



**TripCom**  
*Triple Space Communication*

**FP6 – 027324**

Deliverable

**D9.3**  
**Impact Analysis: Initial Report**

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## EXECUTIVE SUMMARY

In this report, we summarize the outward activities of TripCom. Such activities define the impact of the project before it produces its final results.

In particular, the projects so far has produced 20 scientific publications; it has been promoted in at least 9 public talks and keynotes; and the consortium organized two important events, both for industry outreach and for research cooperation. The main project web site not only covers the project, but also its background technologies, its applications and the relevant events, so it has the potential to grow past a simple project web site. And finally, the young project already has been involved in some standardization activities, which will be one of the most important areas at the conclusion of the project.

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<b>Abstract (for dissemination)</b>	This deliverable summarizes the outward activities of the TripCom project, and evaluates their initial impact. At this stage, the main measure of project impact is its scientific output and public talks, but other important areas such as standardization and initiatives to promote space-based computing are expected to be significant components of the final impact of the project.
<b>Keywords</b>	Project impact

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## LIST OF ABBREVIATIONS

<b>ANSI</b>	American National Standards Institute
<b>BSD</b>	Berkeley Software Distribution
<b>DAWG</b>	Data Access Working Group
<b>DBMS</b>	Database Management Systems
<b>ER</b>	Entity Relationship
<b>FOAF</b>	Friend Of a Friend
<b>HTTP</b>	Hyper Text Transfer Protocol
<b>iTQL</b>	Interactive Tucana Query Language
<b>JRDF</b>	Java RDF
<b>LAN</b>	Local Area Network
<b>LGPL</b>	GNU Lesser General Public Licence
<b>N3</b>	Notation 3
<b>N3QL</b>	N3 Query Language
<b>NDM</b>	Oracle Spatial Network Data Model
<b>OASIS</b>	Organization for the Advancement of Structured Information Standards
<b>ORDI</b>	Ontology Representation and Data Integration
<b>OWL</b>	Web Ontology Language
<b>OWLIM</b>	OWL In Memory
<b>RDBMS</b>	Relational DBMS
<b>RDF</b>	Resource Description Framework
<b>RDFS</b>	RDF Schema
<b>RDQL</b>	RDF Data Query Language
<b>ROI</b>	RDF Input/Output
<b>SAIL</b>	Storage And Inference Layer
<b>SOFA</b>	Simple Ontology Framework API
<b>SOAP</b>	Simple Object Access Protocol
<b>SeRQL</b>	Sesame RDF Query Language
<b>SEQUEL</b>	Structured English Query Language
<b>SPARQL</b>	SPARQL Protocol And RDF Query Language
<b>SQL</b>	Structured Query Language
<b>STREP</b>	Specific Targeted Research Project
<b>TCP</b>	Transmission Control Protocol
<b>URI</b>	Uniform Resource Identifier
<b>URL</b>	Uniform Resource Locator
<b>W3C</b>	World Wide Web Consortium
<b>WSDL</b>	Web Service Description Language
<b>WSMO</b>	Web Service Modeling Language
<b>XML</b>	Extensible Markup Language
<b>YARS</b>	Yet Another RDF Store
<b>YARSQL</b>	YARS Query Language

# 1 INTRODUCTION

TripCom is a Specific Targeted Research Project (STREP) aiming to “change the Internet usage through computers just as the Web revolutionized the Internet usage through humans.” The project partners combine their expertise to bring the Web paradigm of “persistently publishing and reading data” to Web services, so that also automated software systems share the benefits of Web architecture.

Apart from the pre-defined deliverables that will be produced in this project, there are also outward activities, such as publication and event organization, which allow the project to disseminate its results even before the work is done. Such dissemination improves the impact of the project, increasing its end value. In particular, the main research areas where TripCom should disseminate its work are Tuple spaces, Web services, Semantic Web, EAI (Electronic Application Integration) and eHealth.

This deliverable presents an overview of the impact of TripCom throughout the first half of the project duration. The following chapters each list the external activities in a particular category, and briefly analyze them in terms of activity per partner or work package. In the end, Chapter 7 provides an overall summary of this report and discusses the future impact that we expect over the second half of the project lifetime.

## 2 PUBLICATIONS

Scientific publishing is the primary dissemination channel for the results of a project such as TripCom. The following table lists the publications that came out of the work in TripCom.

CEFRIEL	E. Della Valle, D. Cerri, A. Ghioni, and D. Cerizza. <i>Seamlessly and Securely sharing health care data with Triple Space Communication</i> , The Int'l Trade Event and Conf. for eHealth, Telemedicine and Health ICT (Med-e-Tel), Luxemburg, 5-7 April 2006.
LFUI	D. Fensel, R. Krummenacher, and M. Zaremba. <i>The Role of Semantic Technology</i> , Semantic Technology - A European Perspective during WWW2006, Edinburgh, Scotland, 23-26 May 2006.
WP8B	D. Cerizza, E. Della Valle, D. Foxvog, R. Krummenacher, and M. Murth. <i>Towards European Patient Summaries based on Triple Space Computing</i> , Proc. of 1st European Conf. on eHealth, Fribourg, Switzerland, 12-13 October 2006.
CEFRIEL	E. Della Valle, D. Cerri, A. Ghioni, D. Cerizza. <i>Triple Space Communication an infrastructure for seamlessly and securely sharing healthcare data</i> . In the Official Journal of the European Association of Hospital Managers, November 2006.
WP8B	Emanuele Della Valle, Dario Cerizza, Reto Krummenacher, Lyndon J. B. Nixon, Elena Paslaru-Bontas Simperl, Doug Foxvog. <i>A proposal for Building the European Patient Summary using Triple Space Computing</i> , Workshop for W3C Semantic Web Health Care & Life Sciences, International Semantic Web Conference (ISWC), Athens, Georgia, Nov 6, 2006.
LFUI	Axel Polleres and Roman Schindlauer. <i>SPAR2QL: From SPARQL to rules</i> . In International Semantic Web Conference (ISWC2006 - Posters Track), Athens, GA, USA, November 2006. Poster.
TUW	Joskowicz, G., e. Kühn, M. Murth. <i>The XD Model - Extending XML and DOM to Standards Based Coordination</i> . In Proceedings of the 10th IASTED International Conference on Software Engineering and Applications (SEA), Nov. 13-15, 2006, Dallas, Texas, USA.



WP7	D. Foxvog, C. Bussler. <i>Ontologizing EDI Semantics</i> , Advances in Conceptual Modeling - Theory and Practice, Springer, Berlin/Heidelberg, ISBN 978-3-540-47703-7, pp. 301-311, 2006 at the First International Workshop on Ontologizing Industrial Standards (OIS) of the 25th International Conference on Conceptual Modeling (ER 2006), in Tucson, USA
CEFRIEL	Dario Cerizza: <i>Development of a patient summary at European level</i> Presentation at the EPS at the COCOON Conference, Venice, Italy, February 27, 2007.
USTUTT	Karastoyanova, D.; Lessen, T. van; Nitzsche, J.; Wetzstein, B.; Wutke, D.; Leymann, F.: <i>Semantic Service Bus: Architecture and Implementation of a Next Generation Middleware</i> . In Proceedings of the 2nd International Workshop on Services Engineering (SEIW) 2007, in conjunction with ICDE 2007. Istanbul, Turkey, April 16, 2007.
WP8A	Francisco, D. de; Perez, N.; Foxvog D.; Harth A.; Martin D.; Wutke D.; Murth M.; Paslaru E.: <i>Towards a Digital Content Services Design Based on Triple Space</i> . In proceedings of the 10th International Conference on Business Information Systems (BIS). Poznan, Poland 25-27 April 2007.
LFUI	Axel Polleres. <i>From SPARQL to rules (and back)</i> . In Proceedings of the 16th World Wide Web Conference (WWW2007), Banff, Canada, May 2007.
WP8A	D. d. Francisco, J. M. Elicegui, D. Martin, M. Murth, and D. Wutke, <i>Using Triple Spaces to Implement a Marketplace Pattern</i> , In proceedings of the 1st Workshop for Space Based Computing as Semantic Middleware for Enterprise Application Integration (SBC 2007), Vienna, Austria, 2007.
WP2/3	E. Simperl, R. Krummenacher and L. Nixon: A Coordination Model for Triplespace Computing, In 9th Intl Conf. on Coordination Models and Languages (Coordination), Springer Verlag, June 2007.
WP8B	R. Krummenacher, E. Simperl, L. Nixon, D. Cerizza, E. Della Valle: <i>Enabling the European Patient Summary Through Triplespaces</i> In 20th IEEE International Symposium on COMPUTER-BASED MEDICAL SYSTEMS, Maribor, Slovenia, June 20-22, 2007

WP8B	L. Nixon, E. Simperl, D. Cerizza, E. della Valle and R. Krummenacher: <i>Enabling Collaborative eHealth Through Triplespace Computing</i> In the 16th IEEE International Workshops on Enabling Technologies: Infrastructures for Collaborative Enterprises (WETICE), Workshop on Interdisciplinary Aspects of Coordination Applied to Pervasive Environments: Models and Applications (CoMA), Paris, France, June 18-20, 2007.
USTUTT	Nitzsche, J.; Wutke, D.; Lessen, T. van: <i>An Ontology for Executable Business Processes</i> . Workshop on Semantic Business Process and Product Lifecycle Management (SBPM 2007), in conjunction with ESWC 2007. Innsbruck, Austria, June 7, 2007.
NUIG	ZhangBing Zhou, Sami Bhiri, Ke Ning, Laurentiu Vasiliu, Doug Foxvog and Walid Gaaloul: <i>Better Behavioral Description for Dynamic Semantic Web Services Collaboration</i> . In Proceedings of the 3rd International Conference on Semantics, Knowledge and Grid (SKG 2007). Xi'an, China., October 2007.
USTUTT	Martin, D.; Wutke, D.; Scheibler, T.; Leymann, F.: <i>A Comparison of Messaging and Spaces Based on Enterprise Application Integration Patterns</i> . 11th IEEE International EDOC Conference (EDOC 2007). Annapolis, Maryland U.S.A., October 15-19, 2007.
LFUI	Reto Krummenacher, Elena Simperl, and Dieter Fensel: <i>An Ontology-Driven Approach To Reflective Middleware</i> . 2007 IEEE/WIC/ACM International Conference on Web Intelligence. Silicon Valley, USA, November 2-5, 2007.
LFUI	Reto Krummenacher: <i>Ontology-Driven Management of Semantic Spaces</i> . Doctoral Consortium of 6th Int'l Semantic Web Conference and the 2nd Asian Semantic Web Conference. Busan, Korea, November 11-15, 2007.

In summary, there have been 21 publications, 13 from separate partners and 8 from the various work packages. As expected, the major research partners LFUI, CEFRIEL and USTUTT produce most papers. Importantly, the use case work packages produce significant output as well; papers about the use cases demonstrate the practical applications of TripCom technology.

It is worth pointing out that these publications already cover all the target dissemination areas, i.e., Tuple spaces, Web services, Semantic Web, EAI and eHealth.

### 3 KEYNOTES AND TALKS

Apart from publications, also speeches by key representatives of the project are a very effective way of dissemination. The following table lists the keynotes and other invited talks that propagated triplespace computing:

LFUI	D. Fensel: <i>Service Web 3.0: A Paradigm Shift in Computer Science</i> , Keynote at Semantic Technology Annual Conference 2007, Seoul, Korea
LFUI	D. Fensel: <i>Semantically Enabled Service-Oriented Architectures: A Paradigm Shift in Computer Science</i> , Keynote at International Conference on Artificial Intelligence and Applications, AIA 2007, Innsbruck, Austria
LFUI	D. Fensel: <i>A Semantically Enabled Service Oriented Architecture</i> , Invited Talk at Web Intelligence (WI) meets Brain Informatics (BI) (WImBI 2006) Workshop, Beijing, China
LFUI	D. Fensel: <i>Semantically Enabled Service-oriented Architectures</i> , Keynote at 5th International Symposium on Software Composition, Vienna, Austria
USTUTT	F. Leymann: <i>Workflow-Based Cooperation and Coordination in a Service World</i> , Keynote at Business Processes - Today and tomorrow, Dortmund, Germany
USTUTT	F. Leymann: <i>Web Services: Origin, State of the Art and Next Steps</i> , Keynote talk at Semantics 2006, Vienna, Austria
USTUTT	F. Leymann at Gartner EXP Forum, Frankfurt, Germany
USTUTT	F. Leymann: <i>Services and Their Composition: A Quality Perspective</i> , Keynote talk at Conquest 2006, Berlin, Germany
USTUTT	F. Leymann: <i>Semantische Dimension von SOA</i> , Keynote talk at SOA Kongress, Mainz, Germany

Clearly, triplespace computing in general and TripCom in particular have significant presence in speeches at diverse fora; yet there is space for involvement from further partners.

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## 4 EVENTS

Large projects, such as EC-funded Integrated Projects (IPs), often sponsor or even organize events such as conferences in order to gain further visibility and dissemination opportunities. Such sponsorship is uncommon from smaller projects with more limited budgets. Nevertheless, TripCom partners have organized two events so far, as shown in the following table.

July 5, 2006	Space Computing Alliance visiting DERI Innsbruck. Dr. Bernard Angerer from GigaSpace Technologies Inc. initiated potential collaborations between the TripCom consortium and the US-based Space Computing Alliance with a short visit to DERI Innsbruck.
May 31, 2007	SBC 2007: Space Based Computing as Semantic Middleware for Enterprise Application Integration, at 1st European Semantic Technology Conference, Vienna, Austria

Event organization is generally a long-term undertaking, therefore it is understandable that there are only two external meetings (i.e., other than project meetings) to report from the initial stages of the project.

## 5 WEB SITES

Web sites are an important dissemination channel for projects such as TripCom. The main project web site at `tripcom.org` presents an overview of the project, its mission and the consortium, but also a detailed description of the work, both done and expected; a listing of the publications and deliverables; a frequently updated news page and a list of events that are relevant to the project, and also a reading list for background in space-based computing, semantic technologies, electronic data interchange, security and trust, and also eHealth — a major use case.

In the same spirit, the list of frequently asked questions (FAQ) on the TripCom web site is not limited to information about the project, but also about the underlying technologies and planned use case areas. With all this information, the web site has a potential to become more than just a description of the project; it can also serve as a repository of related information, improving the awareness about TripCom in the relevant communities.

On top of the project web site, the TripCom consortium was instrumental in launching an independent initiative called `SpaceBasedComputing.org` to promote the space-based computing (SBC) paradigm invaluable in distributed systems. This initiative aims to be involved in the standardization efforts in the SBC area, and to promote and propagate the paradigm of SBC. However, the `SpaceBasedComputing.org` initiative is too young for its impact to be evaluated here.

It is difficult to judge the impact of specialized web sites such as `tripcom.org` and `spacebasedcomputing.org`. For instance, the homepage of `tripcom.org` has a Google page rank of 7/10, while `spacebasedcomputing.org` has a page rank of 4/10, yet these numbers have no well-defined meaning, and they apply to the specific pages of the site, not the web sites as a whole. Similarly, a web site ranking system called `alexa.com` ranks neither `tripcom.org` nor `spacebasedcomputing.org` in the top 100,000 web sites; which is not at all tragic, considering the size of the WWW and the relative youth of the project. Therefore, while the web sites need to be mentioned in this deliverable, we do not present a concrete evaluation of their impact.

## 6 STANDARDIZATION

The technologies created by TripCom can have an effect on standardization activities, mainly in the scope of Semantic Web Services. Organizations such as the World Wide Web Consortium (W3C) and OASIS (originally SGML Open) are currently working on relevant technologies in this area. Additionally, work package 7 can contribute to standardization in the area of Electronic Application Integration (EAI), which is done within the United Nations Centre for Trade facilitation and Electronic Business (UN/CEFACT) and the International Organization for Standardization (ISO).

The effects of project involvement in standardization are generally three-fold. First, the involved project members gain insight into the new (proposed) standards, keeping the developed technologies up to date with the specifications that have the backing of the industry. As an example of this effect, LFUI was involved in W3C efforts around WSDL 2.0 and SAWSDL (Semantic Annotations for WSDL and XML Schema), and both standards are to be used in the project, increasing interoperability with existing and future technologies in related areas.

Second, by being involved in standardization, the project can affect the future standards, propagating the research and evaluation results and increasing the visibility of the project. For instance, TripCom has been communicating with current standardization activities such as the SPARQL query language being developed by the Data Access Working Group at W3C.

Finally, the project can create proposals for new standards at a later time in the project life time, to further increase the impact of its results. For instance, the ontologies created by work package 7 may be submitted as a basis for standard ontologies for EDIFACT.

Involvement in standardization carries a cost on the potential for exploitation of the accrued intellectual property. W3C imposes a royalty-free licensing requirements for any prospective W3C Recommendation, whereas OASIS supports Reasonable And Non-Discriminatory (RAND) licensing, i.e., the owners of patents can ask a reasonable license fee from the implementors of that technology. The two approaches both have their pros and cons; the TripCom project partners will evaluate the best applicable approach to any new standard proposals.

## 7 SUMMARY AND FUTURE OUTLOOK

In this initial impact report, we have summarized the outward activities of the project partners, separately or in cooperation, which are relevant to the aims of TripCom. The most important indicator of the impact of a research project such as TripCom is its output in scientific publications, fairly sizeable at this stage; and the impact on standards, which has to wait until the project is more mature.

The further areas of impact are public talks that promote triplespace computing; events organized to discuss the research results (such as the SBC workshop) and to foster industry cooperation; and finally also the project web sites, which are not limited to describing the project itself.

The table below summarizes the roughly quantifiable results — the numbers of scientific publications (papers) and the number of major talks; itemized by project partner.

<b>Partner</b>	CEFRIEL	FUB	LFUI	NUIG	TUW	USTUTT	total
<b>Papers alone</b>	3		5	1	1	3	13
<b>Papers in WP</b>	4	4	6	4	3	2	8
<b>Talks</b>			4			5	9

This data can only be seen as a very coarse indication of the impact of the project; new papers are being written and new talks are being scheduled, and of course the project results are yet to be finalized in the second half of the project life time.

This deliverable is only the initial impact report covering the first half of the life time of the project; in fact a number of deliverables is being finished at the same time as this report, and this finishing work will result in further publications and other outward activities which might be seen as falling into the first half of the project life time.

As the project matures, more publications can be expected, especially publications with higher weight, such as conference papers and journal articles, which need complete implementation and evaluation of the TripCom technology.

The rate of public talks and keynotes (apart from paper presentations) is likely to remain steady, although it may be increased through the involvement from further key project representatives, and potentially accounting for talks that are not reported in this deliverable. Similarly, due to its tight focus and budget, the project cannot be expected to suddenly start organizing many new events; yet we expect a limited increase in the final report.

As the project matures and concludes, the two areas that should exhibit the most increase in impact are the involvement in standardization, and results from the [SpaceBasedComputing.org](http://SpaceBasedComputing.org) initiative supported by this project.