on top of the discovery process to select the most relevant fragments using three types of criteria: (i) non functional criteria such as execution price (described by service providers), (ii) cohesion criteria related to the overlap between fragments, which is inferred from the fragmentation technique, and also (iii) the goodness of semantic fit between fragments and goals. The selection process is based on an agent negotiation where each agent is responsible for a semantically coherent list of fragments. Finally, we present an approach which minimizes the number of fragments relevant for the composition goal by both (i) minimizing their overlap and (ii) maximizing the number of goals they could achieve.	CD-JRA-2.2.4	Published at IEEE SOCA 2010, now in progress to submit to journal
USTUTT Tilburg	The numerous process fragmentation techniques in the state of the art vary greatly in terms of which types of processes they are applicable to,why they are applied, how they define the process fragments, etc. The comparison, analysis, reuse and selection of the available process fragmentation techniques are hindered by the lack of a shared terminology and criteria for classifying the different process fragmentation techniques. We want to address this issue by investigating classification criteria for process fragmentation techniques based on the “seven Ws”, namely why, what, when, where, who, which, and how. The classification criteria will be exemplified by applying them to some of the process fragmentation approaches available in the literature.	This WP only	Submitted to BPMDS 2011 workshop at CAiSE2011
USTUTT FBK	This research deals with QoS-aware adaptation of service compositions. Based on KPI dependency analysis (previous work in WP-JRA-2.2), the goal is to adapt the process in order to prevent future KPI target violations.	WP-JRA-2.2 and WP-JRA-1.2	Submitted to SCC 2011
UPM USTUTT	As shown in our previous work, a decision tree analysis can show (“explain”) most important influential factors the KPI depends on (dependency trees). However, we want to improve on the "naïve" approach to KPI dependency analysis by identifying relevant attributes and metrics for each analysis case, and avoiding performance degradations arising from excessively taking into account the irrelevant ones.	This WP, also has impact on JRA-1.3	Still in progress
UPM UOC	While existing service description frameworks attempt to describe service compositions using a variety of composition models ranging from orchestrations to choreographies to Finite State Machines, no framework successfully handles the problem of automatically producing specifications for a composite service, based on the specifications of the participating services. Our work aims to provide a thorough and efficient process of automatically deriving composite specifications based on the specifications of the participating services by attempting to deduce the minimum subset of these specifications that needs to be exposed to the service consumer.	This WP only	Still in progress

1.2.3 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). The consortium is planning **5** research publications in JRA2.3. Of these 5, 4 are still in progress and 1 has been submitted and are pending the review decision.

Collaborators	Description	Also Relates or contributes to	Status
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.	This WP only	Still in progress
CNR TUW 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.	This WP only	Still in progress
CNR SZTAKI	The aim of this joint work is to extend the mechanisms based on the chemical metaphor for service selection (already addressed in the joint collaboration) in order to support the partial selection of services composing SBAs. In such a way it is possible to start the execution of service workflows even in the case not all the necessary service instances are available, so keeping the possibility to instantiate missing services as soon as they become available at the execution time..	CD-JRA-2.3.8	Submitted to ERCIM News No.85
CNR SZTAKI	Partners plan to carry out some experimentation on the chemical model established earlier in the project. The aim of the experimentations is to validate the model and study and improve the evolving nature of the chemical instantiation (composition) process. The experimental framework would be the HOCL interpreter also developed in S-Cube. Publications will be planned depending on the results.	CD-JRA-2.3.8	Still in progress
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-2.3.8 CD-JRA-1.2.7	Still in progress

2 Conclusions

To conclude, this short deliverable reported planned publications at M36. The deliverable reveals the long-term planning associated with co-authored publications in the network, which is expected to yield a higher number of co-authored outputs in year 4 of the project.