



# PROJECT FINAL REPORT

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# 1. Final publishable summary report

## 1.1 *The challenge*

Computing is entering a new era that brings revolutionary changes at many levels, including infrastructure, hardware, middleware, and end-user software. Rapidly advancing ICT trends such as service orientation, smart mobile devices, cloud computing, sensor networks, user-generated content and the Semantic Web transform the Internet into a global platform of knowledge and services. A major challenge in this context is to set up an initiative that coordinates and supports ongoing research and development efforts in the area of Software and Services, specifically those that utilize semantic technologies, towards the realization of this vision of the future Internet of Services.

Since rapid advancement from various fields of ICT necessitates high-level coordination in order to optimally combine research and development results into eventual cross-domain solutions, the Service Web 3.0 project was challenged to provide: vision and leadership through coordinated research activities, professional forums and channels of dissemination, and community networking infrastructure and support to these means.

## 1.2 *Addressing the challenge: the project's proposition*

Service Web 3.0 addresses this challenge through a comprehensive, sustainable program encompassing research coordination and alignment, dissemination and awareness raising, community building and networking activities. In particular, Service Web 3.0 plays a pertinent role in the collaborative effort initiated by the European Commission to design and develop the scientific and technological building blocks for the next generation of the Internet, known as the Future Internet.

The visionary leadership role of the Service Web 3.0 project formalized through prestigious positions held by senior members of the consortium - such as Future Internet caretaker, conference chair and organizer, standardization technical group and working group chair, as well as steering chair for several other initiatives listed in Section 2 - which in concert with three roadmapping workshops lead to the publication of several roadmaps and collections of roadmaps focusing on future development and adoption of networked services and semantic technologies. The successful establishment of the Future Internet Symposium, and the organization of several academic and industrial conferences (e.g the European Semantic Web Conference and the European Semantic Technology Conference) stand as highlights in reviewing Service Web 3.0's provision of professional forums and channels of dissemination. Finally, the project's sustainable community networking infrastructure and support efforts are most visible in the established Future Internet Interest Group, the Semantic Technology Forum Facebook group, the semantic technology YouTube channel broadcasting the Future Internet: Service Web 3.0 video, and the establishment of the STI Symposium, to be hosted yearly as a international community forum for showcasing achievements and establishing beneficial relationships with fellow researchers and developers in the field of semantic technologies.

## 1.3 *Who can benefit from Service Web 3.0*

Service Web 3.0 targets various audiences, both academia and industry. The community around the Future Internet Assembly, in particular the organizations interested in the Internet of Services, has taken up the results of the project, including the research roadmaps on semantic and services technologies, the promotional Future Internet video, the conferences, workshops and symposia established and organized by Service Web 3.0, or the books authored or edited by project partners. Other communities (e.g., semantic technologies) have leveraged Service Web 3.0 to reach out to potential application areas, such as service-oriented computing.

The success of the Service Web 3.0 video, particularly the generally informative nature of the 6 minute mix of animation and expert interviews, helped broaden the targeted audience of the projects dissemination activities. The video was placed on YouTube in October 2009 and as of March 25, 2010, the YouTube “Relevance” based search ranked the “The Future Internet: Service Web 3.0” video as 1st for “Internet of Services,” 2nd for “Future Internet,” and for “Web 3.0,” with views totalling to 16,386. The video was also shown at several conferences and events throughout the past year, such as the 9th International Conference on Knowledge Management and Knowledge Technologies (iKnow 2009), the 1st SWS Winter Retreat 2009, the 2nd STI Offsite 2009, and the 2009 Dagstuhl seminar entitled, “Perspectives Workshop: Semantic Web Reflections and Future Directions.” Academic and media organizations alike used the video for various educational and promotional purposes, from the Fraunhofer Institute for Applied Information Technology to the Miami Lakes Educational Center, or companies such as Planner Digital or Video Report Canarias.

To support the diverse community of viewers, measures to ensure beneficial impact included 1) the creation of the Future Internet Interest Group, which keep its members abreast of upcoming events and activities that are of relevance to the work of the Services Architecture working group of the FI initiative; 2) the Service Web 3.0: Services in Industry & Semantics in Services survey; and 3) the wide spread distribution of the Service Web 3.0 public roadmap.

Although the successful video unexpectedly increased the range of those impacted by the project, supporting the scientific community remained the primary objective of the project. The results of the survey contributed towards two specialized roadmaps of the same titles, as well as several other publications, whereby the targeted readers were active members of the scientific community. To compliment the roadmaps, Service Web 3.0 was extremely active in providing the scientific community with several active working groups and major international conferences and events where members of the community were able to collaborate with one another and report on recent research and development achievements.

Further efforts to ensure benefit from the project’s work on the regional level were also successful. National group initiatives have been formed—e.g. the UK-Future Internet Strategy Group (UK-FISG) which has been established by the Technology Strategy Board and its Digital Communications Knowledge Transfer Network<sup>8</sup>, with endorsement from the UK Government Department of Business Innovation and Skills and the Engineering and Physical Sciences Research Council (EPSRC). The UK-FISG will host a workshop on the topic of the Future Internet, at which Service Web 3.0 will participate through one of its partners. Service Web 3.0 has also been instrumental in setting up a national initiative in Austria: FI Austria.

## **1.4 The results**

The Service Web 3.0 results include:

### *1. Development of a general roadmap on the role of semantic technologies on the Future Internet;*

The roadmap surveys the main challenges to be addressed in the core cross-domain areas identified within the Future Internet Assembly working groups established in 2008 as an initiative of the European Commission. The focus thereof is twofold: on the one hand the Internet of Services, as primary area of the Service Web 3.0, and semantic technologies and their potential to support various aspects of the Future Internet, notably the Internet of Services, at every level. Within the underlying network (based on fixed lines, wireless or mobile phone infrastructures) semantics can support the automatic detection of faults and malignant attacks through the matching of data patterns within a network against template descriptions. Additionally, semantics-based reasoning can support

automatic repair or network reconfiguration (around a damaged network segment). In the context of the Global Service Delivery Platform semantics enables robust and scalable interoperability. This applies at several levels: i) service interoperability to provide an automated capability to integrate stand-alone services with services which are similar or complementary, for instance from a related business domain; ii) data interoperability, so as to provide the automated understanding of the information exchanged and ensure the overall quality of the service; (iii) interoperability of the service layer with the network and application layers of different providers. In addition to providing unambiguous descriptions, at different levels of abstraction, we can semantically describe mechanisms for solving interoperability supporting their reuse. In addition, semantic descriptions of content, users and devices will be utilized by semantic reasoners to find, adapt and compose relevant provisioned services dynamically. This applies for a wide spectrum of areas, from Internet of the Things to Content Networks or Virtual Worlds.

The conclusion of the Future Internet roadmap provides a general overview of the cross-domain challenges which are currently under investigation in the working groups of the Future Internet Assembly. Finding solutions to these challenges is essential if a successful Future Internet is to emerge. Each of these challenges is described in a dedicated section that analyzes the state of the art, proposes solutions on how to overcome the major problems, and elaborates on the role of semantic technologies in the resolution of these problems.

The roadmap is targeted at scientists and engineers doing cross-domain, interdisciplinary research related to the Future Internet, IT developers, managers and evangelists analyzing the potential of semantic technologies as robust and scalable instrument to realize interoperability at various levels, and finally, at the general public with reasonable technical knowledge interested in the future IT-driven development of life, businesses and society in the 21st century.

The roadmap is accompanied by the Service Web 3.0 movie with the goal of promoting ongoing European efforts and attracting interest and awareness from beyond the academic community for contributing to the definition and realization of the theoretical, technological and socio-economic components of the Future Internet.

## *2. Development of specialized roadmaps focusing on service-oriented computing for the industry, and on semantic technologies, respectively;*

*Specialized Roadmap for Services in Industry* - The specialised roadmap Services in Industry anticipates the future emergence of an Internet of Services, and seeks to forecast the technological developments associated with a Global Service Delivery Platform in which we believe semantic technologies will help overcome many current barriers to realization. This combination of semantics and SOA technology will create what we call a —Service Web□ in which billions of parties consume billions of services seamlessly and transparently. This document is intended to provide readers with an insight into the potential adoption of service technologies and commercial exploitation of the new possibilities the Service Web will provide to society and private enterprise.

*Specialized Roadmap for Semantic Technologies* - Following the Service Web 3.0 roadmap for Future Internet, we turned to the semantic technology roadmap, concentrating on predicting the expected developments in semantic technologies over the next 15 years.

Looking back over the past 15 years, few would have predicted the impact of the Internet to our daily lives. Internet technologies have effected a major transformation and spurred innovations in many other technologies and sciences. This transformation has been achieved by tearing apart prior frictions in communication and information exchange. Semantic technologies are on the cusp of becoming mainstream technologies and promise to remove many of the remaining frictions in communication and information exchange.

Wondering about what the impact of semantic technologies in the near and not so far future would be, STI International invited world-leading experts in semantic technologies to a number of roadmapping workshops in 2008 and 2009 to discuss questions such as:

1. Which set of major transformations can we expect from semantic technologies?
2. What is the role of semantic technology in responding to large societal challenges?
3. Which new application areas could emerge from the fusion of semantics with other technologies and sciences?
4. Which technologies come next?

The first workshop was held at the "Österreichische Computer Gesellschaft (OCG)" in Vienna, Austria. Its focus was on semantic technologies in the next 5 years, i.e. by 2014. The second Semantic Technology Roadmap workshop was held at the IHK Haus der Wirtschaft Karlsruhe GmbH, in Karlsruhe, Germany. Its focus was on semantic technologies in 10 years from now, i.e. by 2019. A group of invited experts on semantic technology presented their personal visions. The third Semantic Technology Roadmap workshop was during the European Semantic Web Conference (ESWC) 2009, in Heraklion, Greece. It opened the discussion to the wider international semantics research and application community under the subtitle "How will semantic technologies be used in 2024?"

Based on the expert input from these workshops, we were able to present the vision of the semantic technology community for the development of the technology over the next 15 years. To create the roadmap, we followed a staged approach. The three workshops are intended to gather a wide array of input from members of the semantics community (from within STI International), distinguished experts as well as the wider semantics community. All participants were invited to pitch their vision of the future in a 15 minutes presentation with the audience taking note of the most compelling arguments. These notes were then brought together and clustered among application areas and enabling technologies, evolving into a shared vision of the future and fully enfold its potential to create powerful expectations of emerging technologies and mobilize the resources necessary for their realization.

### *3. Authoring and editing of reference publications, most notably books on the Future Internet, Semantic Web Services and semantic technologies;*

Major reference publications from the Service Web 3.0 project involvement and support include (1) "Towards the Future Internet – A European Research Perspective", the Future Internet Assembly book published in 2009 and distributed at the Future Internet Conference in Prague, (2) "Towards the Future Internet – Emerging Trends from European Research", the Future Internet Assembly book to be published and distributed in April 2010 at the 5th Future Internet Assembly in Valencia, (3) Semantic Web Services Handbook and (4) Handbook of Semantic Web Technologies.

The previously mentioned books are meant as dissemination channel for publishing Service Web 3.0 results. They represent just one of the many dissemination channels used within the project. Other channels of course include the publication of roadmaps discussed above, and the organized events, video distribution, and community building activities listed below.

### *4. Organization and support for 14 conferences, 14 workshops, 3 tutorials, 5 summer and winter schools, 10 keynote and invited talks, and 3 forums and special sessions on Future Internet related topics;*

The comprehensive list can be found in Section 2. Here we list a short description of 2 major conferences established or supported by Service Web 3.0:

*International Conference on Business Information Systems (BIS)* - The International Conference on Business Information Systems is organized since 1997 and by now, is a well-respected event. It is one out of four most important conferences in Europe regarding information systems.

The BIS conference aims to help exchange knowledge between scientific communities, people involved in the development of business IT applications and consultants helping to properly

implement computer technology and applications in the industry. The BIS conference offers possibilities to discuss the up-to-date research concerning the wide range of the development, implementation, application and improvement of business applications and systems.

Each BIS conference has different theme, which distinguish each edition. The theme of the 11th International Conference on Business Information Systems (BIS 2008) – “Business processes and social contexts - reaching beyond the enterprise” -- reflected recent developments in provision of services over the Web and efforts in utilizing social phenomena of blogs, wikis, and folksonomies by enterprises and public administrations. The conference was a forum for the exchange and dissemination of topical research in the development, implementation, application and improvement of computer systems for business processes.

Main theme of the conference in 2009 was "Information Systems for Agile Organizations". The theme reflected recent tendencies in making organizations more responsive to external conditions. On the one hand, improved methods for better data and information management are used. On the other hand, flexible information systems are developed. In both areas semantic technologies are heavily exploited. They allow to bridge various dimensions: personal, social, mobile, organizational and content-related. They relate internal data and external information. Finally, when applied to area of business processes, they permit to extend collaboration between organizations. All of these phenomena move forward the development of flexible business information systems.

BIS 2010 will take place in Berlin, Germany

*Future Internet Symposium* - The 1st Future Internet Symposium (FIS 2008) was held in Vienna, Austria. The symposium deals with the main requirements, which Future Internet must satisfy:

- an Internet of Things, where every mobile and stationary electronic device will be an active participant in the network;
- an Internet of Services, where applications live in the network, and data becomes an active entity;
- an Internet of Content & Media, where most of the contents are generated by end-users;
- an Internet of Publicity, Privacy and Anonymity, where people and software must understand how much trust to extend to others;
- an Internet of Mobility and Ubiquity, where connectivity everywhere is expected, and depended upon.

All these growing Internets, and the others that we have yet to imagine, require further research, especially at the interdisciplinary boundaries where opportunities as well as problems lie.

The first event attracted many practitioners and theorists from all over the Europe. Three days of symposium were packed with three technical sessions accompanied by keynote speeches conducted by the top researches in the area, series of workshops and tutorials.

Following the highly successful first symposium in 2008, the 2nd Future Internet Symposium (FIS 2009) was organized in Berlin, Germany. It was a multidisciplinary forum that sought to integrate research and researchers from all facets of the Internet enterprise. During three days of symposium participants had an opportunity to attend presentations of conference papers arranged in 3 sessions accompanied by keynote speeches performed by leader researched in the area of future Internet, series of workshops and tutorials.

FIS 2010 will also take place in Berlin, Germany.

*5. Development of promotion and information material comprising 6 scientific publications, and of the “The Future Internet Video”, in order to raise awareness, to encourage technology adoption, and to support community building;*

The successful video and subsequent community building activities can be observed on several levels, from the impact on the general public as already discussed in Section 1.3 and summarized in the YouTube screenshot displayed in the graphic below, to the impact on, and support of, the scientific community, also discussed in Section 1.3 and elaborated in further points below.

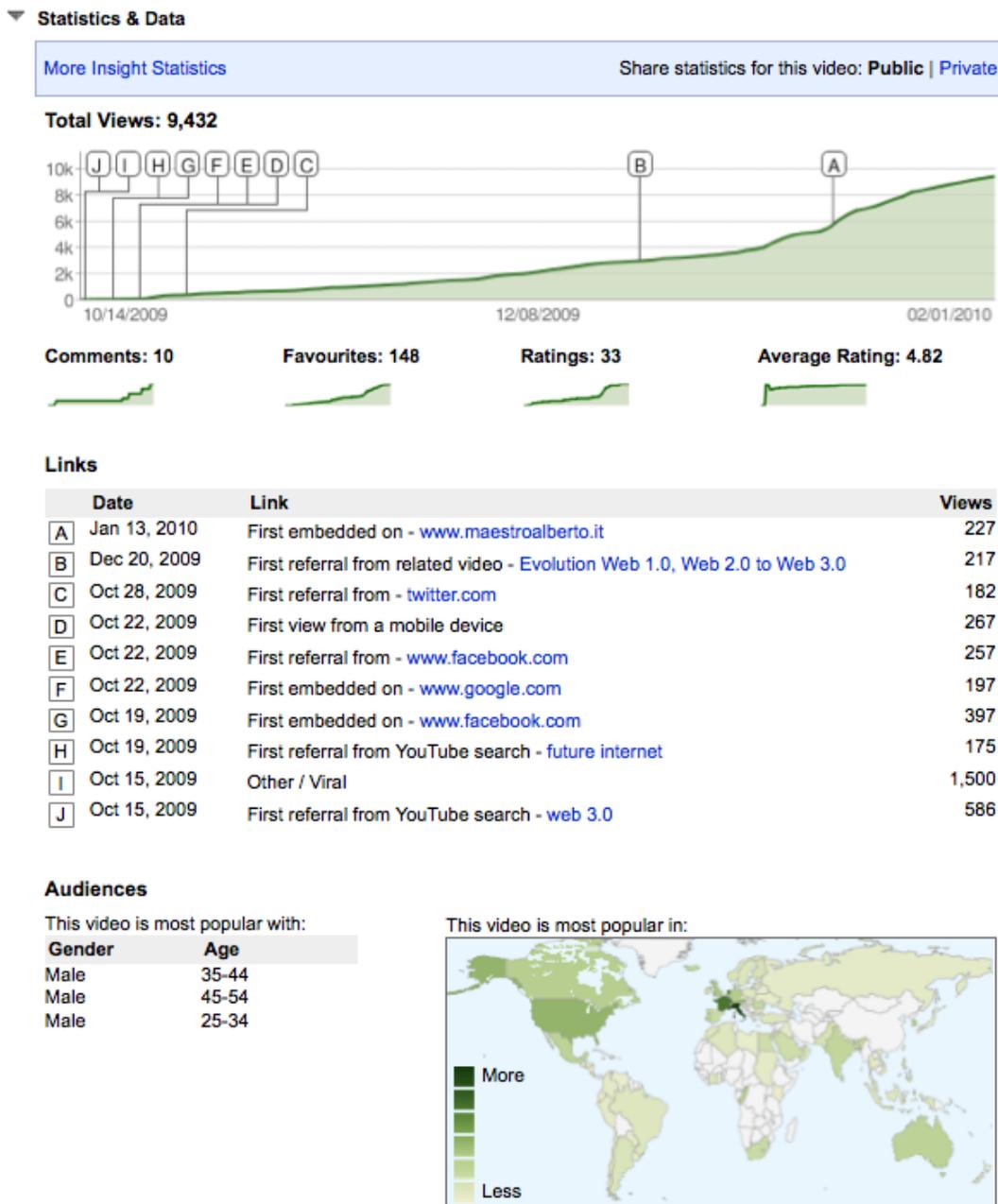


Figure 1 - Future Internet: Service Web 3.0 Video on YouTube

#### 6. Driving and maintaining of the Future Internet Interest Group;

As with many of the networking and community building activities initiated by the Service Web 3.0 project, the support of the Future Internet Interest Group will be continued by STI International for the interim. Future support action and coordination research projects and initiatives, such as the Service Offering for the Future Internet (SOFI) project, will then continue such activities, involving new partner networks and expanding dissemination effort overall reach.

7. *Contribution to standardization activities for semantics and services, including pre-standardization support.*

The key standardisation activities lead by Service Web 3.0 have been mostly within the field of semantic technologies, particularly semantic web services. These activities can be summarized as:

1. The project's identification of and participation in appropriate standardisation bodies, including The World Wide Web Consortium (W3C), such as potential contribution towards SA-REST Member Submission and potential working group to be lead by Service Web 3.0 consortium members, in cooperation with Wright State University, Organization for the Advancement of Structured Information Standards (OASIS), and The Conceptual Models of Services Working Group (CMS-WG) of STI International.
2. The project's identification of emerging standards and suggestions for how these standards can be improved and exploited. Example standards include: MicroWSMO, WSMO-Lite, Semantic Execution Environment (SEE), and Business Process Mod- elling Ontology (BPMO).
3. The project's identification of and participation in evaluation programmes, which are important both to research and to eventual mainstream adoption of semantic technologies. Example evaluation programmes include: The Semantic Web Services (SWS) Challenge and the Semantic Evaluation At Large Scale (SEALS) project.

### 1.5 The pilots

*Not applicable.*

### 1.6 Availability of results

General roadmap for Future Internet	<a href="http://www.serviceweb30.eu/cms/index.php/resources/doc_download/47-d11-service-web-30-public-roadmap">http://www.serviceweb30.eu/cms/index.php/resources/doc_download/47-d11-service-web-30-public-roadmap</a>
Specialized roadmap on service-oriented computing in industries	<a href="http://www.serviceweb30.eu/cms/index.php/resources/cat_view/71-deliverables">http://www.serviceweb30.eu/cms/index.php/resources/cat_view/71-deliverables</a>
Specialized roadmap on semantic technologies	<a href="http://www.serviceweb30.eu/cms/index.php/resources/cat_view/71-deliverables">http://www.serviceweb30.eu/cms/index.php/resources/cat_view/71-deliverables</a>
Roadmap book - Toward the Future Internet – A European Research Perspective	<a href="http://www.booksonline.iospress.nl/Content/View.aspx?piid=12006">http://www.booksonline.iospress.nl/Content/View.aspx?piid=12006</a>
Roadmap book - Towards the Future Internet - Emerging Trends from European Research	IOS Press, 2010 (to appear)
Roadmap book – Semantic Web Services Handbook	Springer, 2010 (to appear)
Roadmap book – Handbook of Semantic Web Technologies	Springer, 2010 (to appear)
Establishment, co-organization and support for conferences, workshops, tutorials, etc.	<a href="http://www.serviceweb30.eu/cms/index.php/resources/cat_view/71-deliverables">http://www.serviceweb30.eu/cms/index.php/resources/cat_view/71-deliverables</a>

Semantics and ontologies collaboration working group	<a href="http://wg.sti2.org/semtech-onto/index.php/Main_Page">http://wg.sti2.org/semtech-onto/index.php/Main_Page</a>
Ontology yellow pages	<a href="http://wg.sti2.org/semtech-onto/index.php/The_Ontology_Yellow_Pages">http://wg.sti2.org/semtech-onto/index.php/The_Ontology_Yellow_Pages</a>
Website	<a href="http://www.serviceweb30.eu">http://www.serviceweb30.eu</a>
The Future Internet Video	<a href="http://www.serviceweb30.eu/cms/index.php/service-web-3-0-the-future-internet">http://www.serviceweb30.eu/cms/index.php/service-web-3-0-the-future-internet</a>
The Future Internet Interest Group	<a href="http://www.serviceweb30.eu/cms/index.php/future-internet/72-future-internet-interest-group">http://www.serviceweb30.eu/cms/index.php/future-internet/72-future-internet-interest-group</a>
Standardization activities	<a href="http://cms-wg.sti2.org/home/">http://cms-wg.sti2.org/home/</a>
Wiki	<a href="http://services.future-internet.eu/index.php/Main_Page">http://services.future-internet.eu/index.php/Main_Page</a>

### **1.7 Potential impact of the results**

The impact of Service Web 3.0 results is substantial and wide-ranging. The results have contributed to the creation of Internet of Services community, and supported coordinated research on services and semantics. The scientific venues organized with the contribution of Service Web 3.0, as well as the promotion and information materials produced, including the Future Internet Movie have enjoyed great popularity and have stimulated contribution towards the Future Internet initiative. A major result of the project during this past year was the release of roadmaps for research and development addressing the main cross-domain challenges defined by the Future Internet Assembly working groups. These roadmaps have a high potential to shape future research and development to realize the Future Internet vision.

### **1.8 Lessons learned during the project**

Valuable experience was gained through ServiceWeb3.0 activities. The iterative workshop format used for the workshop series discussing the impact and future development of semantics technologies was a good overall approach to drive and stimulate discussion on this topic. Limitations and challenges needed to be address in time to further improve the approach. Such limitations and challenges includes (1) different terminologies used by different research groups and (2) limited incentives for industry to participate. However, once the roadmaps were made available researchers and industry practitioners provided valuable feedback. Beside the workshops, interviews were performed with projects and organizations to check the adoption and possible future trends regarding services and semantics. The interviews were very effective.

### **1.9 Partners and contacts**

Beneficiary	Contact	Coordinates
Universitaet Innsbruck, STI Innsbruck	Elena Simperl	Technikerstraße 21a Innsbruck, Austria T: +43 512 507 6488 F: +43 512 507 9872 E: elena.simperl@sti2.at
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## 2. Use and dissemination of foreground

### 2.1 Section A (public)

#### 2.1.1 List of scientific (peer reviewed) publications

TEMPLATE A: LIST OF SCIENTIFIC (PEER REVIEWED) PUBLICATIONS, STARTING WITH THE MOST IMPORTANT ONES										
NO	Title	Main author	Title of the periodical or the series	Number, date or frequency	Publisher	Place of publication	Year of publication	Relevant pages	Permanent identifiers <sup>1</sup> (if available)	Is/Will open access <sup>2</sup> provided to this publication?
1	Toward a Service Web: Integrating the Semantic Web and Service Orientation	J. Domingue, D. Fensel	IEEE Intelligent Systems		IEEE Computer Society		2008	86-88		
2	A conceptual roadmap for scalable semantic computing	G. Hench, E. Simperl, A. Wahler, D. Fensel	ICSC 2008	proceedings	IEEE Computer Society			562-568		
3	SOA, Web	K.	Technical				2008			

<sup>1</sup> A permanent identifier should be a persistent link to the published version full text if open access or abstract if article is pay per view ) or to the final manuscript accepted for publication (link to article in repository).

<sup>2</sup> Open Access is defined as free of charge access for anyone via the internet. Please answer "yes" if the open access to the publication is already established and also if the embargo period for open access is not yet over but you intend to establish open access afterwards.

	services and QoS - perception on the Polish market	Haniewicz, M.Kaczmarek, D. Zyskowski	report							
4	A conceptual roadmap for scalable semantic computing	G. Hench, E. Simperl, A. Wahler, D. Fensel	ICSC 2008	proceedings	IEEE Computer Society			562-568		
5	PSMs in a Global Networked Age	J. Domingue, D. Fensel	AIEDAM Special Issue Problem Solving Methods: Past, Present and Future	23(3)	Cambridge University Press		2009			
6	Semantic Web Handbook	J. Domingue, D. Fensel, J. Hendler		book	Springer		2009			
7	Semantics-Driven Interoperability on the Future Internet	I. Toma, E. Simperl, G. Hench, A.Filipowska, John Domingue	ICSC 2009	proceedings	IEEE Computer Society			551-558		
8	Towards the Future Internet - A European Research Perspective	G. Tselentis, J. Domingue, A. Galis, A. Gavras, D. Hausheer, S. Krco, V.			ISO Press		2009			

		Lotz, T. Zahariadis								
9	A Roadmap for Semantic Technologies	I. Toma, E. Simperl, G. Hench	ESWC 2009	proceedings	3rd STI Roadmappi ng Workshop "Charting the next generation of semantic technologies		2009			
10	Semantics- Driven Interoperabilit y on the Future Internet	I. Toma, E. Simperl, A. Filipowska, G. Hench and J. Domingue	ICSC 2009	proceedings			2009			
11	The Future of the Internet of Services for Industry: the ServiceWeb 3.0 Roadmap	L.Nixon, D.Lambert, A. Filipowska, E.. Simperl	FIA 2009				2009	poster		
12	A joint roadmap for semantic technologies and the Internet of Things	I.Toma, E.Simperl, G. Hench	ESWC 2009	proceedings	3rd STI Roadmappi ng workshop		2009			
13	Towards the Future Internet – Emerging Trends from European	G. Tselentis, A. Galis, A. Gavras, B. Stiller, S. Krcro, V.	IOS Press	book			2010			

	Research	Lotz, E. Simperl, T. Zahariadis								
14	Semantic Web Services Handbook	D. Fensel, F. Facca, E. Simperl	Springer	book			2010			
15	Handbook of Semantic Web Technologies	J. Domingue, D. Fensel, J.A. Hendler	Springer	book			2010			

### **2.1.2 Standardisation activities**

- OASIS (established relationships with several SOA oriented technical committees; STI Innsbruck chairs OASIS SEE TC)
- W3C (established relationships with Rule Interchange Format WG and W3C working group on semantic web services)
- CMS continuing the standardisation of semantics for Web services
- STI Standardization & Reference Architecture Service
- Conceptual Models for Services (CMS) Working Group (<http://cms-wg.sti2.org>)

### **2.1.3 Synergies**

- ICT SSAI&E projects

### **2.1.4 Demonstration**

- Future of the Internet movie

### **2.1.5 Conferences**

- 2008
  - 11th International Conference on Business Information Systems (BIS 2008)
  - Information Systems 2020 Conference
  - 5th European Semantic Web Conference (ESWC 2008)
  - 10th International Conference on Electronic Commerce (ICEC 2008)
  - 2nd European Semantic Technology Conference (ESTC 2008)
  - 1st Future Internet Symposium (FIS 2008)
  - 3rd Asian Semantic Web Conference (ASWC 2008)
- 2009
  - 2nd International Conference on Business Process and Services Computing (BPSC 2009)
  - 12th International Conference on Business Information Systems (BIS 2009)
  - 6th European Semantic Web Conference (ESWC 2009)
  - 2nd Future Internet Symposium (FIS 2009)
  - 3rd International Conference on Semantic Computing (ICSC 2009)
  - 3rd European Semantic Technology Conference (ESTC 2009)
  - Asian Semantic Web Conference (ASWC) 2009

### **2.1.6 Workshops**

- 2008
  - Advances in Semantics for Web services Workshop (semantics4ws'08)
  - 1st IEEE International Workshop on Semantics for Business Process Management (SBPM 2008) Special Session (COMPSAC 2008)
- 2009
  - International Workshop on Intelligent Service Management (ISM'09)
  - 2nd Workshop on Mashups, Enterprise Mashups and Lightweight Composition on the Web (MEM 2009)
  - 1st Workshop on the Economics of Knowledge-based Technologies (ECONOM 2009)
  - 1st Workshop on Service Discovery and Selection in SOA Ecosystems (SDS-SOA 2009)
  - 3rd Workshop on Social Aspects of the Web (SAW 2009)

- 2nd Workshop on Advances in Accessing Deep Web (ADW 2009)
- International Workshop on the Role of Services, Ontologies, and Context in Mobile Environments (RoSOC-M 2009)
- 3rd STI Roadmapping Workshop “Charting the next generation of semantic technology”
- Exploiting Structured Information on the Web (ESIW 2009)
- Workshop on Semantic Extensions of Middleware: Enabling Large Scale Knowledge Applications (SEMELS 2009)
- 8th Semantic Web Services Challenge Workshop (SWSC 2009)
- 3rd Workshop on Non-Functional Properties and SLA Management in Service-Oriented Computing (NFPSLAM-SOC 2009)

### **2.1.7 Forums and special sessions**

- 1st OCG Forum Semantic Systems (FSS 2009)
- 2nd STI International Offsite (STI Offsite 2009)
- Special Session on Semantic-Based Interoperability at the 3rd IEEE Conference on Semantic Computing (ICSC 2009)

### **2.1.8 Keynotes and invited speeches**

- 2008
  - Presentation at ARIS Process Day Poland, “Semantyka w modelowaniu procesów biznesowych – klucz do automatyzacji i podniesienia efektywności czy dodatkowe obciążenie dla projektantów procesów?”, October 2008, Warsaw, Poland,
  - Presentation at CR&IT Conference, From Business Modelling to Service Oriented Architectures, December 12th, 2008
- 2009
  - Invited talk of John Domingue at the University of Aberdeen on the Future Internet and SOA4All, February 25th, 2009
  - Invited talk of John Domingue at LTN Event on the Future Internet in London
  - Invited talk of John Domingue on Future Internet and SOA4All at the Austrian Computer Society's OCG Forum Semantic Systems 2009, <http://www.sti2.org/ocg-forum-semantic-systems>, September 2009
  - John Domingue Keynote, Future Internet. A Semantics and Services Perspective. Wealth of Networks 2009: Digital Economies and the Next-generation Internet. Bringing together researchers, industry and the UK community to explore the future of the Digital Economy in the UK. March 24th, 2009, Congress Centre London, hosted by University of Southampton, <http://wealthofnetworks2.wordpress.com/agenda/>
  - Open Lecture on the Future Internet at Faculty of Informatics and Electronic Economy, Pozan University of Economics, Poland (June 6th, 2009)
  - Lecture of John Domingue - a perspective on the Future Internet at the Semantic Week in Amsterdam on 23rd June, 2009)
  - Invited talk of Agata Filipowska at Theseus Symposium in Berlin (<http://www.eubusiness.com/Internet/theseus.09>), June 29th, 2009
  - Invited talk of Prof. Witold Abramowicz during the conference for industry, Ogrody Innowacji TP (<http://ogrodyinnowacji.tp.pl/>)

### **2.1.9 Tutorials**

- “Semantic Management of Business Processes in the Future Internet” at the 1st Future Internet Symposium (FIS 2008)
- “Introduction to the Semantic Web” tutorial at the 7th International Semantic Web Conference (ISWC 2008)
- “Web Service Crawling and Annotation“ tutorial at 2nd Future Internet Symposium (FIS 2009)

### **2.1.10 Summer schools**

- 6th Summer School on Ontological Engineering and the Semantic Web (SSSW 2008)
- 4th Summer School organized by the Berufsakademie Heidenheim and Poznan University of Economics
- 2nd Asian Semantic Web School (ASWS 2008)
- 1st Semantic Web Services Winter Retreat (SWS-Retreat 2009)
- 1st IEEE 2009 Summer School on Semantic Computing (SSSC 2009)

### **2.1.11 Other**

- STI International Services Convent in St. Petersburg
- 1st EU Matchmaking Event, ESWC 2009, Jun-09
- STI International 3rd Roadmap Workshop, ESWC 2009, Jun-09
- 1st Semantic Web Services Winter Retreat, March-09, Seefeld Olympic Region, Austria
- STI International 2nd Roadmap Workshop, Vienna, Austria, Oct-08
- STI International 1st Roadmap Workshop, Vienna, Austria, Sept-08
- STI International General Assembly, Vienna, Austria, Sep-08
- STI Service Convent 2008, July-08, Istanbul, Turkey.

## 2.2 Section B (confidential)

The applications for patents, trademarks, registered designs, etc. shall be listed according to the template B1 provided hereafter.

The list should, specify at least one unique identifier e.g. European Patent application reference. For patent applications, only if applicable, contributions to standards should be specified.

<b>TEMPLATE B1: LIST OF APPLICATIONS FOR PATENTS, TRADEMARKS, REGISTERED DESIGNS, ETC.</b>			
Type of IP Rights: Patents, Trademarks, Registered designs, Utility models, etc.	Application reference(s) (e.g. EP123456)	Subject or title of application	Applicant (s) (as on the application)

Please complete the table hereafter:

<b>TEMPLATE B2: OVERVIEW TABLE WITH EXPLOITABLE FOREGROUND</b>					
Exploitable Foreground (description)	Exploitable product(s) or measure(s)	Sector(s) of application	Timetable, commercial use	Patents or other IPR exploitation (licences)	Owner & Other Beneficiary(s) involved
1. New superconducti ve Nb-Ti alloy	MRI equipment	1. Medical 2. Industrial inspection	2008 2010	A materials patent is planned for 2006	Beneficiary X (owner) Beneficiary Y, Beneficiary Z, Poss. licensing to equipment manuf. ABC

In addition to the table, please provide a text to explain the exploitable foreground, in particular:

- Its purpose
- How the foreground might be exploited, when and by whom
- IPR exploitable measures taken or intended
- Further research necessary, if any
- Potential/expected impact (quantify where possible)

This section is not applicable to Serviceweb3.0.

### 3. Report on societal implications

Replies to the following questions will assist the European Commission to obtain statistics and indicators on societal and socio-economic issues addressed by projects. The questions are arranged in a number of key themes. As well as producing certain statistics, the replies will also help identify those projects that have shown a real engagement with wider societal issues, and thereby identify interesting approaches to these issues and best practices. The replies for individual projects will not be made public.

#### **A General Information** (completed automatically when Grant Agreement number is entered.

Grant Agreement Number:

Title of Project:

Name and Title of Coordinator:

#### **B Ethics**

1. Did you have ethicists or others with specific experience of ethical issues involved in the project?	<input type="radio"/>	Yes
	<input checked="" type="radio"/>	No

2. Please indicate whether your project involved any of the following issues (tick box) :	<b>NO</b>
---	-----------

##### **INFORMED CONSENT**

- |   |  |
|---|--|
| • Did the project involve children?                                     |  |
| • Did the project involve patients or persons not able to give consent? |  |
| • Did the project involve adult healthy volunteers?                     |  |
| • Did the project involve Human Genetic Material?                       |  |
| • Did the project involve Human biological samples?                     |  |
| • Did the project involve Human data collection?                        |  |

##### **RESEARCH ON HUMAN EMBRYO/FOETUS**

- |  |  |
|--|--|
| • Did the project involve Human Embryos?               |  |
| • Did the project involve Human Foetal Tissue / Cells? |  |
| • Did the project involve Human Embryonic Stem Cells?  |  |

##### **PRIVACY**

- |  |  |
|--|--|
| • Did the project involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction) |  |
| • Did the project involve tracking the location or observation of people?  |  |

##### **RESEARCH ON ANIMALS**

- |   |  |
|---|--|
| • Did the project involve research on animals?            |  |
| • Were those animals transgenic small laboratory animals? |  |
| • Were those animals transgenic farm animals?             |  |
| • Were those animals cloning farm animals?                |  |
| • Were those animals non-human primates?                  |  |

##### **RESEARCH INVOLVING DEVELOPING COUNTRIES**

- |   |  |
|---|--|
| • Use of local resources (genetic, animal, plant etc)                                   |  |
| • Benefit to local community (capacity building ie access to healthcare, education etc) |  |

##### **DUAL USE**

- |  |  |
|--|--|
| • Research having potential military / terrorist application |  |
|--|--|

<b>C Workforce Statistics</b>		
<b>3 Workforce statistics for the project: Please indicate in the table below the number of people who worked on the project (on a headcount basis).</b>		
<b>Type of Position</b>	<b>Number of Women</b>	<b>Number of Men</b>
Scientific Coordinator	1	
Work package leader	2	2
Experienced researcher (i.e. PhD holders)	2	5
PhD Students	0	0
Other		3
<b>4 How many additional researchers (in companies and universities) were recruited specifically for this project?</b>		
Of which, indicate the number of men:		0
Of which, indicate the number of women:		0

D Gender Aspects		
<b>5 Did you carry out specific Gender Equality Actions under the project?</b>	<input type="radio"/> x	Yes No
<b>6 Which of the following actions did you carry out and how effective were they?</b>		
<input type="checkbox"/> Design and implement an equal opportunity policy	Not at all effective	Very effective
<input type="checkbox"/> Set targets to achieve a gender balance in the workforce	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
<input type="checkbox"/> Organise conferences and workshops on gender	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
<input type="checkbox"/> Actions to improve work-life balance	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>	<input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/> <input type="radio"/>
<input type="radio"/> Other:		
<b>7 Was there a gender dimension associated with the research content – i.e. wherever people were the focus of the research as, for example, consumers, users, patients or in trials, was the issue of gender considered and addressed?</b>		
<input type="radio"/> Yes- please specify		
x No		
E Synergies with Science Education		
<b>8 Did your project involve working with students and/or school pupils (e.g. open days, participation in science festivals and events, prizes/competitions or joint projects)?</b>		
<input type="radio"/> Yes- please specify		
x No		
<b>9 Did the project generate any science education material (e.g. kits, websites, explanatory booklets, DVDs)?</b>		
x Yes- please specify: book, movie, website, roadmaps		
<input type="radio"/> No		
F Interdisciplinarity		
<b>10 Which disciplines (see list below) are involved in your project?</b>		
x Main discipline <sup>3</sup> : 1.1		
<input type="radio"/> Associated discipline <sup>3</sup> :		<input type="radio"/> Associated discipline <sup>3</sup> :
<b>G Engaging with Civil society and policy makers</b>		
<b>11a Did your project engage with societal actors beyond the research community? (if 'No', go to Question 14)</b>	x <input type="radio"/>	Yes No
<b>11b If yes, did you engage with citizens (citizens' panels / juries) or organised civil society (NGOs, patients' groups etc.)?</b>		
x No		
<input type="radio"/> Yes- in determining what research should be performed		
<input type="radio"/> Yes - in implementing the research		

<sup>3</sup> Insert number from list below (Frascati Manual)

Yes, in communicating /disseminating / using the results of the project

<b>11c In doing so, did your project involve actors whose role is mainly to organise the dialogue with citizens and organised civil society (e.g. professional mediator; communication company, science museums)?</b>	<input type="radio"/> x	Yes No
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**12 Did you engage with government / public bodies or policy makers (including international organisations)**

- No
- Yes - in framing the research agenda
- Yes - in implementing the research agenda
- Yes, in communicating /disseminating / using the results of the project

**13a Will the project generate outputs (expertise or scientific advice) which could be used by policy makers?**

- Yes – as a **primary** objective (please indicate areas below- multiple answers possible)
- Yes – as a **secondary** objective (please indicate areas below - multiple answer possible)
- No

**13b If Yes, in which fields?**

Agriculture Audiovisual and Media Budget Competition Consumers Culture Customs Development Economic and Monetary Affairs Education, Training, Youth Employment and Social Affairs	Energy Enlargement Enterprise Environment External Relations External Trade Fisheries and Maritime Affairs Food Safety Foreign and Security Policy Fraud Humanitarian aid	Human rights <u><b>Information Society</b></u> Institutional affairs Internal Market Justice, freedom and security Public Health Regional Policy <u><b>Research and Innovation</b></u> Space Taxation Transport
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**13c If Yes, at which level?**

- Local / regional levels
- National level
- European level
- International level

<b>H Use and dissemination</b>		
<b>14 How many Articles were published/accepted for publication in peer-reviewed journals?</b>		Not applicable
<b>To how many of these is open access<sup>4</sup> provided?</b>		
<b>How many of these are published in open access journals?</b>		
<b>How many of these are published in open repositories?</b>		
<b>To how many of these is open access not provided?</b>		
<b>Please check all applicable reasons for not providing open access:</b>		
<input type="checkbox"/> publisher's licensing agreement would not permit publishing in a repository <input type="checkbox"/> no suitable repository available <input type="checkbox"/> no suitable open access journal available <input type="checkbox"/> no funds available to publish in an open access journal <input type="checkbox"/> lack of time and resources <input type="checkbox"/> lack of information on open access <input type="checkbox"/> other: .....		
<b>15 How many new patent applications ('priority filings') have been made?</b> <i>("Technologically unique": multiple applications for the same invention in different jurisdictions should be counted as just one application of grant).</i>		Not applicable
<b>16 Indicate how many of the following Intellectual Property Rights were applied for (give number in each box).</b>	Trademark	Not applicable
	Registered design	Not applicable
	Other	Not applicable
<b>17 How many spin-off companies were created / are planned as a direct result of the project?</b>		1 spin-off in preparation (on roadmapping)
<i>Indicate the approximate number of additional jobs in these companies:</i>		
<b>18 Please indicate whether your project has a potential impact on employment, in comparison with the situation before your project:</b>		
<input type="checkbox"/> Increase in employment, or <input type="checkbox"/> Safeguard employment, or <input type="checkbox"/> Decrease in employment, <input checked="" type="checkbox"/> Difficult to estimate / not possible to quantify	<input checked="" type="checkbox"/> x <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	In small & medium-sized enterprises In large companies None of the above / not relevant to the project
<b>19 For your project partnership please estimate the employment effect resulting directly from your participation in Full Time Equivalent (FTE = one person working fulltime for a year) jobs:</b>		<i>Indicate figure:</i> Difficult to estimate at the moment

<sup>4</sup> Open Access is defined as free of charge access for anyone via the internet.



- 3.1 Basic medicine (anatomy, cytology, physiology, genetics, pharmacy, pharmacology, toxicology, immunology and immunohaematology, clinical chemistry, clinical microbiology, pathology)
- 3.2 Clinical medicine (anaesthesiology, paediatrics, obstetrics and gynaecology, internal medicine, surgery, dentistry, neurology, psychiatry, radiology, therapeutics, otorhinolaryngology, ophthalmology)
- 3.3 Health sciences (public health services, social medicine, hygiene, nursing, epidemiology)
  
- 4. AGRICULTURAL SCIENCES
- 4.1 Agriculture, forestry, fisheries and allied sciences (agronomy, animal husbandry, fisheries, forestry, horticulture, other allied subjects)
- 4.2 Veterinary medicine
  
- 5. SOCIAL SCIENCES
- 5.1 Psychology
- 5.2 Economics
- 5.3 Educational sciences (education and training and other allied subjects)
- 5.4 Other social sciences [anthropology (social and cultural) and ethnology, demography, geography (human, economic and social), town and country planning, management, law, linguistics, political sciences, sociology, organisation and methods, miscellaneous social sciences and interdisciplinary , methodological and historical SIT activities relating to subjects in this group. Physical anthropology, physical geography and psychophysiology should normally be classified with the natural sciences].
  
- 6. HUMANITIES
- 6.1 History (history, prehistory and history, together with auxiliary historical disciplines such as archaeology, numismatics, palaeography, genealogy, etc.)
- 6.2 Languages and literature (ancient and modern)
- 6.3 Other humanities