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Management Summary

This deliverable reports co-authored S-Cube publications that are in progress, submitted and accepted but not published at M44 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 M44 of the S-Cube Network of Excellence. For each publication this section reports the main S-Cube work package for which the research was undertaken, as well as other work packages, tasks and 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 within each activity.

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

At M44 the consortium is planning the production of the following 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 consortium is planning the following research publications in JRA1.1.

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.	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	JRA-1.2	Accepted: Andrikopoulos, V., Benbernou,

	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.		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	Submitted to Service-Oriented Computing and Applications Journal
LERO@UL VUA POLIMI	With the expansion of national markets beyond geographical limits, success of any business often depends on using software for competitive advantage. Furthermore, as technological boundaries are expanding, projects distributed across different geographical locations have become a norm for the software solution providers. Nevertheless, when implementing Global Software Development (GSD), organizations continue to face challenges in adhering to the development life cycle. The advent of the internet has supported GSD by bringing new concepts and opportunities resulting in benefits such as scalability, flexibility, independence, reduced cost, resource pools, and usage tracking. It has also caused the emergence of new challenges in the way software is being delivered to stakeholders. Application software and data on the cloud is accessed through services which follow SOA (Service Oriented Architecture) principles. In this paper, we present the challenges encountered in globally dispersed software projects. Based on goals mutually shared between GSD and the cloud computing paradigm, we propose to exploit cloud computing characteristics and privileges both as a product and as a process to improve GSD.	CD-JRA-1.1.7	Accepted in REMIDI Workshop, Collocated with ICGSE 2011, Helsinki, Finland.
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
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	This WP only	Still in progress

	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.		
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 system 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.	This WP only	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 Project Manager and a software Developer. We expect to enhance this case study work with a further case study and to publish our results.	This WP only	Case study used as part of SBA reference model paper published in IST.
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	CD-JRA-1.1.5	After publication at PESOS '10, Still in progress to be submitted to journal

	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.		
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	Accepted to ServiceWave'11
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 application of the 3D service automation viewpoints to different domains exhibits promising reusability.	This WP only	Submitted to Journal of Systems and Software
Lero@UL, FBK, POLIMI	The loose coupling of services and Service-Based Applications (SBAs) have made them the ideal platform for context-based run-time adaptation. There has been a lot of research into implementation techniques for adapting SBAs, without much effort focused on the software process required to guide the adaptation. This paper aims to bridge that gap by providing an empirically grounded software process model that can be used by software practitioners who want to build adaptable SBAs. The process model will focus only on the adaptation specific issues. The process model presented in this paper is based on data collected through interviews with 10 practitioners	CD-JRA-1.1.6	Accepted for publication in Information and Software Technology Journal

	occupying various roles within 8 different companies. The data was analyzed using qualitative data analysis techniques. We used the output to develop a set of activities, tasks, stakeholders and artifacts that were used to construct the process model. The outcome of the data analysis process was a process model identifying nine sets of adaptation process attributes. These can be used in conjunction with an organisation's existing development life-cycle or another reference life-cycle. The process model developed in this paper provides a solid reference for practitioners who are planning to develop adaptable SBAs. It has advantages over similar approaches in that it focuses on software process rather than the specific adaptation mechanism implementation techniques.		
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	Accepted to the IEEE International Conference on Web Services (ICWS), 2011.
TILBURG, VUA	The Service Science, Management and Engineering (SSME) field covers a wide range of research topics and has become fragmented due to the necessary specialization such broad area requires. The European Commission's Network of Excellence in Software Services and Systems (S-Cube) is an attempt to bring scientists together to perform joint research in this field that crosses existing research boundaries and, in the process of doing so, to help establish an enduring European network of researchers practicing SSME. To assist in the consolidation of research and bridge the gaps between disciplines, the S-Cube Knowledge Model (KM) has been developed to provide a method of capturing, managing and refining the knowledge produced by the network and provide a common understanding of research outputs. This presentation will discuss the motivation, requirements and experiences from realizing the S-Cube KM, which allows the collection, analysis and management of research within S-Cube and enables the extraction and combination of the explicit, cross-cutting knowledge embedded in collaborative research.	IA-1.1	Accepted to Proceedings of KMIS 2011 conference.
University of Muenster, FBK, Polimi	We describe how the generic Lifecycle Model developed in the S-Cube project for the design and management of Service Based Applications (SBA) can be utilized in the context of Cloud Computing. In particular, we focus on the fact that the Infrastructure-as-a-Service approach enables the development of Real-Time Online Interactive Applications (ROIA), which include multi-player online computer games, interactive e-learning and training applications and high performance simulations in virtual environments. We illustrate how the Lifecycle Model expresses the major design and execution aspects of ROIA on Clouds by addressing the specific characteristics of ROIA: a large number of concurrent users connected to a single application instance, enforcement of Quality of Service (QoS) parameters, adaptivity to changing loads, and frequent real-time interactions between users and services. We describe how our novel resource management system RTF-RMS implements concrete mechanisms that support the developer in designing adaptable ROIA on Clouds according to the different phases of the Lifecycle Model. Our experimental results demonstrate the influence of the proposed	This WP only	Accepted at 7th International Workshop on Engineering Service-Oriented Applications (WESOA'11) in conjunction with ICSOC 2011

	adaptation mechanisms on the application performance.		
UniDue, Polimi	Addressing Highly Dynamic Changes in Service-oriented Systems: Towards Agile Evolution and Adaptation	JRA-1.3, JRA-1.2	Accepted for publication in IGI Global "Adaptive Services"
Lero@UL VUA, POLIMI,	GSD and SOA. With the expansion of national markets beyond geographical limits, success of any business often depends on using software for competitive advantage. Furthermore, as technological boundaries are expanding, projects distributed across different geographical locations have become a norm for the software solution providers. Nevertheless, when implementing Global Software Development (GSD), organizations continue to face challenges in maintaining adherence to the development life cycle. The advent of the internet has supported GSD by bringing new concepts and opportunities resulting in benefits such as scalability, flexibility, independence, reduced cost, resource pools, and usage tracking. It has also caused the emergence of new challenges in the way software is being delivered to stakeholders. Application software and data on the cloud is accessed through services which follow SOA (Service Oriented Architecture) principles. In this paper, we present the challenges encountered in globally dispersed software projects. Based on goals mutually shared between GSD and the cloud computing paradigm, we propose to exploit cloud computing characteristics and privileges both as a product and as a process to improve GSD.	This WP only	Accepted for publication in Remidi 2011

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. The consortium is planning the following research publications in JRA1.2.

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.	JRA-1.3, JRA-2.2	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 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.	This WP only	Still in progress
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	Accepted as full paper at ICSOC'2011
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. The approach also instruments service repositories, negotiating SLAs proactively and agents, controlling the adaptation.	JRA-1.1, JRA-1.3	Accepted for publication at Servicewave'11
UNIDUE, SZTAKI, U Münster	Cross-layer adaptation of service-based systems	JRA-1.1, JRA-1.3, JRA-2.3, JRA-2.2	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. The consortium has planned the following research publications in JRA1.3.

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
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	This WP only	Submitted to ACM Computing Surveys

	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.		
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	Follow-up work from COMPSAC 2011; Submission forum tbd
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 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.	JRA-1.*	Accepted at WAS4FI workshop @ ServiceWave' 2011
UNIDUE, UPM, TUW	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-1.2, JRA-2.2	Still in progress – to be submitted to journal

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

At month M44 the consortium is planning the production of the following 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 consortium is planning the following research publications in JRA2.1.

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 and provide an overview of current simulation-based modelling approaches and optimising business processes.	JRA 2.1.5	Accepted in CLOSER2011, the Cloud Computing and Service Science Conference, Noordwijkerhout Netherlands.
LERO@UL TILBURG	The reusability of services is a cornerstone of the Service-Oriented Architecture design paradigm as it leads to a reduction in the costs associated with software development, integration and maintenance. However, reusability is difficult to achieve in practice as services are either too generic or over-specified for the tasks they are required to complete. This paper presents our work in defining an approach for achieving service reusability in Service-Based Applications (SBAs) by decomposing the reusability requirements into two layers and then into separate views that allow the customization of business policies, quality of service, tasks and control (i.e., orchestration/choreography) parameters. The objective of defining such an approach is to provide an appropriate solution that will guide the customization of a service's functional and non-functional properties to allow it to be reused in different business contexts.	JRA 2.1.5	Accepted in International Conference on Electronic Commerce and Web Technologies, ECWEB2011, Toulouse, France
LERO@UL TILBURG	Cost and complexity are currently the most substantial obstacles for designing and delivering services in the public sector. The traditional in-house development and maintenance landscape of public services require experts from diverse domains, various technologies and complex on-premise infrastructure, etc. The high upfront cost and complexity impede the proliferation of Information Technology (IT) within the domain of public sector. It is the aim of this research project to deliver a cloud based platform that allows non IT-experts to customize prefabricated and reusable public services by parameterizing them. This customization revolves around reference guidelines that accommodate a methodology in a consistent manner	JRA 2.1	Accepted in CLOSER2011, the Cloud Computing and Service Science Conference, Noordwijkerhout Netherlands.
LERO@UL TILBURG	Ensuring completeness of processes is a challenging task because, in recent days, they entail multiple views stemming from distinctive fields. It requires forming teams that combine deep technical and	JRA 2.1	Accepted in International Conference on

	programming knowledge with business experts. These teams of experts are enormously expensive. Besides, increasingly, the public service organizations realize the need to deliver public services more quickly and personalized to the requirements of local communities or citizens. The service organizations may achieve rapid delivery of services either by hiring a team of experts or by using a solution that underpins the local (human) resources that are non IT-experts to customize the reusable processes that encapsulate services. The former is not an ideal option for many public service organizations owing to the cost. In case of latter, unfortunately, there is no suitable solution available that can guide non IT-experts to customize processes. Thus, it is the aim of this research to deliver a framework that allows non IT-experts to customize the prefabricated and reusable end-to-end processes by parameterizing the services.		Information Technology IT2011
LERO@UL TILBURG	Processes are the main constituents of public services and as such demand correct and complete execution. Increasingly however, governments feel the pressuring need to deliver public services more quickly and personalized to the needs of local communities or citizens. This not only jeopardizes their quality but also requires them to form teams that combine deep technical and programming knowledge with business experts. It is the aim of this research project to deliver a framework to customize generic processes to produce context specific one.	JRA 2.1	Accepted in International Conference on Information Technology and electronic Service, ICITeS 2011, Tunisia Accepted in International Journal of Information Studies, 2011
TILBURG, UCBL	Integrating Business Process Design-time Compliance Verification with Runtime and Offline Monitoring: A Lifetime Compliance Support	This WP only	Still in progress
TILBURG, UNIDUE	Constructing comprehensive views on Service Networks (SNs) to deliver functionality in lifelike quality. The research focuses on combining current work in measuring the performance indicators at different levels of SNs, e.g. BPM layer, service composition and coordination layer, and service infrastructure layer. By doing that, it aims to reveal the relations between performance indicators crossing different layers. Researcher from partners have illustrated the problem and work scope, and conceptually shown an exemplary relation between KPI and quality of service (QoS). Currently representative case studies for validation are under analysis.	WP-JRA-1.3	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. The consortium is planning the following research publications in JRA2.2.

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 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 techniques developed by FBK.	This WP only	Still in progress
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	CD-JRA-2.2.4	Published at IEEE SOCA 2010, now still in progress to submit to journal

	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.		
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. The consortium is planning the following publications in JRA2.3.

Collaborators	Description	Also Relates or contributes to	Status
CNR TUW	Service-Oriented Architectures (SOAs), and traditional enterprise systems in general, record a variety of events (e.g., messages being sent and received between service components) to proper log files, i.e., event logs. These files constitute a huge and valuable source of knowledge that may be extracted through data mining techniques. To this end, process mining is increasingly gaining interest across the SOA community. The goal of process mining is to build models without a priori knowledge, i.e., to discover structured process models derived from specific patterns that are present in actual traces of service executions recorded in event logs. However, in this work we focus on detecting frequent sequential patterns, thus considering process mining as a specific instance of the more general sequential pattern mining problem. Furthermore, we apply two sequential pattern mining algorithms to a real event log provided by the Vienna Runtime Environment for Service-oriented Computing, i.e., VRESCo. The obtained results show that we are able to find services that are frequently invoked together within the same sequence. Such knowledge could be useful at design-time, when service-based application developers could be provided with service recommendation tools that are able to predict and thus to suggest next services that should be included in the current service composition.	This WP only	Accepted for publication at 1st International Workshop on Adaptive Services for the Future Internet (WAS4FI)
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	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 M44. 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 the last 4 months of the project.