



REuse and Migration of legacy applications to Interoperable Cloud
Services

REMICS

Small or Medium-scale Focused Research Project (STREP)

Project No. 257793



Deliverable D7.2

Plans for collaboration and society impact

Work Package 7

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Executive Summary

This document “D7.2 – Plans for collaboration and society impact” is a public deliverable of the Project “REuse and Migration of legacy applications to Interoperable Cloud Services (REMICS)” in “Small or medium-scale focused research project (STREP)” within the European seventh framework program for the ICT Call 5 (FP7-ICT-2009-5) challenge 1 Pervasive and Trusted Network and Service Infrastructures.

The goal of REMICS is to develop advanced model-driven methodology and tools for REuse and Migration of legacy applications to Interoperable Cloud Services. Service Cloud paradigm stands for combination of cloud computing and SOA for development of Software as a Service systems.

To support the migration, REMICS will enhance the OMG standards regarding Architecture Driven Modernization (ADM) methodology with specific methods, metamodels and tool support, including knowledge discovery, patterns and transformations for SOA and Cloud Computing, a platform-independent language for the cloud paradigm (PIM4Cloud), Model Driven Interoperability (MDI), Models@Runtime, Model Checking and Model-based Testing (MBT).

This document is a plan containing the expected outcome from several tasks in REMICS. It defines the strategies of the project with respect to interaction with other external entities to improve the project results through an open innovation approach and to ensure the dissemination of the benefits of the project results in the community. The tasks addressed in the deliverable are the following:

- Task T7.1: Project website

The objective of this task is to set up and maintain the REMICS project website. The REMICS website will be a single entry point for project-related material, including information about relevant events, case studies, and published project results. The following key features will be supported by the REMICS project website: download area for REMICS-specific documents and demonstration software, abstracts and/or full papers of lectures, project news and so forth.

- Task T7.2: Standardisation

In this task the standardisation efforts within the REMICS project will be coordinated. Most of the project members are active OMG members with in-depth knowledge and experiences in initiating, driving and finalising standardisation task forces. The key goal of the standardisation is to have REMICS results standardised in the OMG PIM4Cloud standard. This task will produce a standardisation plan that will aid this purpose. The task will also develop plans for standardisation of other extensions developed in the project – REMICS extensions for KDM, PIM4ServiceInteroperability, PIM4Models@Runtime and U2TP.

- Task T7.3: Collaboration and Dissemination

The dissemination activities of the project will be coordinated in this task. This will include: the scientific publication of project results through articles and papers at conferences, workshops and in international journals, presentation of the REMICS approach at conferences and workshops, and integration of the project research results in the academic partners training activities such as university courses and student projects. In this task the responsible parties will produce a dissemination plan and contribute to the reports tracking the progress of all dissemination activities.

- Task T7.4: Exploitation

The exploitation plan will identify and characterize each of the potential interested groups, including standardisation bodies, software vendors, consultancy organizations (including internal and external consultancy), academics and students, researchers, software department managers and software practitioners. Specific exploitation will be detailed on the basis of the exploitation plan contained in the proposal and taking into account each of the identified interest target communities. At the start of the project the Exploitation and Dissemination plans will be written, synthesizing inputs from all partners within the consortium. These plans will then be periodically updated with the progress of each partner, and assessed against the expected goals. In this deliverable the exploitation plans of DOME and DISYS as SMEs taking advantage of REMICS



Public



results are presented. Additionally Netfective and SOFTEAM as tool providers have provided their exploitation plans.

- T7.5 Collaboration with ICT IoS projects

Collaboration with other IoS projects will be planned and coordinated in this task. This includes identifying common technical interests, planning joint activities for exchange and dissemination of results, coordination of standardization activities and contributions to common open source repositories and projects. The collaboration and society impact plan will be available by M6 while the periodic results will be reported in the periodic progress reports

This document presents plans regarding dissemination, exploitation, standardization and collaboration as of February 2011. These will be subject of review and extension as the project progresses.

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1 Introduction

This document “D7.2 – Plans for collaboration and society impact” describes the strategy for the activities to be carried out during the execution of the REMICS project and once the project has finished to collaborate with other similar initiatives and to translate the results of the project to the research and industrial community. . The work has been mainly performed within the following tasks:

- Project website (REMICS Task 7.1)
In the context of this task the deliverable will include the general strategy for the website development, evaluation, maintenance, backup, migration and withdrawal approach and strategies.
- Standardisation (REMICS Task 7.2)
This task will produce a standardisation plan that will aid this purpose. The task will also develop plans for standardisation of other extensions developed in the project – REMICS KDM, PIM4ServiceInteroperability, PIM4Models@Runtime and U2TP.
- Collaboration and Dissemination (REMICS Task 7.3)
In this task the responsible parties will produce a dissemination plan and contribute to the reports tracking the progress of all dissemination activities.
- Exploitation (REMICS Task 7.4)
Specific exploitation will be detailed on the basis of the exploitation plan contained in the proposal and taking into account each of the identified interest target communities. Taking into account the public nature of the deliverable the exploitation part will remain generic and will be detailed in further reports internal to the project.
- Collaboration with ICT IoS projects (REMICS Task 7.5)
Collaboration with other IoS projects will be planned and coordinated in this task. This includes identifying common technical interests, planning joint activities for exchange and dissemination of results, coordination of standardization activities and contributions to common open source repositories and projects. The collaboration and society impact plan will be available by M6 while the periodic results will be reported in the periodic progress reports

The document is structured in two main sections:

- Chapter 2 -Collaboration
The collaboration plan contains the general approaches to interact with other entities in an open innovation approach, in which different entities (enterprises, projects, individuals, etc) collaborate in order to achieve better research results with fewer resources in a win-win relationship. In this line the collaboration plan includes an introduction to the standardisation activities and an introduction to the collaboration strategies with other entities such as other FP projects.
- Chapter 3 Social Impact
The social impact part of this plan includes the activities to be performed to disseminate the project result into research and into the industrial community. The plan to achieve social impact is split in three main lines; i.e. the web site, the publications/presentations and the exploitation.

This document will be used as a basis for the implementation of the activities within the REMICS project and will be the base to measure the progress in WP 7 reports.

2 Collaboration

2.1 Standardisation

2.1.1 PIM4Cloud

The Service Cloud paradigm stands for combination of cloud computing and SOA for the development of Software as a Service systems. OMG has now started discussions about a standardization process for PIM (Platform Independent Model) for Cloud Computing (PIM4Cloud or CloudML). This work is in its starting phase and REMICS will participate in the OMG discussions regarding the RFP and later the standard itself. We foresee to use the SoaML¹ standard developed in the SHAPE² project and extend it in aspects related to cloud, especially the deployment of services.

ESI, SOFTEAM and SINTEF are partners who will focus on this standardization work. We will participate in the upcoming OMG event on 21-25 March 2011 in Arlington, USA, where the Cloud Standards Working Group meeting will be on March 21.

In parallel with OMG activities, REMICS will follow other standardization activities regarding cloud computing³. Examples are OCCI (Open Cloud Computing Interface)⁴ and CDMI (Cloud Data Management Interface)⁵. We are following the development of Cloud standards at <http://cloud-standards.org/>

2.1.2 KDM

KDM, standing for Knowledge Discovery Metamodel⁶, is an OMG® standard led by the Architecture Driven Modernization (adm.omg.org) task force. KDM is itself a standalone metamodel for modernizing legacy information systems by means of Model-Driven Development (MDD) but experience and practice show that key capabilities are missing in KDM. Several expected KDM packages are in the process of being specified (as standards) and next implemented. Abstract Syntax Tree Metamodel (ASTM) is one these packages to improve the fine-grain analysis and processing of code: ASTM builds upon KDM in order to represent software below the procedural level. This effort allows KDM to fully represent applications and facilitate the exchange of granular meta-data across multiple languages.

REMICS will provide its own implementation and validation of ASTM (no support exists when writing these lines). Moreover, extensions to both KDM and ASTM are necessary in REMICS (including static cross metamodel links and/or transformation scheme) to support REMICS case studies. These extensions will serve as inputs for the forthcoming standardization, validation and stabilization of both KDM and ASTM.

2.1.3 PIM4ServiceInteroperability

Interoperability is seen as the key to increase competitiveness of enterprises. With the move towards services-oriented architectures and the Service Clouds some of the old challenges of interoperability are no longer there, such as middleware procedure call protocols compatibility issues. However some of the more basic interoperability issues are still present, such as discrepancy in exchanged XML formats.

¹ <http://www.omg.org/spec/SoaML/>

² <http://www.shape-project.eu/>

³ See these described in http://cloud-standards.org/wiki/index.php?title=Main_Page and in REMICS deliverable D2.1.

⁴ <http://occi-wg.org/doku.php>

⁵ <http://cdmi.sniaccloud.com/>

⁶ <http://www.omg.org/spec/KDM/1.0/>

When exchanging information, creating service compositions and even calling a single service one does not always get the data in a format required. To solve these problems, mediation is a common solution. Nevertheless, the problem with mediation is that it often requires a lot of extra work in development, deployment and sometimes even running a special infrastructure for the mediation. This means that solving interoperability problems can be a cumbersome task and the solution may need to be integrated with the rest of your system. Model-Driven Interoperability has shown that lifting information to a higher level of abstraction can reduce the effort needed for mapping different information formats. Based on mappings and predefined transformations it is then possible to create some kind of mediation.

REMICS will provide extensions to the OMG standard SoaML (to be ported to the PIM4Cloud when first draft available) to provide support to proper data modelling in order to enable advanced Model-Driven Interoperability techniques.

2.1.4 PIM4Models@Runtime

The idea of models@runtime results from that model executability, i.e., models endowed with an operational semantics. The OMG® is going to release FUML (beta available when writing these lines) standing for Semantics of a Foundational Subset for Executable UML Models (www.omg.org/spec/FUML). This approach develops a metamodel that puts forward dedicated metatypes to embody execution notions. Concretely, metatypes like Event, State... are usually available in most common behaviour-centered modelling languages but notions like Priority policy, Run-to-completion cycle (each instance corresponds to an event interpretation cycle)... are mandatory to create an action language.

Models@runtime are in essence executable but also persist at runtime to create a reflection layer in order to observe (read) and control (write) models. Application management is the spirit of technologies like Java Management eXtensions (JMX) are first-class domains in which models@runtime brings out a high significant added value.

The cloud computing perspective in REMICS increases the need for underpinning applications on models@runtime to qualitatively measure the validity of porting legacy information systems on the top cloud platforms. REMICS intends to add a module to PIM4Cloud for tacking the monitoring and command of modernized applications through explicit, tangible and changeable models at runtime.

2.1.5 UML Testing Profile (UTP)

The UML Testing Profile⁷ is a specification of the OMG which defines a specification of test related artefacts. The UML Testing Profile is relevant in the REMICS context in order to model test cases which are applied to the migrated system.

After a few years of experiences in using the first version of UTP it has been turned out that a couple of changes need to be made to the definition of the UTP in order to make it more usable in practice and to cover a wider range of testing concepts. This has led to the creation of a Revision Task Force at the OMG where among others also REMICS partners are already working on improving this specification. The next deadline for the reporting on the work of this RTF is set to July 1, 2011.

It is foreseen to charter one or two subsequent RTFs at the OMG, based on the results and feedback gained from the application of the UML Testing Profile for Cloud within the REMICS project in order to ensure that UTP can be used adequately for the definition of test models for cloud systems.

2.1.6 Software Metrics Metamodel (SMM)

The Software Metrics Metamodel⁸ (SMM) is used to structure the definition of metrics and metric computation results. Since metrics will be used during the migration process in REMICS it will be

⁷ http://www.omg.org/technology/documents/profile_catalog.htm

⁸ <http://www.omg.org/spec/SMM/>

important to describe metrics and store evaluation results in order to give guidance during the migration process.

First version of the SMM specification of OMG is available but there are still many open issues which need to be resolved in order to make the specification better applicable in practice. It is expected that valuable feedback can be gathered during the course of the REMICS project which will then influence the SMM-specification. Currently, a RTF is running which has its report deadline set to September 30, 2011. It is expected that additional RTF will be charted.

2.1.7 DSL4SE

The Domain-Specific Language and a kernel of essentials for Software Engineering, DSL4SE⁹, is an ongoing standard in the OMG for the creation of a language and a kernel that allows people to describe the essentials of their current and future practices and methods in a light way; so that they can be composed, simulated, applied, compared, enacted, evaluated and measured by practitioners as well as taught and researched by academic and research communities. The initiative is supported by the committers of the SEMAT¹⁰ initiative.

In REMICS we are involved in the RFP process and the following work as an alternative way to represent a methodology as it promises to solve some of the problems of existing software engineering process modelling approaches.

2.2 IoS Projects

The objective with respect to the collaboration with other FP projects is to identify them, identify the right contact person, present ourselves and establish appropriate communication means, collaboration areas and common initiatives. In summary the plan will take into account the following activities:

- PC01 (Project collaboration activity 01): Identification of projects:

Based on the information available in the commission and the knowledge of the different partners a list is elaborated with information on the potential collaboration projects (Annex A). That list will be shared with the commission to see if they have additional views on it. The result of this activity will be a sorted list of projects from which we should select a small group of relevant projects.

- PC02: Identification of contact people:

Next step will be to contact the coordinators of those projects in order to establish the right contact people. We have started this phase.

- PC03: Identification of individual collaboration approaches:

The projects will be contacted to identify possible collaboration areas where REMICS and the other projects can contribute or enrich each other. Example of collaboration areas can be common technical interests, planning joint activities for exchange and dissemination of results, coordination of standardization activities, contributions to common open source repositories and projects, the exchange of public and confidential information, collocated meetings, cross pilot cases support, etc. We have started this phase.

- PC04: Identification of common collaboration approaches:

The projects are contacted to identify possible activities involving more than two projects. Example of these activities can be common technical interests, planning joint activities for exchange and dissemination of results, coordination of standardization activities, contributions to common open source repositories and projects, common workshops, training programmes, definition of future research lines in this area, etc.

⁹ "Domain-Specific Language and a kernel of essentials for Software Engineering (DSL4SE) draft RFP", ad/11-02-01, <http://www.omg.org/cgi-bin/doc?ad/2011-02-01>

¹⁰ <http://www.semat.org/bin/view>

As a preliminary result of the activity PC01 a list has been developed and sorted. From this filtering we have identified four highly related projects 4CAAST, CLOUD4SOA, CLOUD-TM, and MOSAIC. More detailed information on the projects can be found in the annex (Annex A).

- 4CAAST:

The project will provide resources to improve the Internet-scale application platform for design, operation, management, and trading of services and service compositions which can be tailored to different local or global communities through a PaaS Cloud. This could be evaluated as a future deployment infrastructure for the REMICS project in comparison to the current alternatives.

- CLOUD4SOA:

Cloud4SOA focuses on resolving the interoperability and portability issues that exist in current Clouds infrastructures and on introducing a user-centric approach for applications which are built upon and deployed using Cloud resources. The interoperability is directly related to the interoperability aspect of REMICS and the portability could be an interesting feature to be evaluated in the context of the REMICS project.

- CLOUD-TM:

Cloud-TM offers a simple and intuitive programming model for large scale distributed applications that integrates the familiar notion of atomic transaction as a first-class programming language construct, sparing programmers from the burden of implementing low level, error-prone mechanisms (e.g. locking, persistence and fault-tolerance) and permitting major reductions in the time and cost of the development process. In this case Cloud-TM could be interested in the feedback from the REMICS project as a source of improvement areas in the Cloud programming models.

- CONTRAIL:

The main contribution of CONTRAIL will be the development of an integrated approach to virtualization, offering Infrastructure as a Service (IaaS), services for federating IaaS Clouds, and Platform as a Service (PaaS) on top of federated Clouds. This could be also a test base for the REMICS pilots.

- MOSAIC:

It aims to develop an open-source platform that enables applications to negotiate Cloud services as requested by their users. Using the Cloud ontology, applications will be able to specify their service requirements and communicate them to the platform via the innovative API. Cloud-application developers and maintainers will be able to postpone their decision on the procurement of Cloud services until runtime, while end-user applications will be able to find best-fitting Cloud services to their actual needs and efficiently outsource computations.

As a preliminary result of the activity PC02 In the first months of the project we have started contacts with some of the listed projects: 4CAST, CLOUD4SOA and MOSAIC.

As a preliminary result for the activity PC03 a collaboration activity has been established with the MOSAIC project in the organisation of a cloud related workshop (<http://www.enase.org/workshops.asp#EVACCS>) in the EANSE conference (<http://www.enase.org/home.asp>). In this case the MOSAIC project coordinator takes part in the program committee of the workshop together with the REMICS people. In this line we will continue looking for additional collaboration activities such as coordination meetings in EU events such as ServiceWave 2011¹¹, and similar.

¹¹ <http://servicewave.eu/2011/>

3 Society Impact

3.1 Web Site

The objective of REMICS has been to create the web site in the first month of the project. The activities in this short term plan where:

- Analysis of the requirements for EU project web sites
- Acquisition of the domain
- Acquisition of the infrastructure
- Selection of previous examples
- Selection of the content management system
- Development of the first prototype
- Publication of the web site

For the maintenance of the project we have taken into account the following features listed in the DOW:

- Events
- Case studies
- Published project results
- Download area for REMICS-specific documents and demonstration software, abstracts and/or full papers of lectures, project news

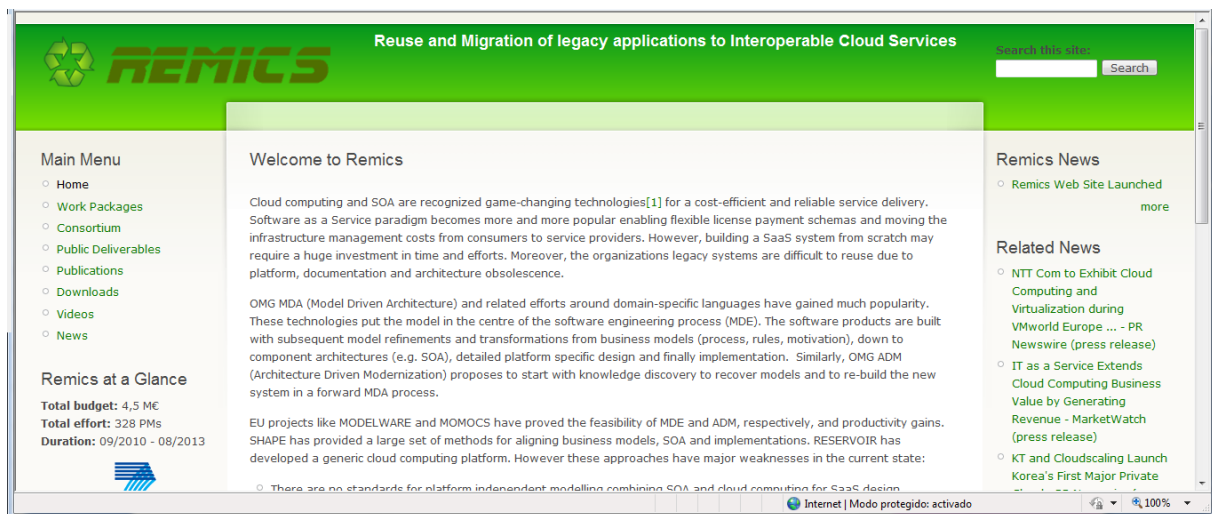


Figure 1 – REMICS Web Site; <http://remics.eu>

We have also defined the procedures and the mechanisms to add that information in a seamless way.

- For events and news there is a news editing facility embedded in the content management system.

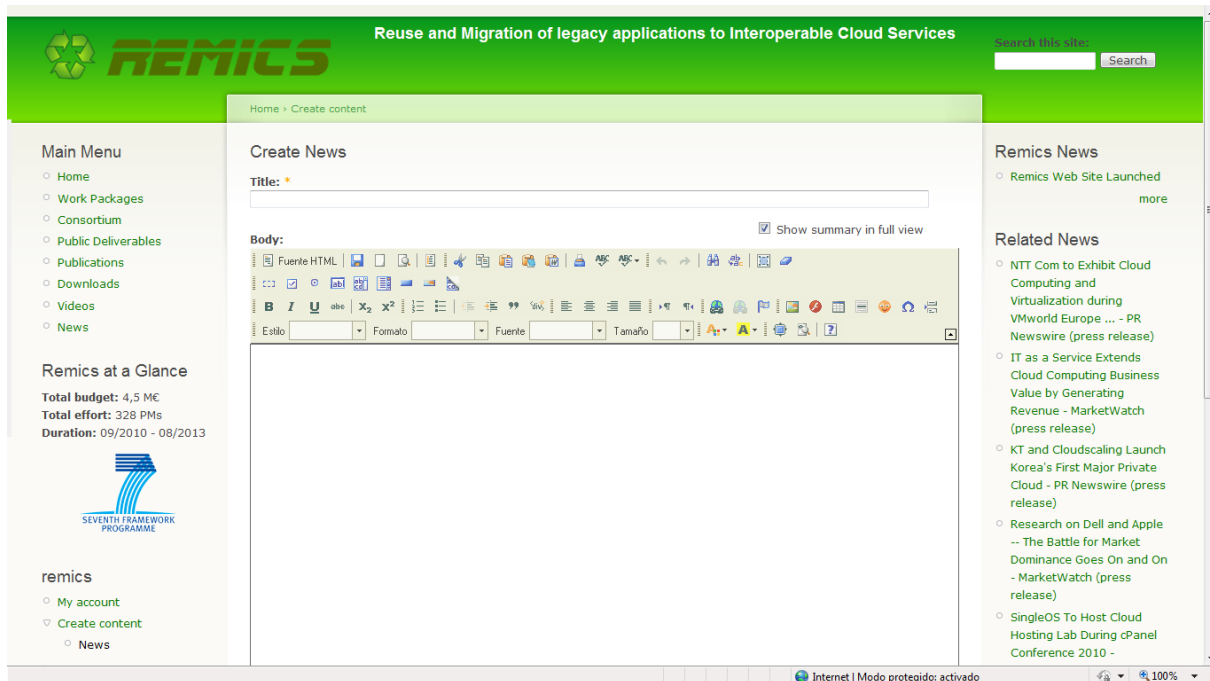


Figure 2 – REMICS News Editing

- For the population of the download area, this is expected to be done through the manual editing of the download pages.

The addition of the new content to the portal is guided by the availability of events and deliverables to include, and it will be done as soon as the new content is available.

3.2 Dissemination

3.2.1 Books

REMICS partners have planned a book chapter in a book titled “Migrating Legacy Applications: Challenges in Service Oriented Architecture and Cloud Computing Environments”..

We also consider publishing REMICS results in a book in the third year of the project.

3.2.2 Workshops Organisation

In addition to contributing to events as program committee members, REMICS partners are involved in organizing events and workshops:

- Parastoo Mohagheghi from SINTEF is one of organisers of EVACCS'11¹² (1st international workshop on Evaluating Cloud Computing and Services), to be organized in conjunction with ENASE 2011. The workshop date is June 8, 2011 and call for papers is published.
- Fraunhofer FOKUS is co-organiser of a workshop series on Model-Driven Tool and Process Integration (MDTPI), which focuses on tool chains and development solutions for system creation. Next edition is taking place in Birmingham, UK, June 6th, 2011.
- Fraunhofer FOKUS is co-organiser of a workshop series on Model-Driven Testing in Practice, which focuses on practical aspects of model-driven testing. Next edition is taking place in Paphos, Cyprus, August 31, 2011

¹² <http://www.ense.org/EVACCS.asp>

- Fraunhofer FOKUS is organiser of a series of events related to Eclipse-Technology. This comprises Eclipse Integrated Development Day as well as Eclipse Demo Camps. Next edition of Eclipse Day is taking place in Berlin, Germany, May 9th, 2011

3.2.3 Events

ServiceWave events and Future Internet Assembly (FIA) events have been co-located and the next one is on Oct 26-28, 2011 in Poznan – Poland. REMICS has already participated in the demonstration evening of ServiceWave 2010¹³ (held on December 13-15, 2010 in Ghent – Belgium) with a presentation of REMICS objectives, BluAge technology and Modelio tool with SoaML presentations of our use cases. We will also evaluate possibility for participating in ServiceWave 2011 or other upcoming events where European research projects are gathering. We will also evaluate organizing an event for relevant projects when the announcements are available.

3.2.4 Papers, conference workshops attendance

Table 1 provides a list of major conferences and journals where REMIS results could be published. There are also several workshops held in parallel with conferences.

Table 1 - Some relevant journals and conferences

Research area	Journals and conferences
Model-driven engineering	<ul style="list-style-type: none"> • MoDELS - International Conference on Model Driven Engineering Languages and Systems • ECMDA-FA – European Conference on Model Driven Architecture – Foundations and Applications • IEEE Transactions on Software Engineering • ACM Transactions on Software Engineering and Methodology • Software and Systems Modeling, Springer Verlag
Service-oriented architectures	<ul style="list-style-type: none"> • World Wide Web Conference • International Conference on Service Oriented Computing • ACM Transactions on Information Systems • ACM Transactions on Internet Technology • IEEE Internet Computing • Communications of the ACM
Service Clouds	<ul style="list-style-type: none"> • IEEE International Conference on Cloud Computing • International Cloud Computing Conference & Expo • ServiceWave events

¹³ <http://servicewave.eu/2010/joint-demonstration-evening/>

Testing	<ul style="list-style-type: none"> • MoTIP - Workshop on Model-based Testing in Practice • STV - Systems Testing & Validation Workshops • Conquest - Conference on Quality Engineering in Software Technology • TESTCOM – International Conference on Testing of Communicating Systems • TTCN-3 User Conference
Empirical research	<ul style="list-style-type: none"> • ESE – Empirical Software Engineering journal- Springer • ESEM- Empirical Software Engineering and Measurement conference

3.2.5 Training Activities

These are the currently planned training activities to be derived from the REMICS project:

- REMICS results will be presented in the course Information Infrastructure¹⁴, at the University of Oslo taught by Dr. Arne Berre in fall semesters.
- Publications of REMICS will also be part of the course New Software Technology¹⁵, taught in spring semesters at the Norwegian University of Science and Technology.
- REMICS results in the area of testing will become part of lectures given by Ina Schieferdecker at Technische Universität Berlin or Freie Universität Berlin.

3.3 Open Source

The REMICS project will focus on Open source Metamodels and Models rather than Open Source code with an emphasis on Open Models for standards based on Open Interfaces. We will typically provide EMF Eclipse based versions of the models representing the standards being worked on and provided in REMICS. This will allow for easy access to the standards and easy implementation of these by multiple vendors. For these and the related software we will use the Eclipse Open Source license.

These EMF eclipse based versions of the models will be packaged and placed in the project web page under the download section. In parallel we will evaluate the possibility of hosting these components in other open source sites such as eclipse, or sourceforge.

Softeam and Netfective will develop and provide commercially licensed software. Softeam will provide Modelio Free tool as an entry point tool free of charge. The project will use the Modelbased.net website managed by SINTEF as a potential web site for dissemination of Open Models. This is currently being used by SINTEF for their Open Source MOFScript implementation of the OMG Model2Text standard. We will also consider collaboration with the www.modeldriven.net community.

3.4 Exploitation plans

3.4.1 DISYS

The objectives of DISYS by using REMICS results are:

- Obtain faster migration of legacy software.
- Increase our part of web services in our software portfolio.
- Increase revenue from increased sale of products and reduced unpaid support.

¹⁴ <http://www.uio.no/studier/emner/matnat/ifi/INF5210/index-eng.xml>

¹⁵ <http://www.idi.ntnu.no/emner/tdt10/>

- Increase software quality from the use of model driven development.
- Simplify integration with third party software vendors through service integration.
- Simplify access to our software by the consumers (browser requirement only).
- Increase ability to scale out if deployed on a commercial service provider.

REMICS tools and methods will be used during the project and make a basis for future implementation and evolution. The concrete plans for using these will be developed during the project.

3.4.2 DOME

The objectives of DISYS by using REMICS results are:

- Simplify access to our software to our current clients (browser requirement only).
- Allow the access to new clients, since no installation is needed (browser requirement only).
- Ease the access to new channels, like mobile application for smartphones or tablets with internet capability.
- Provide experience in migration from a private data center to a cloud platform like Amazon EC2.
- Improve integration with third party service providers with the interoperability tools provided by REMICS.
- Improve the software quality. The automated tests will be useful to detect programming errors. Using the new testing methods like Model Based tests and metrics should also improve the robustness of the new system.
- Improve the scalability and distribution of our software, since the distributed cloud platform will allow us to efficiently distribute the software in different machines.

REMICS tools and methods will be used during the project and make a basis for future implementation and evolution. The concrete plans for using these will be developed during the project.

3.4.3 Netfective

The exploitation plan and strategy of Netfective is as follows:

- To strengthen BLU AGE® in general and BLU AGE® REVERSE in particular with more functionalities and capabilities (processing « new » legacy languages like PL/SQL...);
- To increase the number of customers and projects (in the USA market especially) envisaging leadership in market niches, strong collaboration with USA IT integrators ; to open Netfective's European portfolio and set of references for credibility, including DOME and DISYS for that;
- To open the product to cloud computing platforms (commercial platforms especially) through new BSPs: new market segments' positioning, new clients interested in mixing MDD and cloud computing;
- To initiate (and next convince) regular customers into the successful marriage of MDD and cloud computing in the spirit of enhanced adaptability/agility at runtime especially;
- To significantly influence standards ADM and KDM specifically at the OMG® through a **reference experimentation**, use and evaluation of KDM and ASTM; to develop a first standard of models@runtime as a component of PIM4cloud;
- To augment the notoriety through the participation within EU projects and standard definition.

3.4.4 SOFTEAM

SOFTEAM is a French SME of about 220 employees, based in Paris, and having subsidiaries in Saint Quentin en Yvelines, Rennes, Nantes and Sophia Antipolis.



Founded in 1989, SOFTEAM has a long experience in object oriented methodology, and has been editing and distributing an object-oriented CASE tool since 1992. SOFTEAM is involved in the following three main activities:

- CASE tool publishing with the Modelio MDE workbench,
- IT services and consulting: as a provider of object-oriented methodology, and as an active OMG contributor,
- Training: SOFTEAM provides training in related technical areas (languages, techniques, tools) and in methodological areas.

SOFTEAM solutions and services are used in many industrial domains including: aerospace & defence, automobile, telecommunications, banking & insurance.

As a contributing member and voter since 1994, SOFTEAM is deeply involved in the work of the OMG and, in particular, the standardization of UML. SOFTEAM, represented by the VP of R&D, Philippe DESFRAY, maintains a close synergy between the significant R&D efforts and its involvement within the OMG.

As a member of the ADTF (Analysis & Design Task Force), a member of UML RTF (Revision Task Force) and UML FTF (Finalization Task Force), SOFTEAM continues to influence the UML standard and related technologies. In particular, SOFTEAM directed the introduction of the following technological advances:

- UML profiles, based on its R&D work and its precursor tools.
- flow diagrams (information flow) and protocol state machines within UML 2.0
- definition of the SPEM (Software Process Engineering Metamodel) standard, directed by SOFTEAM
- Among others, SOFTEAM participated in elaboration of UTP (UML2 Test Profile) and MARTE (Modeling and Analysis of Real Time and Embedded Systems)
- SoaML; the SOA modelling language specification.

SOFTEAM was forerunner and promoter of MDA technologies (Model Driven Architecture), now at the centre of the OMG's strategy. SOFTEAM puts great emphasis on applying MDA to UML.

REMICS results will help SOFTEAM to improve its product and service offering. In particular the Modelio MDE workbench will benefit from the new modeling languages developed in REMICS. The SoaML offering will be enriched with specific language covering cloud deployment aspects. The UTP profile will be improved to address the peculiarities of cloud application testing. SOFTEAM work on SEMAT will help to be first on the market with new tools on advanced agile engineering process modelling. Finally, integration with Netfactive BluAge tools will allow to combine the SOFTEAM's reach graphical modelling front-end with advanced platform oriented code generation. This will enable SOFTEAM to propose new cutting edge tools, to maintain its position and even to gain new shares in the UML tools market.

Annex A. Sorted list of potential related FP projects

ACRONYM	TITLE				
COORDINATOR					
CONTRACT	START	MONTHS	BUDGET	TYPE	GRANT
DESCRIPTION					
4CAAST	Building the PaaS Cloud of the Future (4CAAST)				
TELEFONICA INVESTIGACION Y DESARROLLO SA					
258862	01/06/2010	39	14910000	Collaborative project (generic)	8880000
<p>To survive in today s economy; short time-to-market and efficiency are paramount for the creation of innovative products and to survive in the current economic climate. This is especially true for IT services which will dominate the way people work and live in the future. Cloud computing is essentially changing the way services are built, provided and consumed. Despite simple access to Clouds, building elastic services is still an elitist domain and proprietary technologies are an entry barrier especially to SMEs and consequently, it remains largely within the domain of established players. To accelerate the creation of highly demanded tailored services in a timely manner, the Cloud paradigm requires major change to address the way services are built, provided and accessed. Abstracting from technical complexities lowers entry barriers and empowers SMEs in especial, to offer applications to this significant market without large upfront investments. The project envisions: An Internet-scale application platform for design, operation, management, and trading of services and service compositions which can be tailored to different local or global communities. 4CaaS will provide benefits and business opportunities for the following stakeholders: Application Providers can focus on building applications integrating the latest IT and Telco interaction (NaaS) paradigms. Particular emphasis will be paid to scalability, lifecycle and resource management. Platform Providers can instantiate and efficiently operate a 4CaaS platform as a service and can establish an eco-system via the 4CaaS marketplace. Service Aggregators can focus on value added services through composition and mashup. The project will bring significant benefits to the European economy. It will provide an easy to use Infrastructure for a More Competitive Environment, greatly simplifying design and delivery of tailored services and compositions.</p>					
CLOUD4SOA	A CLOUD INTEROPERABILITY FRAMEWORK AND PLATFORM FOR USER-CENTRIC, SEMANTICALLY-ENHANCED SERVICE-ORIENTED APPLICATIONS DESIGN, DEPLOYMENT AND DISTRIBUTED EXECUTION (CLOUD4SOA)				
ATOS ORIGIN SOCIEDAD ANONIMA ESPANOLA					
257953	01/09/2010	36	4140000	Collaborative project (generic)	2740000
<p>Cloud4SOA focuses on resolving the interoperability and portability issues that exist in current Clouds infrastructures and on introducing a user-centric approach for applications which are built upon and deployed using Cloud resources. To this end, Cloud4SOA aims to combine three fundamental and complementary computing paradigms, namely Cloud computing, Service Oriented Architectures and lightweight semantics to propose a reference architecture and deploy fully operational prototypes.</p> <p>The 36-month Cloud4SOA project will result in:</p> <p>R1. The Cloud4SOA Cloud Semantic Interoperability Framework, which will provide a set of recommendations and good practices on how to achieve semantic interoperability between different Cloud platforms.</p> <p>R2. The open, generic Cloud4SOA Reference Architecture, which will introduce a scalable, reusable and transferable approach for facilitating the design, deployment and execution of resource intensive SOA services on top of semantically interlinked Clouds.</p> <p>R3. The Cloud4SOA lightweight models for resources and services which will offer the necessary semantics for annotating computing resources and SOA services.</p> <p>R4. The Cloud4SOA platform as a reference implementation based on the Cloud Semantic</p>					

<p>Interoperability Framework and the Cloud4SOA Reference Architecture.</p> <p>R5. Three showcases which will validate and prove the proposed Cloud4SOA architecture, models and tools.</p> <p>R6. Wide scale dissemination and exploitation of the project results to the European academic, scientific and business stakeholders and end users organizations through the formulation and active day-to-day support of a broad Community of Practice or Interest Group on Cloud Semantic Interoperability. The goal of this group will be to raise Cloud Interoperability related issues to international standardization bodies (e.g. W3C, OASIS)</p> <p>Led by ATOS, the Cloud4SOA consortium consists of nine (9) partners, from six (6) EU member states, i.e. Spain, Ireland, Greece, Germany, Portugal and Romania.</p>					
CLOUD-TM		Cloud-TM: A Novel Programming Paradigm for Cloud Computing (CLOUD-TM)			
INESC ID - INSTITUTO DE ENGENHARIA DE SISTEMAS E COMPUTADORES, INVESTIGACAO E DESENVOLVIMENTO EM LISBOA					
257784	01/06/2010	36	2480000	Collaborative project (generic)	1700000
<p>Cloud Computing has emerged as a new paradigm for deploying, managing and offering services through a shared infrastructure. The foreseen benefits of Cloud Computing are very compelling both from a cloud consumer and from a cloud services provider perspective: freeing corporations from large IT capital investments via usage-based pricing schemes; leveraging the economies of scale for both services providers and users of the cloud; easing the deployment of services. One of the main challenges to materialize these perceived benefits is to identify innovative distributed programming models that simplify the development of Cloud-based services, allowing for ordinary programmers to take full advantage of the seemingly unbounded amount of computational power and storage available on demand in large scale Cloud infrastructures. This project aims at designing, building, and evaluating an innovative middleware platform for service implementation of Cloud-based services: Cloud-TM (Cloud-Transactional Memory).</p> <p>Cloud-TM offers a simple and intuitive programming model for large scale distributed applications that integrates the familiar notion of atomic transaction as a first-class programming language construct, sparing programmers from the burden of implementing low level, error-prone mechanisms (e.g. locking, persistence and fault-tolerance) and permitting major reductions in the time and cost of the development process. Cloud-TM will embed a set of autonomic mechanisms to simplify service monitoring and administration, a major source of costs in dynamic and elastic environments such as the cloud. These mechanisms aim at ensuring the achievement of user defined Quality of Service levels at minimum operational costs by automating the provisioning of resources from the cloud and self-tuning the middleware platform to achieve optimal efficiency in the utilization of resources.</p>					
MOSAIC		Open-Source API and Platform for Multiple Clouds (MOSAIC)			
SECONDA UNIVERSITÀ DEGLI STUDI DI NAPOLI					
256910	01/09/2010	30	2870000	Collaborative project (generic)	2270000
<p>Imagine that you are responsible for your corporation s data center, and you experience wild variability in the computational load in your data center. You only have jobs to run at the end of every month, in the rest of time your infrastructure is almost unused. Still, you have high maintenance costs. You heard about Cloud computing earlier, you took a two days course, and you are made to believe that it will solve your problems. When you introduce Cloud services to your organization, however, you realize this task is not as easy as it seemed. First, you realize that you should use different Cloud providers each month, since the variable computational requirements fit different Clouds offer. The second issue is that you cannot find a single Cloud provider that has all the required services. If you think that the above description fits you, than the mOSAIC platform is for you. Using mOSAIC solution you do not have to decide on a specific Cloud provider at design time, instead any time you use Cloud services, you will access the ones fitting best your needs.</p> <p>The mOSAIC project (mosaic-project.eu) aims to develop an open-source platform that enables applications to negotiate Cloud services as requested by their users. Using the Cloud ontology, applications will be able to specify their service requirements and communicate them to the platform via the innovative API. The platform will implement a multi-agent brokering mechanism</p>					

that will search for services matching the applications request, and possibly compose the requested service if no direct hit is found. Cloud-application developers and maintainers will be able to postpone their decision on the procurement of Cloud services until runtime, while end-user applications will be able to find best-fitting Cloud services to their actual needs and efficiently outsource computations. The platform will facilitate competition between Cloud providers, who, in return, will be able to reach customers they could not reach before.					
CONTRAIL		Open Computing Infrastructures for Elastic Services (CONTRAIL)			
INSTITUT NATIONAL DE RECHERCHE EN INFORMATIQUE ET EN AUTOMATIQUE					
257438	01/10/2010	36	11290000	Collaborative project (generic)	8300000
<p>In the future of corporate IT, companies will rely on highly dynamic distributed IT infrastructures. Federation models are envisioned where a given organisation will be both a Cloud provider during periods when its IT infrastructure is not used at its maximal capacity, and a Cloud customer in periods of peak activity.</p> <p>The main contribution of CONTRAIL will be the development of an integrated approach to virtualization, offering Infrastructure as a Service (IaaS), services for federating IaaS Clouds, and Platform as a Service (PaaS) on top of federated Clouds. This service stack will be part of the CONTRAIL open source system, facilitating industrial up-take of Cloud computing. The main outputs of CONTRAIL are a collection of infrastructure services offering network, computation and storage as a service; services to federate IaaS Clouds; a set of high level services and runtime environments for typical Cloud applications, including efficient map/reduce, scalable service-oriented application hosting, and automatic workflow execution; and a set of applications and use cases from the domains of e-business, e-science, telecommunication and media using and demonstrating the CONTRAIL system.</p> <p>CONTRAIL leverages the open source XtreamOS system, developed in the successful XtreamOS European integrated project and which was designed for large scale dynamic infrastructures. XtreamOS integrates services for data, application, security and community management that can be adapted to provide a unified solution for building private, public and federated Cloud infrastructures. CONTRAIL has core virtualization technology integrated with its high-level services and its Cloud management facilities.</p> <p>This unique approach of covering "the whole Cloud" from the core infrastructure, via federation mechanisms, to management services, enables the construction of transparent, trusted and reliable Cloud platforms with operations governed by service level agreements.</p>					
SLA@SOI		Empowering the service economy with SLA-aware infrastructures (SLA@SOI)			
SAP AG					
216556	01/06/2008	36	15210000	Collaborative project (generic)	9630000
<p>The ongoing transformation of a product-oriented economy towards a service-oriented economy has come to a critical point. IT-supported service provisioning is of major relevance in all industries and domains. However, the nature of these setups is typically quite static because it requires significant effort to create service offers, to negotiate provisioning details with customers and to manage and control provided services.</p> <p>The research project SLA@SOI will provide a major milestone for the further evolution towards a service-oriented economy, where IT-based services can be flexibly traded as economic good, i.e. under well defined and dependable conditions and with clearly associated costs. Eventually, this will allow for dynamic value networks that can be flexibly instantiated thus driving innovation and competitiveness.</p> <p>The technical approach of SLA@SOI is to define a holistic view for the management of service level agreements (SLAs) and to implement an SLA management framework that can be easily integrated into a service-oriented infrastructure (SOI). The main innovative features of the project are:</p> <ol style="list-style-type: none"> (1) an automated e-contracting framework, (2) systematic grounding of SLAs from the business level down to the infrastructure, (3) exploitation of virtualization technologies at infrastructure level for SLA enforcement, and (4) advanced engineering methodologies for creation of predictable and manageable services. <p>SLA@SOI will provide its results in 2 complementing ways. First, an open source based SLA</p>					

<p>management framework will allow for realizing the benefits of predictability, transparency and automation in an arbitrary service-oriented infrastructure. Second, in-depth guidance for industrial stakeholders will be given explaining the best practise on how to transform their service business into an SLA-driven one.</p> <p>SLA@SOI comprises representative world-class players in academia and industry required for materializing the vision of this ambitious project.</p>					
SOA4ALL		Service oriented architectures for aAll (SOA4ALL)			
ATOS ORIGIN SOCIEDAD ANONIMA ESPANOLA					
215219	01/03/2008	36	13490000	Collaborative project (generic)	9470000
<p>Computer science is entering a new generation. The emerging generation starts by abstracting from software and sees all resources as services in a service-oriented architecture (SOA). In a world of services, it is the service that counts for a customer and not the software or hardware components which implement the service. Service-oriented architectures are rapidly becoming the dominant computing paradigm. However, current SOA solutions are still restricted in their application context to being in-house solutions of companies. A service Web will have billions of services. While service orientation is widely acknowledged for its potential to revolutionize the world of computing by abstracting from the underlying hardware and software layers, its success depends on resolving a number of fundamental challenges that SOA does not address today. SOA4All will help to realize a world where billions of parties are exposing and consuming services via advanced Web technology.</p> <p>The outcome of the project will be a comprehensive framework and infrastructure that integrates four complimentary and revolutionary technical advances into a coherent and domain independent service delivery platform:</p> <ul style="list-style-type: none"> - Web principles and technology as the underlying infrastructure for the integration of services at a worldwide scale. - Web 2.0 as a means to structure human-machine cooperation in an efficient and cost-effective manner. - Semantic Web technology as a means to abstract from syntax to semantics as required for meaningful service discovery. - Context management as a way to process in a machine understandable way user needs that facilitates the customisation of existing services for the needs of users. <p>SOA4All is endorsed by the NESSI constituency as a Strategic Project and will contribute significantly to the NESSI Open Framework, which is one of the main challenges of the European Platform on Software and Services.</p>					
SPACIOS		Secure Provision and Consumption in the Internet of Services (SPACIOS)			
UNIVERSITA DEGLI STUDI DI VERONA					
257876	01/10/2010	36	5340000	Collaborative project (generic)	3350000
<p>The vision of the Internet of Services (IoS) entails a major paradigm shift in the way ICT systems and applications are designed, implemented, deployed and consumed: they are no longer the result of programming components in the traditional meaning but are built by composing services that are distributed over the network and aggregated and consumed at run-time in a demand-driven, flexible way. In IoS, services are business functionalities that are designed and implemented by producers, deployed by providers, aggregated by intermediaries and used by consumers. However, the new opportunities opened by IoS will only materialise if concepts, techniques and tools are provided to ensure security.</p> <p>State-of-the-art security validation technologies, when used in isolation, do not provide automated support to the discovery of important vulnerabilities and associated exploits that are already plaguing complex web-based security-sensitive applications, and thus severely affect the development of the IoS. Moreover, security validation should be applied not only at production time but also when services are deployed and consumed.</p> <p>Tackling these challenges is the main objective of the project, which will lay the technological foundations for a new generation of analysers for automated security validation at service provision and consumption time, thereby significantly improving the security of the IoS. This will be achieved by developing and combining state-of-the-art technologies for penetration testing, security testing, model checking and automatic learning. These will all be integrated into the</p>					

SPaCloS Tool, which we shall apply proof of concept on a set of security testing problem cases drawn from industrial and open-source IoS application scenarios. This will pave the way to transfer project results successfully in industrial practice. We shall execute 2 concrete migration paths: to SAP and SIEMENS business units, and to industrial interest groups, standardisation bodies and open-source communities.					
SOFI		Service Offering for the Future Internet (SOFI)			
STI INTERNATIONAL CONSULTING UND RESEARCH GMBH					
257284	01/06/2010	24	545152	Coordination and support actions	444268
<p>The goal of SOFI is to complement R&D projects in the area of Internet of Services, Software and Virtualization (Objective 1.2) through specific support activities. SOFI aims to ensure the position of European research as a leader in the definition and realization of the theoretical and technological foundations of the Future Internet of Services, as well as European industry's competitive advantage in the creation of value and new opportunities from the use of Future Internet. SOFI will build upon existing work related to the Service related working groups, most specifically the Future Internet Service Offer WG (FISO), within the Future Internet.</p> <p>The specific objectives of the SOFI proposal are:</p> <p>Support the organisation of the Future Internet Assembly, and in particular to pursue the activities of and further develop the Future Internet Service Offer. SOFI will lead the work of producing an annual book with results from the Future Internet Assemblies. This approach will be complemented by a world-wide effort to coordinate European Future Internet efforts with corresponding programs in the USA, Japan, and elsewhere, ensuring EU Future Internet initiatives related to software and services are relevant and that European industry and society can be at the helm of the Future Internet.</p> <p>Support dissemination of the Internet of Services community results as a crucial instrument to strengthen and extend the impact of supported collaborative research projects through the provision of specific dissemination channels, in particular the conference series Future Internet Symposium (FIS) and ServiceWave. SOFI will also help raise awareness among European businesses and public stakeholders of technological solutions enabled through the Internet of Services, and facilitate the steady and systematic adoption of these technologies by participating in relevant events, conferences, tutorials, and information days.</p> <p>Implement the Future Internet portal and collaboration measures to ensure cohesion and alignment of strategies, objectives and results of projects and initiatives within the Future Internet initiative. In particular, SOFI will collaborate on an improved and regularly updated Future Internet portal, communicating results from the services community and publicizing technical solutions to the research and industry. Also, SOFI will participate in collaboration measures such as a European Vision on the Future Internet Architecture and roadmapping for FP8 research.</p>					
SPIKE		Secure process-oriented integrative service infrastructure for networked enterprises (SPIKE)			
UNIVERSITAET REGENSBURG					
217098	01/01/2008	36	2830000	Collaborative project (generic)	1960000
<p>SPIKE will develop a software platform for the easy and fast setup of business alliances. The project targets two main organisational objectives: first, outsourcing parts of the value chain to business partners (and vice versa, offering such parts in form of services); second, enabling collaboration between members of participating organisations through ad-hoc created as well as predefined business processes. SPIKE will enable collaboration and cooperation between the networked enterprises.</p> <p>The solution will encompass a semantically enriched service oriented infrastructure including a virtual semantic service bus for workflow control and handling and transformation of messages. At the enterprise interface level, we follow a collaborative process portal approach, capturing the user's working context and seamlessly transmitting it to other applications and services according to the current workflow. This will also enable integration of legacy systems via tailored portlets and connectors. Special focus will be put on the security issues involved; the solution will include an easy-to-administer security infrastructure for the networked enterprise which will provide security services for service and workflow management.</p> <p>The user partners will demonstrate the potential of SPIKE at the case of pilot deployments and</p>					

<p>use cases, i.e. a collaborative business alliance and two services ready for use in the networked enterprise. Because of its focus, the project will have an impact on organizations of all sizes that want to collaborate with each other. The base SPIKE components will be developed as an open source solution, with a special emphasis on easy adoption and cost feasibility. Where possible, we will build upon and enhance existing open source software. This way, SPIKE will have a special impact on SMEs. It will enable them to offer their services to potential new customers in a cost-saving and timely manner.</p>					
AESOP		ArchitecturE for Service-Oriented Process - Monitoring and Control (AESOP)			
SCHNEIDER ELECTRIC AUTOMATION GMBH					
258682	01/09/2010	30	7280000	Collaborative project (generic)	4500000
<p>AESOP will investigate a Service-oriented Architecture approach for monitoring and control of Process Control applications (batch and continuous process). Large process industry systems are a complex set of multi-disciplinary, connected, heterogeneous systems that function as a complex system of which the components are themselves systems. They link many components from individual groups of sensors to e.g. whole control, monitoring, supervisory control systems, performing SCADA and DCS functions.</p> <p>The future -Perfect Plant- will enable monitoring and control information flow in a cross-layer way. Components can be dynamically added or removed and dynamic discovery enables the on-demand information combination and collaboration. All systems will collaborate in an enterprise-wide system of systems, dynamically evolving based on business needs.</p> <p>AESOP deals with several key challenges that arise such as real-time web services, interoperability, plug and play, self-adaptation, reliability, cost-effectiveness, energy-awareness, high-level cross-layer integration and cooperation, event propagation, aggregation and management.</p> <p>Using SOA we will go to complex infrastructures linked in a cross-layer way from devices to enterprise systems. Transition from legacy systems will be studied for existing ones. The SOA-based approach proposed by AESOP will simplify the integration of monitoring and control systems on application layer.</p> <p>AESOP will demonstrate the application feasibility in pilots. The use cases provided from several end-users will be demonstrated in pilot applications. Engineering tools, application modelling and methodologies will be investigated and highlights on the future of the domain will be provided by research and academic partners. The AESOP partnership among important ICT players / stakeholders of the industrial value chain is a key aspect of the proposal that allows to foresee important contributions to relevant standardization bodies.</p>					
NESSOS		Network of Excellence on Engineering Secure Future Internet Software Services and Systems (NESSOS)			
CONSIGLIO NAZIONALE DELLE RICERCHE					
256980	01/10/2010	42	5250000	Networks of Excellence	3800000
<p>The Network of Excellence on Engineering Secure Future Internet Software Services and Systems (NESSoS) aims at constituting and integrating a long lasting research community on engineering secure software-based services and systems.</p> <p>The NESSoS engineering of secure software services is based on the principle of addressing security concerns from the very beginning in system analysis and design, thus contributing to reduce the amount of system and service vulnerabilities and enabling the systematic treatment of security needs through the engineering process. In light of the unique security requirements the Future Internet will expose, new results will be achieved by means of an integrated research, as to improve the necessary assurance level and to address risk and cost during the software development cycle in order to prioritize and manage investments.</p> <p>NESSoS will integrate the research labs involved; NESSoS will re-address, integrate, harmonize and foster the research activities in the necessary areas, and will increase and spread the research excellence.</p> <p>NESSoS will also impact training and education activities in Europe to grow a new generation of skilled researchers and practitioners in the area.</p> <p>NESSoS will collaborate with industrial stakeholders to improve the industry best practices and support a rapid growth of software-based service systems in the Future Internet. The research excellence of NESSoS will contribute to increase the trustworthiness of the Future Internet by</p>					

improving the overall security of software services and systems. This will support European competitiveness in this vital area.					
PINCETTE		Validating Changes and Upgrades in Networked Software (PINCETTE)			
IBM ISRAEL - SCIENCE AND TECHNOLOGY LTD					
257647	01/07/2010	36	4170000	Collaborative project (generic)	2800000
<p>Europe relies on the availability and flawless functioning of distributed infrastructures, such as electricity, water, communication, transportation, and environmental management. This infrastructure is based on distributed networked IT systems for monitoring and control. Technological innovation offers opportunities for more efficient infrastructure. Innovation in infrastructures and the resulting improvement in quality of life are hindered by the danger of upgrades:</p> <ul style="list-style-type: none"> - in a new version, some of the existing functionality can be lost; - incompatibilities between the old and new version can result in major service outages; <p>As it is infeasible to update the entire infrastructure at once, periods of coexistence between old and new components are inevitable.</p> <p>As a result, infrastructure upgrades are done only once the existing infrastructure performs below acceptable levels. Lowering the risk of infrastructure updates will benefit society, infrastructure operators, and the European systems vendors. All existing validation solutions do not take upgrades into account. A solution for validating upgrades is in dire need because of shorter product lifecycles and increasing complexity and scale of networked systems.</p> <p>PINCETTE will develop the technology to ensure safe infrastructure upgrades by validating continuously evolving networked software systems.</p> <p>PINCETTE will 1) reduce the cost and time to market of upgrades by several orders of magnitude; 2) increase the level of confidence in the safety of upgrades; 3) enable certification of upgrades. The PINCETTE consortium is composed of the leading European research experts and prominent infrastructure providers. The PINCETTE technology will be validated at:</p> <ul style="list-style-type: none"> - ABB produces and sells components and systems used in utility, industrial, and public transportation infrastructures. A major share of the European power grid is built on ABB equipment. - VTT provides the monitoring and maintenance robot system for the International Thermonuclear Experimental Reactor. - IAI operates autonomous aircrafts for environmental monitoring, deployed worldwide. 					
SECURECHANGE		Security engineering for lifelong evolvable systems (SECURECHANGE)			
UNIVERSITA DEGLI STUDI DI TRENTO					
231101	01/02/2009	36	7060000	Collaborative project (generic)	5100000
<p>There is growing demand to continuously evolve systems to meet changing business needs, new regulations and policies, novel technologies and computing infrastructures. Unfortunately, the pace of required change affects our ability to ascertain and maintain the quality of a system. Our objective is thus to develop techniques and tools that ensure "lifelong" compliance to security, privacy and dependability requirements for a long-running evolving software system. This is challenging because these requirements are not necessarily preserved by system evolution.</p> <p>The project will develop processes and tools that support design techniques for evolution, testing, verification, re-configuration and local analysis of evolving software. Our focus is on mobile devices and homes, which offer both great research challenges and long-term business opportunities.</p> <p>Concrete achievements will include:</p> <ul style="list-style-type: none"> - Architectural blueprint and integrated security process for lifelong adaptable systems - Methodology for evolutionary requirements with tools for incremental requirements models evaluation and transformation - Security modelling notation for adaptive security with formally founded automated security analysis tools. - IT security risk assessment with tool-support for lifelong adaptable systems - Techniques and tools to verify adaptive security while loading on-device - Model-based testing approach for evolution 					

The results are continuously validated jointly with key industry players.					
SERVICE WEB 3.0	Service Web 3.0 (SERVICE WEB 3.0)				
UNIVERSITAET INNSBRUCK					
216937	01/01/2008	24	721273	Coordination and support actions	482350
<p>Even after four decades of rapid advances, computing is currently subject to revolutionary changes at all levels, including hardware, middleware, network infrastructure, but more importantly intelligent applications. Emerging technologies such as the Semantic Web or Web Services transform the Internet from a network of information to a network of knowledge and services. The number of services which will be offered on the Internet is expected to rise dramatically in the next few years.</p> <p>It is the mission of Service Web 3.0 to address these emerging developments and contribute to the implementation of framework programmes and their projects, and supports the preparation of future community research and technological development.</p> <p>The focus of Service Web 3.0 will be to:</p> <ul style="list-style-type: none"> - Create, maintain, and publish roadmaps as a means to plan and coordinate framework and community activities for a future service world - Set-up of dedicated service clusters focusing on Semantic Web services within STI2 network (Semantic Technology Institute International) - Provide information material as white papers and feasibility studies for raising the awareness for the technology in industry, introducing new business models and systematically facilitating Semantic Web services and Semantic Web technology adoption, in particular for SMEs - Support standardization activities for semantic service descriptions - Create a European International Position Strategy for collaboration with key IT companies and coordination of strategies with regard to framework activities. - Exploit synergies through networking and cross-fertilization with other research and network projects related to this area - Organize special focused conferences and seminars <p>Service Web 3.0 will pave the way to realize a world where billions of parties are exposing and consuming services via advanced Web technology.</p>					
SERVICE-FINDER	Realizing Web service discovery at Web scale (SERVICE-FINDER)				
CEFRIEL - SOCIETA CONSORTILE A RESPONSABILITA LIMITATA					
215876	01/01/2008	24	1690000	Collaborative project (generic)	1260000
<p>The Web is moving from a collection of static documents to a collection of services. For realizing service interchange in a business to business setting, the service-oriented architecture together with the Web Services technology are widely seen as the most promising fundament. As a result, considerable attention has been given, both in research and in industry to Web Services and related technologies.</p> <p>In addition a paradigm shift in the usage of the Web in general has happened. The role of a Web user is shifting from a passive, only consuming function to one where he actively participates: the so-called "Web 2.0" phenomena. Both Web Service's technologies and Web 2.0's technologies have been used in order to develop applications. However, up to now these two areas have been kept separate: the applications that use Web Services do not use the Web 2.0 approach, and vice versa. Instead, Service-Finder aims at developing a platform for service discovery in which Web Services are embedded in a Web 2.0 environment.</p>					
SMARTLM	Grid-friendly software licensing for location independent application execution (SMARTLM)				
ATOS ORIGIN SOCIEDAD ANONIMA ESPANOLA					
216759	01/02/2008	30	4010000	Collaborative project (generic)	2700000
<p>The existing licensing models for commercial applications are focusing on software used on compute resources within an administrative domain. A problem occurs when we want to use this software in a distributed service oriented infrastructure where the resources are often not in the same administrative domain that hosts the license server which is authorizing the application use.</p>					

<p>Today licenses usually are bound to hardware within the domain of the user and do not allow access from outside thus enforcing local use of the protected applications only. The Grid approach in contrary is about using distributed resources from different domains. The experience made in many recent projects trying to use commercial applications in Grid systems clearly indicates a technological barrier of current licensing mechanisms that must be overcome before the Grid becomes a fully commercial productive environment.</p> <p>SMARTLM solution is to implement licenses as Grid services thus providing platform-independent access just like other Grid resources. Service Level Agreements based on evolving standards will then govern licenses. Depending on the level of trust signed or encrypted, agreements will be used to transport licenses through the Grid to the resource to which a user has been granted access to execute his application tasks. The agreement on a license and the conditions of use for an application will be reached through negotiation between service providers and service customers.</p> <p>SMARTLM will provide new generic licensing virtualisation technology based on standards as WS-Agreement and WS-Negotiation and integrate it in the major Grid middlewares. The project will also identify new service-oriented business models for this approach. A number of widely-used license-protected commercial applications will be adapted to be executed under control of the new licensing mechanisms and will become part of a highly quality show-case to convince more code-owners to adapt their applications.</p>					
COIN		Collaboration and interoperability for networked enterprises (COIN)			
TXT E-SOLUTIONS SPA					
216256	01/01/2008	48	14380000	Collaborative project (generic)	10000000
<p>By 2020 enterprise collaboration and interoperability services will become an invisible, pervasive and self-adaptive knowledge and business utility at disposal of the European networked enterprises from any industrial sector and domain in order to rapidly set-up, efficiently manage and effectively operate different forms of business collaborations, from the most traditional supply chains to the most advanced and dynamic business ecosystems.</p> <p>The mission of the COIN IP is to study, design, develop and prototype an open, self-adaptive, generic ICT integrated solution to support the above 2020 vision, starting from notable existing research results in the field of Enterprise Interoperability (made available by the Enterprise Interoperability DG INFOS D4 Cluster and specifically by the projects ATHENA, INTEROP, ABILITIES, SATINE, TRUSTCOM) and Enterprise Collaboration (made available by projects ECOLEAD, DBE, E4 and ECOSPACE).</p> <p>In particular, a COIN business-pervasive open-source service platform will be able to expose, integrate, compose and mash-up in a secure and adaptive way existing and innovative to-be-developed Enterprise Interoperability and Enterprise Collaboration services, by applying intelligent maturity models, business rules and self-adaptive decision-support guidelines to guarantee the best combination of the needed services in dependence of the business context, as industrial sector and domain, size of the companies involved, openness and dynamics of collaboration. This way, the Information Technology vision of Software as a Service (SaaS) will find its implementation in the field of interoperability among collaborative enterprises, supporting collaborative business forms, from supply chains to business ecosystems, like a utility, the Interoperability Service Utility (ISU). The COIN project will finally develop an original business model based on the SaaS-U (Software as a Service-Utility) paradigm on the base of the open-source COIN service platform.</p>					
FITTEST		Future Internet Testing (FITTEST)			
UNIVERSIDAD POLITECNICA DE VALENCIA					
257574	01/09/2010	36	5850000	Collaborative project (generic)	4000000
<p>The Future Internet will be a complex interconnection of services, applications, content and media, on which our society will become increasingly dependent for critical activities such as public utilities, social services, government, learning, finance, business, as well as entertainment. Consequently, Future Internet applications have to meet high quality demands.</p> <p>Testing is the mostly used quality assurance technique applied in industry. However, the complexity of the technologies involved in the Future Internet makes testing extremely challenging and demands for novel approaches and major advancement in the field.</p>					

<p>The overall aim of the FITTEST project is to address these testing challenges, by developing an integrated environment for automated testing, which can monitor the Future Internet application under test and adapt to the dynamic changes observed.</p> <p>The environment will implement continuous post-release testing to address self-modifiability and run-time adaptation of Future Internet applications. Since services can be dynamically discovered and added, intended use of the application can change after release.</p> <p>The environment will integrate, adapt and automate various techniques for continuous Future Internet testing (e.g. dynamic model inference, model-based testing, log-based diagnosis, oracle learning, combinatorial testing, concurrent testing, regression testing, etc.).</p> <p>The environment will make use of evolutionary search based techniques, to make it possible for the above mentioned techniques to deal with the huge search space associated with the Future Internet testing challenges. In this way, we can address new, emerging or unexpected behaviour that may originate from the dynamism, autonomy and self-adaptation.</p> <p>FITTEST results will be evaluated with case studies using real Internet systems like virtual worlds, social networking, highly scalable service providers and a SaaS enabled CASE tool, that are highly relevant to the Future Internet vision.</p>					
GEYSERS		Generalised architecture for dynamic infrastructure services (GEYSERS)			
INTERROUTE S.P.A.					
248657	01/01/2010	36	10430000	Collaborative project (generic)	7040000
<p>"GEYSERS vision is to qualify optical infrastructure providers and network operators with a new architecture, to enhance their traditional business operations. Optical network infrastructure providers will compose logical infrastructures and rent them out to network operators; network operators will run cost-efficient, dynamic and mission-specific networks by means of integrated control and management techniques. In the GEYSERS concept, high-end IT resources at users' premises are fully integrated with the network services procedures, both at the infrastructure planning and connection provisioning phases. Following this vision, GEYSERS will specify and implement a novel optical network architecture able to support "Optical Network + Any-IT" resource provisioning seamlessly and efficiently. Energy consumption metrics for the end-to-end service routing are part of this efficiency. GEYSERS is proposing to: - Specify and develop mechanisms that allow infrastructure providers to partition their resources (optical network and/or IT), compose specific logical infrastructures and offer them as a service to network operators. This will be done overcoming the current limitations of networks/domain segmentation, and will support dynamic and on-demand changes in the logical infrastructures. - Specify and develop a Network Control Plane for the optical infrastructure, by extending standard solutions (ASON/GMPLS and PCE), able to couple optical network connectivity and IT services automatically and efficiently, and provide them in 1 step, dynamically and on-demand, including infrastructure re-planning mechanisms.</p> <p>These achievements will enable infrastructure providers, network operators and application providers to participate in new business scenarios where complex services with complex attributes and strict bandwidth requirements can be offered economically and efficiently to users and applications. The GEYSERS outcomes will be validated in an EU-wide optical network test-bed."</p>					
MOGENTES		Model-based generation of tests for dependable embedded systems (MOGENTES)			
AUSTRIAN RESEARCH CENTERS GMBH - ARC					
216679	01/01/2008	36	4440000	Collaborative project (generic)	3100000
<p>MOGENTES aims at significantly enhancing testing and verification of dependable embedded systems by means of automated generation of test-cases relying on development of new approaches as well as innovative integration of state-of-the-art techniques. Driven by the needs of its industrial partners, it will address both testing of non-functional issues like reliability, by e.g. system stress and overload tests, and functional safety tests, meeting the requirements of standards such as IEC 61508, ISO WD 26262, or AUTOSAR. MOGENTES will demonstrate that different domains with a wide variety of requirements can significantly benefit from a common model-based approach for achieving automated generation of efficient test-cases and for verifying system safety correctness using formal methods and fault injection, as this approach increases system development productivity while achieving predictable system dependability properties. For</p>					

<p>that purpose, proof-of-concept demonstrations will show the applicability of the developed technologies in two application domains: railway and automotive. In particular, MOGENTES aims at the application of these technologies in large industrial systems, simultaneously enabling application domain experts (with rather little knowledge and experience in usage of formal methods) to use them with minimal learning effort. All in all, MOGENTES will increase knowledge and develop new techniques and tools in the area of verification and validation of dependable embedded systems which can be applied in model-based development processes also by non-experts in formal methods.</p>					
OPEN		Open pervasive environments for migratory interactive services (OPEN)			
CONSIGLIO NAZIONALE DELLE RICERCHE					
216552	01/02/2008	30	4490000	Collaborative project (generic)	2830000
<p>The objective of OPEN is to provide users with migratory interactive services, which enable users to change interaction platform and still continue their tasks through an interface adapted to the new context of use. The benefits of this type of service are multifaceted: migration can be used to improve user experience by switching to a more suitable device (bigger screen, better resources) and/or to a communication channel that can guarantee better Quality of Service (shorter delays, higher bandwidth). In order to address such complex issues there is a need for middleware able to consider and integrate various aspects: adapt and preserve the state of the software application parts dedicated to interacting with end users; support mechanisms for application logic reconfiguration; and identify suitably flexible mechanisms available in the underlying network layers. The resulting middleware should be able to interoperate with existing technologies. Thus, OPEN will aim to offer an intelligent infrastructure able to: provide and coordinate reliable, dynamically changing/reconfiguring services; deliver seamless and transparent support to users in carrying out their tasks when changing available services and/or devices, even in multi-user interactive applications; offer personalised user interaction by exploiting different interaction modalities and network technology. To achieve such goals, we will develop an intelligent middleware solution supporting reconfiguration of both the application logic and the user interface software by means of an infrastructure providing the necessary context information regarding the available devices, connectivity, users. We also plan to apply the middleware solutions developed to a couple of example applications from different domains (business applications and gaming), to demonstrate the feasibility of the approach, the limited effort required of application developers, and its ability to enable new application services.</p>					
PICOS		Privacy and identity management for community services (PICOS)			
JOHANN WOLFGANG GOETHE UNIVERSITAET FRANKFURT AM MAIN					
215056	01/02/2008	36	5950000	Collaborative project (generic)	4000000
<p>With the emergence of services for professional and private on-line collaboration via the Internet, many European citizens spend work and leisure time in on-line communities. Users consciously leave private information; they may also leave personalized traces they are unaware of. PICOS will develop and build a state-of-the-art platform for providing the trust, privacy and identity management aspects of community services and applications on the Internet and in mobile communication networks. The PICOS approach to trustworthy on-line community collaboration addresses these four questions: What are the Trust, Privacy and Identity issues in new context-rich mobile communication services, especially community-supporting services? How can information flows and privacy requirements be balanced in complex distributed service architectures (e.g., mash-ups)? How can these issues be solved in an acceptable, trustworthy, open, scalable, manner? Which supporting services and infrastructures do the stakeholders need? The PICOS consortium includes European industry and research communities. The project will first review contemporary research in relevant disciplines. Its platform design and prototype development work will then create interoperable, open, privacy-respecting identity and trust management tools that can be demonstrated to the public. These will be used to construct community application prototypes by leading industry partners; those will be trialled with selected on-line communities. PICOS will self-evaluate usability, ergonomics, legal issues, trust and</p>					

<p>privacy. Expected PICOS results are:</p> <ul style="list-style-type: none"> - A set of interdisciplinary requirements for trustworthy, privacy-friendly community transactions, - A platform prototype that demonstrates the provision of state-of-the-art privacy and trust technology to community applications, - User-centric trials that validate its applicability, <p>Publications and a final report will disseminate the PICOS results to the public.</p>					
S(O)OS		Service-oriented operating systems (S(O)OS)			
UNIVERSITAET STUTTGART					
248465	01/02/2010	36	3180000	Collaborative project (generic)	2250000
<p>Processor and network architectures are making rapid progress with more and more cores being integrated into single processors and more and more machines getting connected with increasing bandwidth. Processors become heterogeneous and reconfigurable, thus allowing for dynamic adaptation to specialised needs. In future, thousands of billions of devices may be connected to form a single computing unit.</p> <p>No current programming model is able to cope with this development, as they are too tightly coupled with the underlying device structure. Furthermore, complex, non-aligned middlewares and operating systems render the programming model unnecessarily inefficient. In order to realise efficient programmability of terascale devices by experts and average developers equally, a complete new approach to handling these types of devices across all layers is required: The S(o)OS project will address future distributed systems on the level of a holistic operating system architecture by drawing from Service Oriented Architectures and the strength of Grids. This will decouple the OS from the underlying resource infrastructure, thus making execution across an almost unlimited number of varying devices possible, independent from the actual hardware.</p> <p>S(o)OS will allow for automatic distribution of code parts across such a resource fabric by investigating means to execute processes, threads and parallel applications across resources in a way that addresses both code requirements and resource availability, thus improving overall performance.</p> <p>S(o)OS intends to enable even average developers to cope with large, widely distributed infrastructures. The project therefore examines means for run-time code assessment, its segmentation and distribution across the infrastructure. This will range from automated assessment to a powerful extension for experienced developers to specify e.g. communication and relationship requirements.</p>					
SATURN		SysML based modelling, architecture exploration, simulation and synthesis for complex embedded systems (SATURN)			
ARTISAN SOFTWARE TOOLS LIMITED					
216807	01/01/2008	36	3750000	Collaborative project (generic)	2450000
<p>SATURN's goal is to bridge the current gap between modelling and verification/synthesis in UML based designs of Embedded Systems that are equally composed of HW and SW. To do this, the UML profile for MARTE is evaluated for its complementary application with SysML, and significantly improved adding formal semantics of different Models of Computation for integrated modelling and verification environments. By bridging this gap, SATURN expects to demonstrate a significant reduction in time-to-market.</p> <p>This will be delivered through:</p> <ul style="list-style-type: none"> (a) the augmentation of SysML with MARTE, (b) the use of MARTE as a platform to integrate SysML with a run-time environment for cross-domain verification, (c) the automatic generation of implementable descriptions for both hardware (SystemC/VHDL) and embedded software (C/C++) components of the targeted system, and (d) the integration of different abstraction layers allowing seamless integration at functional and target architecture level. <p>Results are validated by two complex industrial proof-of-concept case studies covering a smart camera system and an outdoor broadband wireless telecom system.</p> <p>SATURN combines two SME tool vendors (Artisan and Extessy AG) with leading system houses (Intracom S.A. Telecom Solutions & Thales Security Systems S.A.S). The consortium also</p>					

<p>includes two major European Universities: Paderborn University & University of Cantabria. SATURN enables Artisan to build on its leading position in engineering based UML tools (extending SysML based on Artisan Studio) while Extessy will benefit from the project by increasing their respective market in verification infrastructures. Taking advantage of the open platform of Extessy AG, the SATURN process will be extremely flexible, and integrate with different third party verification tools and implementations. Through contributions to MARTE standardisation, project results will be exploited both during the project and will persist long after the project has completed.</p>					
ACSI		Artifact-Centric Service Interoperation (ACSI)			
IBM ISRAEL - SCIENCE AND TECHNOLOGY LTD					
257593	01/06/2010	36	4700000	Collaborative project (generic)	3240000
<p>Interoperation between electronic services is one of the most challenging and pressing issues in today's increasingly globalized and de-centralized economy. Our proposal tackles this challenge with a unified research program based on two key notions: interoperation hubs, that enable flexible, scalable support for service collaborations in an open network, and dynamic artefacts, that provide an approach to modelling and deploying business processes that simplifies the management of hand-offs of data and process between different services and organizations. The research has three streams: (a) scientific, to develop the new notion of artefact-centric interoperation hub, and a surrounding framework of service coordination, views, evolution, verification, and process mining based on formal and empirical techniques and tools; (b) technology, to develop a substantial prototype for creating and operating these hubs, that integrates the techniques and tools devised by the scientific research stream; and (c) validation, to demonstrate and test the results of the research. The ACSI research program will simplify the creation and maintenance of service collaboration environments as follows: 1. At least 40% reduction, over conventional techniques, in the design and deployment of environments that support large numbers of service collaborations with similar goals 2. At least 20% reduction, over conventional techniques, in the costs of on-boarding into, and maintaining, service collaborations 3. At least 30% reduction in on-going manual activity needed to support typical service collaborations 4. At least 90% of data transformation in service collaborations will be automated ACSI's consortium combines world-class researchers in all of the key technical areas needed for this research, including experts on artefact-centric business processes, verification, data integration and ontologies, process mining, services architectures, and business process management.</p>					
ALIVE		Coordination, organisation and model driven approaches for dynamic, flexible, robust software and services engineering (ALIVE)			
UNIVERSITAT POLITECNICA DE CATALUNYA					
215890	01/02/2008	30	3770000	Collaborative project (generic)	2810000
<p>New generations of networked applications based on the notion of software services that can be dynamically deployed, adjusted and composed will make it possible to create radically new types of software systems. In turn, this will require profound changes in the way in which software systems are designed, deployed and managed exchanging existing, primarily top-down "design in isolation" engineering, to new approaches which are based on integrating new functionalities and behaviours into existing running systems of already active, distributed and interdependent processes.</p> <p>The ALIVE project is based around the central idea that many of the strategies used today to organise the vastly complex interdependencies found in human social, economic behaviour will be essential to structuring future service based software systems. More specifically the project aims to combine cutting edge Coordination and Organisation mechanisms (providing flexible, high-level means to model the structure of interactions between services in the environment) and Model Driven Design (providing for automated transformations from models into multiple target platforms) to create a framework for software and services engineering for "live" open systems of active services.</p> <p>The project will:</p> <ol style="list-style-type: none"> 1) develop an advanced framework for application development, deployment and management in service environments, 					

<p>2) develop new engineering techniques and tools 3) develop a methodology for dynamic, "live" service design and maintenance, and 4) layer the framework directly on emerging architectures and toolkits for service oriented and web services systems.</p> <p>Results will be delivered in an open content and open source manner in order to foster take-up, reuse and to support ongoing research in the domain. The project also includes three challenging case studies from the domains of information services for citizens, mobile device applications and crisis management.</p>					
ANIKETOS		Secure and Trustworthy Composite Services (ANIKETOS)			
STIFTELSEN SINTEF					
257930	01/08/2010	42	14050000	Collaborative project (generic)	9600000
<p>The Future Internet will provide an environment in which a diverse range of services are offered by a diverse range of suppliers, and users are likely to unknowingly invoke underlying services in a dynamic and ad hoc manner. Moving from today's static services, we will see service consumers that transparently mix and match service components depending on service availability, quality, price and security attributes. Thus, the applications end users see may be composed of multiple services from many different providers, and the end user may have little in the way of guarantee that a particular service or service supplier will actually offer the security claimed.</p> <p>ANIKETOS will help establish and maintain trustworthiness and secure behaviour in a constantly changing service environment. The project will align existing and develop new technology, methods, tools and security services that support the design-time creation and run-time dynamic behaviour of composite services, addressing service developers, service providers and service end users.</p> <p>ANIKETOS will provide methods for analysing, solving, and sharing information on how new threats and vulnerabilities can be mitigated. A platform will be constructed for creating and maintaining secure and trusted composite services. Specifications, best practices, standards and certification work related to security and trust of composite services will be promoted for inclusion in European reference architectures. Our approach to achieving trustworthiness and security of adaptive services will take account of socio-technical aspects as well as basic technical issues. The consortium consists of large industrial and research players in the field, including end user partners with specific domain competence related to three case studies planned in the project. The project duration will be 42 months with an overall budget of 13.9 M and a grant of 9.6 M.</p>					
ASSERT4SOA		Advanced Security Service cERTificate for SOA (ASSERT4SOA)			
SAP AG					
257351	01/10/2010	36	5140000	Collaborative project (generic)	3400000
<p>The term certification has several different meanings in ICT. Software practitioners can earn a certificate for expertise in a certain hardware or software technology. The maturity of crucial IT processes, such as software development, can be and is often certified. Even individual software systems can be certified as having particular non-functional properties, including safety, security or privacy. However, the latter type of certification (e.g. Common Criteria) has had only a limited use to this day. Current trends in the IT industry suggest that software systems in the future will be very different from their counterparts today, due to greater adoption of Service-Oriented Architectures (SOAs) and the wider spread of the deployment of Software-as-a-Service (SaaS). These trends point to large-scale, heterogeneous ICT infrastructures hosting applications that are dynamically built from loosely-coupled, well-separated services, where key non-functional properties like security, privacy, and reliability will be of increased and critical importance. In such scenarios, certifying software properties will be crucial. Current certification schemes, however, are either insufficient in addressing the needs of such scenarios or not applicable at all and thus, they cannot be used to support and automate run-time security assessment. As a result, today's certification schemes simply do not provide, from an end-user perspective, a reliable way to assess the trustworthiness of a composite applications in the context where (and at the time when) it will be actually executed. ASSERT4SOA will fill this gap by producing novel techniques and tools fully integrated within the SOA lifecycle for expressing, assessing and certifying security properties for complex service-oriented applications, composed of distributed software services</p>					

that may dynamically be selected, assembled and replaced, and running within complex and continuously evolving software ecosystems.					
AVANTSSAR	Automated validation of trust and security of service-oriented architectures (AVANTSSAR)				
UNIVERSITA DEGLI STUDI DI VERONA					
216471	01/01/2008	36	6070000	Collaborative project (generic)	3800000
<p>Driven by rapidly changing requirements and business needs, IT systems and applications are undergoing a paradigm shift: components are replaced by services, distributed over the network, and composed and reconfigured dynamically in a demand-driven way into service-oriented architectures. Exposing services in future network infrastructures entails a wide range of trust and security issues. Solving them is extremely hard since making the service components trustworthy is not sufficient: composing services leads to new subtle and dangerous vulnerabilities due to interference between component services and policies, the shared communication layer, and application functionality. Thus, one needs validation of both the service components and their composition into secure service architectures. AVANTSSAR proposes a rigorous technology for the formal specification and Automated Validation of Trust and Security of Service-oriented Architectures. This technology will be automated into an integrated toolset, the AVANTSSAR Validation Platform, tuned on relevant industrial case studies.</p> <p>The project will develop:</p> <ul style="list-style-type: none"> - ASLan, the first formal language for specifying trust and security properties of services, their associated policies, and their composition into service architectures. - Automated techniques to reason about services, their dynamic composition, and their associated security policies into secure service architectures. - The AVANTSSAR Validation Platform, an automated toolset for validating trust and security aspects of service-oriented architectures. - A library of validated composed services and service architectures, proving that our technology scales to envisaged applications. <p>Migrating project results to industry and standardization organizations will speed up the development of new network and service infrastructures, enhance their security and robustness, and increase the public acceptance of emerging IT systems and applications based on them.</p>					
BONFIRE	Building service testbeds on FIRE (BONFIRE)				
ATOS ORIGIN SOCIEDAD ANONIMA ESPANOLA					
257386	01/06/2010	42	8560000	Collaborative project (generic)	6700000
<p>BonFIRE will design, build and operate a multi-site Cloud prototype FIRE facility to support research across applications, services and systems at all stages of the R&D lifecycle, targeting the services research community on Future Internet.</p> <p>The BonFIRE vision is to give researchers in these areas access to a facility that supports large scale multi-disciplinary experimentation of their systems and applications addressing all aspects of research across all layers. We will develop and support a framework which allows service-based computing practitioners to experiment with their latest ideas in service orientation and distributed computing. We have elaborated 3 usage scenarios. Our overall goal is to encourage new communities of experimenters to take advantage of the opportunities offered by the FIRE infrastructure to guide the development of the Future Internet from a service-based applications standpoint.</p> <p>The facility will be demand-driven, open, standards-based and dynamic. It will provide additional functionality to that currently available. It will adopt the principle of "open coordinated federation of test-beds"; and will provide innovative usage scenarios.</p> <p>We will stimulate research through 2 open calls to establish a methodology of experimentally driven research. The facility shall be open not only to the researchers selected and funded by BonFIRE through the open calls but also to a wider researcher community in order to encourage the usage and involvement of a significant number of end users.</p> <p>We have set the ambitious target of having an initial framework in operation by month 9. This will be followed by periodic updates which will enhance the functionality of BonFIRE in response to user requirements. We aim to make the test-bed sustainable after the end of the project by studying possible associated business models and by balancing the short- and long-term interests</p>					

of all interested parties (users, owners, policy makers etc) in business decision-making.					
CHOREOS		Large Scale Choreographies for the Future Internet (CHOREOS)			
THALES COMMUNICATIONS SA					
257178	01/10/2010	36	8670000	Collaborative project (generic)	6380000
<p>The CHOReOS project positions itself in the context of the Ultra-Large-Scale (ULS) Future Internet of software services. To address the challenges inherent of ULS as well as other key requirements of the Future Internet, such as fusion of the user/developer/system roles, adaptability and QoS-awareness, to name a few, CHOReOS revisits the concept of choreography-based service composition in service-oriented systems.</p> <p>CHOReOS introduces a dynamic development process, and associated methods, tools and middleware sustaining the ever-adaptable composition of services by domain experts being the users of business choreographies in the Future Internet. CHOReOS concepts then encompass formally grounded abstractions and models, dynamic choreography-centric development process, governance and service-oriented middleware, thus providing an Integrated Development & Runtime Environment (IDRE) aimed at overcoming the ULS impact on software system development.</p> <p>Formally grounded abstractions and models enable reasoning about the properties, both functional and non-functional, of ULS choreographies. Dynamic choreography-centric development process allows the fusion of the user/developer/system roles, while managing the ULS service base, and supports the synthesis of scalable and adaptable choreographies. Governance includes service integration policies and rules, as well as tools for dynamic verification & validation of choreographies.</p> <p>Finally, service-oriented middleware enables adaptable choreographies over ESB-based middleware, Grids, Clouds, and technologies for the Internet of Things, thus overcoming scalability and heterogeneity issues of the Future Internet. Last but not least, CHOReOS assesses the industrial exploitation of this choreography-centric vision by experimenting on three demanding use cases in different domains (passenger-friendly airport, mobile-enabled coordination of people, vehicular network) and by carrying out a study of social-technical factors.</p>					
CUMULONIMBO		A Highly Scalable Transactional Multi-Tier Platform as a Service (CUMULONIMBO)			
UNIVERSIDAD POLITECNICA DE MADRID					
257993	01/10/2010	36	4720000	Collaborative project (generic)	2990000
<p>The next generation of Platforms as a Service (PaaS) for cloud providers demand consistency, availability, and simpler programming abstractions, such as transactional consistency. Obtaining these three properties simultaneously is, however, a significant challenge. In CumuloNimbo, we propose to achieve this goal by building a stackable and modular execution platform that can be installed as a service and provides the same degree of consistency as current service-oriented platforms, however, at much higher, Internet-level, scale. Current PaaS systems sacrifice data consistency for scalability, thus increasing the complexity of building applications on top of such platforms when strong consistency guarantees are necessary.</p> <p>Providing such guarantees at the application level requires hiring highly-skilled programmers, which is often costly and prohibitive, especially for SMEs. As a result, many newly developed applications are unable to guarantee consistency appropriately, which quickly becomes visible to end users as flaws in the application.</p> <p>CumuloNimbo will develop a new Platform as a Service that will provide high scalability, at the 100+ service-nodes level, without sacrificing data consistency and simple programming abstractions. The targeted PaaS will be a transactional multi-tier software stack for cloud computing providing the same functionality to current, software multi-tier stacks, such as Java EE. Providing scalability without sacrificing consistency is a major breakthrough that will enable European stakeholders in service platforms to position in the cloud computing market with a competitive advantage.</p>					
EBBITS		Enabling business-based Internet of Things and Services - An Interoperability platform for a real-world populated Internet of Things domain (EBBITS)			
FRAUNHOFER-GESELLSCHAFT ZUR FOERDERUNG DER ANGEWANDTEN FORSCHUNG					

E.V					
257852	01/09/2010	48	12020000	Collaborative project (generic)	8390000
<p>The ebbits project aims to develop architecture, technologies and processes, which allow businesses to semantically integrate the Internet of Things into mainstream enterprise systems and support interoperable real-world, on-line end-to-end business applications. It will provide semantic resolution to the IoT and hence present a bridge between enterprise applications, people, services and the physical world, using information generated by tags, sensors, and other devices and performing actions on the real-world.</p> <p>The ebbits platform will support interoperable business applications with context-aware processing of data separated in time and space, information and real-world events (addressing tags, sensor and actuators as services), people and workflows (operator and maintenance crews), optimisation using business rules (energy and cost performance criteria), end-to-end business processes (traceability, life-cycle management), or comprehensive consumer demands (product authentication, trustworthy information, and knowledge sharing).</p> <p>The Intrepid platform will feature a Service oriented Architecture based on open protocols and middleware, transforming every subsystem or device into a web service with semantic resolution. The ebbits platform thus enables the convergence of the Future Internet into the</p>					
FORWARD		Managing emerging threats in ICT Infrastructures (FORWARD)			
TECHNISCHE UNIVERSITAET WIEN					
216331	01/01/2008	24	889950	Coordination and support actions	889950
<p>The aim of the coordination action FORWARD is to promote collaboration and partnership between researchers from academia and industry involved in the protection of ICT infrastructures against cyber-threats such as malicious code (viruses, botnets, and spyware), spam, and phishing. The goal is to identify, network, and coordinate the multiple research efforts that are underway in these areas and leveraging these efforts with other activities to build secure and trusted ICT systems and infrastructures.</p> <p>The main objectives of this project are to:</p> <ul style="list-style-type: none"> - Establish working groups to discuss best practices, progress and priorities, setting the research agendas to be pursued in Europe and identify possible new research areas and threats that need to be address. - Set up an online platform for regularly assessing and reviewing the evolution of the threat landscape and the state of the art in threat detection and prevention techniques. - Organize workshops with relevant groups of experts from industry and academia but also with policy makers for discussing and presenting the emerging threat landscape, the ongoing research in answer to these threats, and recommended actions to be taken in partnership with industry and governments. - Leverage the findings of individual working groups to describe scenarios in which adversaries use a combination of attacks to threaten the security and disrupt the lives of the people in the European Union. <p>The core consortium consists of six leading academic institutions that are well recognized for their broad expertise in different areas of systems security and ICT threat defence. To ensure industrial participation, this core consortium is complemented by an industrial board that provides a platform for players from industry to contribute to the project. For this board, we won representatives of twelve companies that endorse FORWARD and its goals, as well as assert their willingness to serve on the industrial board.</p>					
INDENICA		INDENICA - Engineering Virtual Domain-Specific Service Platforms (INDENICA)			
SAP AG					
257483	01/10/2010	36	6160000	Collaborative project (generic)	3770000
<p>Service-oriented computing has attracted significant attention over recent years. While this innovative approach provides enormous potential for software development in an open, networked environment, the very different constraints and quality concerns in different domains have so far led to a heterogeneous landscape of service platforms.</p> <p>While a single integrated platform would be highly desirable, the domain-specific constraints in</p>					

areas like factory automation, business information systems or telecommunication are much too diverse, leading to the need for specialized, domain-specific service platforms. Already now a plethora of different service platforms are available. This fragmentation, however, effectively slows the emergence of a full service ecosystem. In order to fulfill the vision of an integrated platform ecosystem, the various platforms must be made interoperable.

The INDENICA project will address these challenges in an explicit and integrated way. It will provide a development method, infrastructure components and tools that support the efficient derivation of specialized, domain-specific service platforms. By deriving these platforms from common infrastructures, we will combine optimal adaptation of the service platform to domain-specific constraints with easy and fast development. At the same time, the resulting platforms will be interoperable by design. This allows integrating arbitrary INDENICA service platforms at any time into a virtual domain-specific service platform. The integrated platforms will act from an application point of view as a single platform, enabling transparent multi-platform deployment and comprehensive QoS management. On the technical side INDENICA will use Product Line Techniques (compositional and generative techniques) to provide an efficient approach for the derivation of the domain-specific platforms.

INDENICA results will be systematically validated using an integrated multi-domain use case. This use case integrates components from the relevant areas of the industrial partners and provides a demonstration for the strong integration capabilities of INDENICA platforms.

ITSY	IT[t] Simply Works (ITSY)
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UNIVERSITAET POTSDAM

258058	01/06/2010	12	131760	Coordination and support actions	117000
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The primary goal of the proposed effort is to generate a set of innovative research topics on the notion of simplicity as a driving paradigm in ICT development, maintenance and use. We believe that the philosophy of simplicity is strategically important, yet poorly understood, and rarely systematically applied. Instead, design principles attempt to focus on increased functionality within thinly disguised complexity, often at the expense of life cycle costs and total cost of ownership issues (e.g., training, system malfunctions, system upgrades).

Often designers are unaware of the tradeoffs and impacts. With the increased use of ICT in such socially critical areas such as healthcare, society can no longer afford systems that do not perform as specified. We believe that an understanding of simplicity is the key. Simplicity is foundational, its essence fundamental to many desired characteristics of ICT systems such as reliability, usability and trust. Thus, we believe that knowledge gained through research on simplicity can provide the EU a sustainable competitive advantage. To gain this knowledge we must ask the right questions, we must develop the proper research directions. To do so, the IT Simply Works team will organise a set of multidisciplinary experts to assist in surveying key research communities about their understandings and vision of the philosophy of simplicity.

Only through such a multidisciplinary approach can we hope to achieve a basic and yet thorough understanding of the important issues to be addressed. The results of this effort will be presented in a final report elaborating the vision of simplicity in ICT and proposing topics, initiatives and modalities for future-directed foundational research and its transformation for benefitting Europe's citizens, businesses, industry and governments.

M:CIUDAD	A metropolis of ubiquitous services (M:CIUDAD)
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FUNDACION ROBOTIKER

215007	01/12/2007	36	3970000	Collaborative project (generic)	2640000
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Imagine what kind of applications become possible when our mobile devices not only present data but provide valuable information to other users. Suppose that you are able to create instant services with information, contents and knowledge with your mobile device and in your mobile device. And suppose that this knowledge can be used remotely by other users in a simple way, with their mobile and portable equipment. And now, imagine the amount of available knowledge of those services. Millions or perhaps billions of potential sources with valuable information: constantly updated, relevant to our instant interests and context aware information.

So, what are the required tools to let each user to become a service provider with a mobile device? In which way should the mobile platform behave to make it simple to use and efficient?

How to reach to this type of distributed, volatile type of services and their associated knowledge or

information? And, how to exploit businesses with that? User-friendly creation tools in the mobile, optimised execution environment, a model for knowledge warehouse, a proposed specific searching engine and a set of business models for users, for service providers and for third parties. This is m: Ciudad's scope.						
OPTIMIS		Optimized Infrastructure Services (OPTIMIS)				
ATOS ORIGIN SOCIEDAD ANONIMA ESPANOLA						
257115	01/06/2010	36	10370000	Collaborative project (generic)	7130000	
<p>With the challenges of service and infrastructure providers as the point of departure, OPTIMIS focuses on open, scalable and dependable service platforms and architectures that allow flexible and dynamic provision of advanced services.</p> <p>The OPTIMIS innovations can be summarized as a combination of technologies to create a dependable ecosystem of providers and consumers that will be the foundation of an efficacious operation of services and infrastructures. This includes innovations for optimizing the whole service lifecycle, starting from service construction. Trust, risk, eco-efficiency and cost are all crucial for optimizing deployment and execution, capturing the essence of the optimized cloud ecosystem produced by the trust on consumers and providers and the risk of not accomplishing specific ecological or economical goals. Adaptive self-preservation is key to meet predicted and unforeseen changes in resource requirements. Identification of new market roles and value activities calls for new business models and investigations of legal and regulatory aspects for governing cloud operation.</p> <p>Part of the OPTIMIS outcome will be architectures, an open specification, and a software toolkit for provisioning of sustainable IT services capable of satisfying key societal and economical needs. OPTIMIS will support the requirements of a variety of scenarios central to the next generation cloud service ecosystem by providing a toolkit with a set of key tools accompanied by reference architectures illustrating their use in a few scenarios of broad interest. The scenarios in focus are (1) service providers utilizing cloud bursting to complement local capacity for peak loads, (2) service providers making use of multiple clouds, and (3) infrastructure providers subcontracting resources in a cloud federation. A core of the OPTIMIS Toolkit is the OPTIMIS Base Toolkit comprising tools for assessing and managing aspects of trust, risk, eco-efficiency, and cost.</p> <p>By addressing the whole service lifecycle, taking into account the multitude of future cloud architectures, and a by taking a holistic approach to sustainable service provisioning, OPTIMIS provides a revolutionizing foundation for a reliable, sustainable, and trustful cloud market.</p>						
PROTEST		Property-based Testing (PROTEST)				
THE UNIVERSITY OF SHEFFIELD						
215868	01/05/2008	36	3730000	No contract type	2710000	
<p>This project will develop software engineering approaches to improve reliability in Pervasive and Trusted Network and Service Infrastructures (ICT-2007.1.2). This is achieved today by extensive testing, combined with monitoring and logging in the field. Volumes of automated tests and logging code are written, failures must be analysed and diagnosed and this accounts typically for half the cost of software. Even so, residual errors impose high costs on users.</p> <p>We aim to automate much fault finding and diagnosis, reducing its cost and improving effectiveness, based on properties of the system (specified by developers) which should always hold. Automated tools will generate and run tests, monitor execution at run-time, and log events for post-mortem analysis. When properties fail, the tools will search for simplest failing cases, and analyse trace and coverage information, to assist speedy diagnosis. Concurrency is a major challenge, which will be addressed in part by integrating model checking into our tools.</p> <p>Today's developers are not used to formulating general properties, so we will investigate ways of deriving them from two sources: UML (or UML-like) models, and by re-factoring existing test suites.</p> <p>We combine academic expertise in re-factoring, model checking and testing; a tool vendor; and industrial expertise in telecoms. Three partners are SMEs, Ericsson is a leading telecoms supplier. All use Erlang, an open-source concurrent functional language aimed at telecoms and Internet servers, which will be a common vehicle for our research' easing the transfer of theory into industrial practice. Erlang's good interoperability will enable our tools to find faults in all kinds of systems.</p>						



Public



Our results will improve our tool vendor's products, be adopted by our partners within Ericsson and Lambda-stream, and be disseminated by ETC to their customers throughout Europe's telecoms sector. This three-pronged strategy will guarantee real impact.