Knowledge Web

Annual Public Report

In a nutshell, the mission of Knowledge Web is to strengthen the European industry and service providers in one of the most important areas of current computer technology: Semantic Web enabled e-work and e-commerce. We will concentrate our efforts around the outreach of this technology to industry. Naturally, this includes education and research efforts to ensure the durability of impact and support of industry. Therefore, the main objectives of Knowledge Web are: **Outreach to Industry, Outreach to Education and Coordination of Research.**

http://knowledgeweb.semanticweb.org

Summary of Activities

At the end of its second year the Knowledge Web network is developing its work according to expectations. Partners are doing integrated research on the themes defined in the joint programme of activities: scalability, heterogeneity, dynamics, web services and language extensions.

The network provided a steady flow of results that have been published in the best conferences and journals as well as transferred to standard bodies (this year saw the creation of W3C rule working group and the proposal of the SPARQL language).

In-depth work on heterogeneity, with a now well-established evaluation of ontology matching algorithms, has been fruitful in providing comparison material and contributed the current improvement of the field. Efforts in the Industry area have been refocused towards the life-sciences and human resource management domains. Many outreach events have been held and long-standing contacts are established with the Industry board members.

This year also saw the third edition of the well attended European Summer School on Ontological Engineering and the Semantic Web. The REASE repository of learning units now features 80 online teaching materials on the semantic web.

Overall, the network is in pole position to make the Semantic Web work.

click image to enlarge

Important Work Areas :: Industry

Outreach to industry

We are dedicated to promoting greater awareness and faster take-up of Semantic Web technology within European Industry in total cooperation with the research area activity. Specifically, we aim at firstly reducing time needed to transfer the technology to industry and so to market, and secondly permeating the Research agenda with the Industry and Business needs. To that end we have established an industry board of representative companies from a large spectrum of economical sectors as an effective communication channel between industry and academia, in order to: understand industry needs that could find immediate profit from selecting Semantic Web technologies; survey and profile the existing technologies (tools, infrastructures, standards, …) in relation to the realization of the industry needs.; make recommendations, guidelines and standards to help industry organize, design and implement their migration into Semantic Web technology enabled IT systems; and promote awareness by realizing the added value of the Semantic Web technologies in the increasingly competitive knowledge economy. Please visit the Industry Area section of the Knowledge Web portal.

Industry Board

We have established an industrial board composed of industrial companies that should benefit from knowledge-based technologies (both technology push and technology pull organizations). The current board consists of 40 industry full members (about 80 companies in total). The members of our Industry board are given a privileged access to our network of top leading expertise and upstream technology. We aim at consolidating this network of industrial companies with a special focus given to the first most promising sectors: e.g. Life science and healthcare, Human resources management, Laws, e-Government etc.

Understanding industrial needs

We are actively working on collecting and analyzing use and business cases from industry (about 30 Use Cases). Our analyses will on the one hand show how semantic web technologies have or could have solved concrete business issues, on the other hand evaluate the applicability of semantic web technologies in real business cases. We are mainly focusing on testifying the utility of the current semantic web tools, interoperability of tools and services, and ontology content evaluation and usability.

Recommending Ontological Content

The OOA (Ontology Outreach Advisory) is devoted to 1) develop and extend ontology standardization and recommendation strategies, and so 2) promoting and outreaching good quality ontological content.
In the present state of the Semantic Web and of its adoption by industry, ontological content is difficult to standardize by the methods used by typical standardization bodies. Content typically is subjective, application-dependent and general evaluation criteria are lacking. Therefore a form of “standardization lite” by recommending ontologies will be adopted. The OOA is intended to play the role of ontology recommendation body. The focus and operation of the OOA therefore will be (mainly) content-oriented rather than (only) technology-oriented. Good quality ontologies will be recommended and promoted to industry. The OOA will consist of the most active (industrial + governmental + research) members, these members will be organized as committee sectors.
As a first step, two committee sectors are being initiated, 1) Human Resources 2) healthcare and life sciences. The first general OOA meeting with industry took place in Crete (2 June 2005). The second meeting is proposed in Trento (17 Jan. 2006).

RoadMap, Best Practices and guidelines

We are currently busy developing the technology roadmap of the field of Semantic Web technologies and Web Services, capturing best practices of the best applications using empirical evidence given by the Industry partners on the board and from our own objective evaluations and also from our participation / contribution to the W3C SWG Best

Practices and Deployment and likely in the emerging WG on SWS frameworks (OASIS, W3C).

Promotion of ontology technologies

Several technology show events have been organized and are planned regularly, with the aim of promoting the main achievements to public and private institutions and to give opportunity to the Industry and the academic researcher to meet. These events take the form of international forums where speakers from both industry and academia are invited to present their view on the topics addressed by Knowledge Web namely “Realizing the semantic Web”.

Those awareness events are often co-organized where Knowledge Web is actively cooperating with several related NoEs, especially with Rewerse and AgentLinkIII. From the beginning of 2004 till end of 2006, KW and other NoEs has organized, participated and planned 14 international conferences, 30 international workshops, 6 summer schools, 5 industrial events and 4 invited talks, lectures and seminars. In 2005, the key joint events are International Semantic Web Conference 2005 (ISWC2005), European Semantic Web Conference 2005 (ESWC2005), Semantic Web Days 2005 and KWeb Summer School 2005. In preparation for 2006 are the edition of ESWC 2006, ISWC 2006, and the first Asian Semantic Web Conference ASWC 2006. Also in preparation, to faster the learning phase is the adaptation of academic lectures to specific industry needs. Lastly, contributing to the set up of Competence Center for Semantic Web Services is underway.

Important Work Areas :: Research

Furthering of joint research activities

The network is actively working in the important research areas required to make the Semantic Web a reality for European and global commercial enterprises and for the benefit of European society. Work on making the tools and infrastructure has been actively tackled by a large number of institutions from all over Europe to: scale the semantic web to the size of the web; able to deal with the diversity and heterogeneity of the semantic web; able to embrace the dynamic and changing nature of the semantic web; and able to support a distributed community's development and maintenance of the semantic content necessary to populate a semantic web. Based on an in-depth and wide-spread analysis for all these research areas the network proceeded successfully to advance the state-of-the-art significantly and with a high impact in the community and across its borderlines.

Development of standards

Building on the success of the W3C Web Ontology Language OWL, standardized chiefly through the efforts of the OntoWeb thematic network, a unified framework has been developed and published by Knowledge Web in which the existing (and future) proposals of integrating different sorts of rule based language with OWL can be compared. This fed into the W3C's Semantic Web activity standardization efforts, influences current efforts on setting up a W3C working group for rule standardization, and is directly linked with the work of the FP6 REWERSE NoE.

Application for the commercial markets

Semantic Web Services are the driver and the evaluation mechanism for our research developments. Leveraging and concerting with FP6 integrated projects in the ESSI cluster (which is a successor of the SDK cluster and e.g. includes the EU ASG IP) Knowledge

Web has produced case studies and requirements for the network. Tightening the interlinking of the industrial and the research areas significantly improves the visibility of Semantic Web technologies in commercial markets and ensures a constantly decreasing time-to-market.

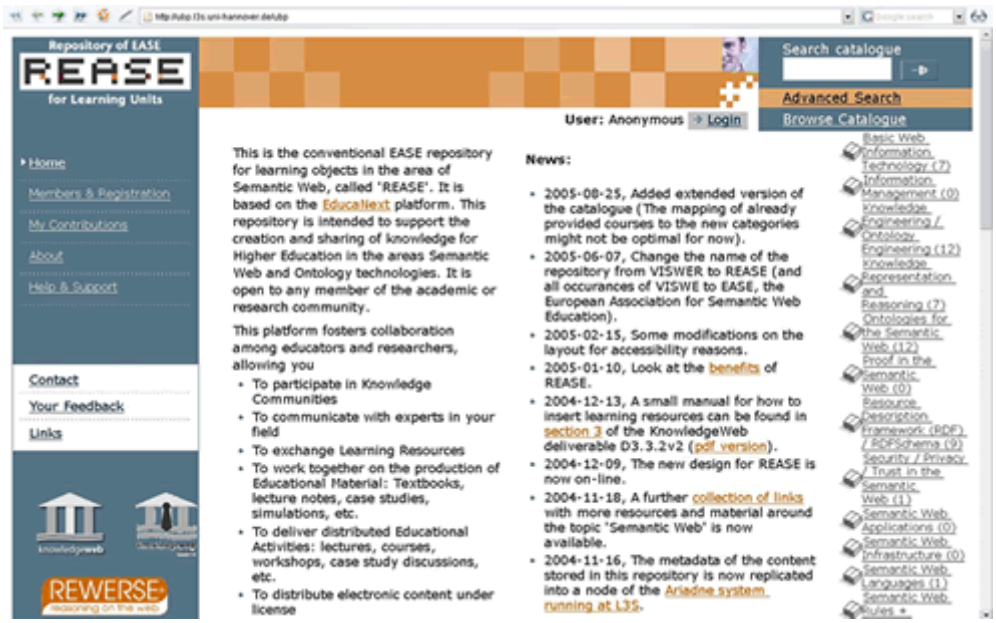
A virtual research community

As part of its activity to sustain a vibrant pan-organization research environment, we successfully continued the topic-oriented researcher exchange (T-REX) program which enables long-term impact with a constantly rising number of high-quality exchanges. The short-term goal of T-REX is to encourage, support and manage primarily the exchange of researchers across all Knowledge Web members, but also to encourage exchanges with external parties. The long-term goal of T-REX is to strengthen the European research area by establishing strong and lasting links across research organizations.

Important Work Areas :: Education

REASE: The Repository of EASE for Learning Units.

To collect existing learning units about the Semantic Web and related topics, REASE has been set up at L3S Research Center (**http://rease.semanticweb.org**). Besides adding further resources, where we focused on learning units for industrial education, we have improved the layout of REASE regarding accessibility and we have extended the catalogue in order to capture the different Semantic Web topics.



click image to enlarge

ASPL -The Advanced Semantic Platform for Learning

The first version of ASPL has been produced and made available at **http://kmi.open.ac.uk/kweb** along with the deliverable report which includes a brief user manual. In essence ASPL makes use of the Magpie infrastructure (**http://kmi.open.ac.uk/projects/magpie**) to give users browsing a web page access to a range of additional material via a set of services. Magpie operates by making use of domain ontologies to dynamically annotate texts. Users access a range of services by clicking on highlighted ontology instances. Services currently provide access to a glossary of semantic web Studies terms, to learning materials held in REASE on a

particular topic, to material in the ACM Digital library, to a list of people active in a particular research area, to a list of papers citing an author, to a list of co-authored papers, to a list of shared institutions, to learning materials in REASE by a particular author, and to material by an author in the ACM Digital library. ASPL is currently being evaluated and will have a further phase of implementation (including more well-defined ontologies) and evaluation before the final version due in month 48.

Towards a shared master program for Semantic Web Studies

Core partners of the shared master have been identified, namely FUB (coordinating partner), UniTN, VU, UPM. The partners are planning a joint master curriculum, which is both of high education level and feasible from the procedural and legal points of view. A first sketch of a procedure for the shared masters program has been worked out already and submitted as deliverable D3.2.5; as a matter of fact, integrated programmes are a relatively new phenomenon to the European universities. Current university procedures and national legislation complicate, unintentionally, the implementation of integrated master's programmes. The deliverable D3.2.5 lists the potential obstacles and suggests solutions to take them away.

European Association for Semantic Web Education (EASE)

EASE is the umbrella for all education area activities within Knowledge Web and ensures endurability of the Knowledge Web educational activities even after the end of the project. EASE will become the organizational umbrella for the summer school and also to be responsible for the learning unit repository. For the foundation of EASE, the statutes have been created and thoroughly discussed. They are currently under review from different legal departments of the participating partners, so that the foundation of EASE can take place in the near future.

Semantic Web PhD Network

The PhD student network, organized by the Free University of Berlin, has continued to meet in 2005, and has grown to 18 members. In roughly bi-monthly meetings each doctoral student has had the opportunity to present their research to this peer group for discussion. In the last meetings of the year we focused on those in the early stages of their research and then on those who wished to practice for the defence of their thesis. For the former, we held an informal discussion round in which possible research directions were discussed and those in the later stages of their doctoral work could offer advice and experience to those in the earlier stages. For the latter, we invited two referees: Prof. Nicola Henze from the University of Hannover and Dr. Klaus Schild from the Free University of Berlin. Doctoral students had the opportunity to present their work and receive constructive comments from these Semantic Web experts. The overall feedback from the participants about the network has been very positive, and it is planned to continue activities in 2006. The Knowledge Web deliverable D3.2.8 provides detail on the network activities and participant evaluation.

Education for business professionals

A key area identified in the initial study of requirements for EASE was that of providing Semantic Web education tailored for industry. Likewise, the breakdown of learning materials collected in the REASE repository showed a lack of materials suitable for use with business professionals. As first steps towards resolving this, we have taken the business use cases collected in Knowledge Web WP1.1 which represent real world business problems with potential Semantic Web-based solutions. Professionals can better relate to such use cases than to abstract discussions of logic, knowledge representation and reasoning. Two learning units have been produced using the use cases (available on REASE) and presented at two events organized by the Free University of Berlin: the Semantic Web Information Day 2005 and as a tutorial at the Berlin XML Days 2005. An overview of this work as well as experiences collected and a set of recommendations for future educational activities aimed at Industry are collected in the deliverable D3.2.9.

User Involvement, Promotion and Awareness

The industry board of Knowledge Web comprises 28 highly dedicated members. Several meetings are planned to strengthen the links between these members and the Knowledge Web project.

Among the very successful events which contribute to the notoriety of Knowledge Web is the summer school organized last summer. The participation of Knowledge Web members in various programme committees, W3C working groups and its organization of events (like next ISWC in Galway) contribute to the visibility of the network.

FP6 integrated projects SEKT, DIP, and Knowledge web have created the SDK cluster for facilitating the coordination between these projects and promoting them. This cluster revolve around two interest groups dedicated to “Ontologies” and “Semantic web services”. It also organizes the two first European Semantic Web Conference.

Knowledge Web cooperates with the Rewerse NoE on industry, research and education activities. It also has cooperations with FP6 projects AgentLink III and Ontogrid and FP5 projects Ontoweb, Esperonto and SWWS.

User Involvement, Promotion and Awareness :: Summer School 05

3rd European Summer School on Ontological Engineering and the Semantic Web (SSSW-05)

The SSSW-05 took place in July in Cercedilla (Spain) under the direction of Prof Enrico Motta (Open University, UK) and Prof. Asun Gomez-Perez (UPM, Spain). The SSSW series of summer schools has established itself as the key educational events in the area of semantic technologies and it is no surprise that we have received many testimonials from students, tutors and invited speakers.

While we continue to experiment with the format of the school (this year we did away with the Œstrands[1] approach and we organised tutorials and hands-on sessions according to seven topics), we retain its practical orientation. One of the key reasons for the success of the school is this constructivist approach, which is in contrast with most other summer schools. Hands-on sessions allow the students to familiarize themselves with key technologies, while team-based work on a week-long project gives them the possibility to explore research ideas in collaboration with other students and with the support of the tutors. At the end of the school the students present their work and prizes are awarded for the best efforts. As usual, the tutorials, hands-on sessions and project work were complemented by a number of invited talks, given by leading academics and representatives from industry.

User Involvement, Promotion and Awareness :: Knowledge Web Portal

The Knowledge Web Semantic Portal

Since March 1st 2004, the public version of the Knowledge Web (KW) portal has been running at **http://knowledgeweb.semanticweb.org/**. The portal includes a public area with public information to be used by anybody interested in knowledge technologies, and also a restricted area to be used by KW partners. The portal has high visibility and it is in the second position in Google at the time of writing this report.

The public area includes general information about the project, specialized pages for the industry area where the main scenarios are quickly accessible, and a link to the educational area where the learning units are available.

The restricted area includes content restricted to KW partners, and a few tools that help on the management of the network.

The KW Semantic Portal has been built reusing the ODESeW technology [1].

The first prototype of the Knowledge Web Semantic Portal has the following functionalities:

- Knowledge Presentation. This is done by means of user-defined visualizations of ontology classes, relations and instances with different browsing permissions for portal users. The knowledge stored in the portal can be accessed with menus generated automatically from ontologies that are synchronized, and can be viewed differently according to the various types of information stored in them.

- Knowledge Editing. This portal allows inserting, updating and removing class instances, their attributes and relation instances, in multiple inter-linked ontologies and with different edition permissions for the portal users.
- Knowledge Search and Querying based either on keywords or on the structured information provided by the ontologies inside the system.

- Administration Services, which allow managing the semantic portal users, the editing and visualization permissions, and some other portal needs.

The intended users of the Knowledge Web portal are the following:

- *Administrators*. These users are in charge of the Knowledge Web Semantic Portal management and are responsible for managing the users, their permissions, the ontologies and their instances.
- *Community users*. These are the partners participating in the Knowledge Web NoE. Their main responsibility is to introduce contents in the KW Semantic Portal. They can also navigate and search for information in the portal without any kind of restriction.
- *External users*:
    - *Guest users.* They can navigate through the Knowledge Web Portal and search for information.
    - *Software agents.* They can use the content on the Knowledge Web Portal because the information is available in different languages (RDF(S) and OWL).

The Knowledge Web Semantic Portal is able to manage multiple ontologies. To use this semantic portal as a tool for monitoring the Knowledge Web NoE, the first draft of the ontologies includes information about the project (milestones, workpackages, etc.), the organizations participating, the people involved in the project, the documents related to the project (deliverables, minutes, etc.), and the events associated with such project. That is, currently, five domain-specific ontologies (Documentation, Event, Organization, Person, Project and Project Management) have been developed to be included in the Knowledge Web Semantic Portal.

In 2005, it has been included in the Knowledge Web portal the functionality to input partner progress for each two-monthly periodic report, and to generate these reports automatically. This functionality informs each partner about when and what things to report on each report period and provides the coordinator with a monitorization of the current state of all the partial reports from the partners. Finally, the portal compiles all the reports to generate a complete progress report of the whole project in a Microsoft Word document. This functionality is supported by Document, Person and Project ontology and mainly by the Project Management ontology.

download the presentation

The Knowledge Web Semantic Portal Statistics

By October 31st 2005, the Knowledge Web Semantic Portal manages 5 ontologies (Documentation, Event, Organization, Person and Project). These ontologies have a total of 75 concepts, 51 ad-hoc relations, and 702 instances.

Figure 1 presents KW portal visits. In total, from March 1st 2004 to October 31st 2005, we got 28.197 visits. Of these visits, 42% comes from KW members and 58% from non-KW members. Analysing the access from countries (see figure 3), we can say that mainly most of the accesses came from Spain, United States, Germany, and UK.

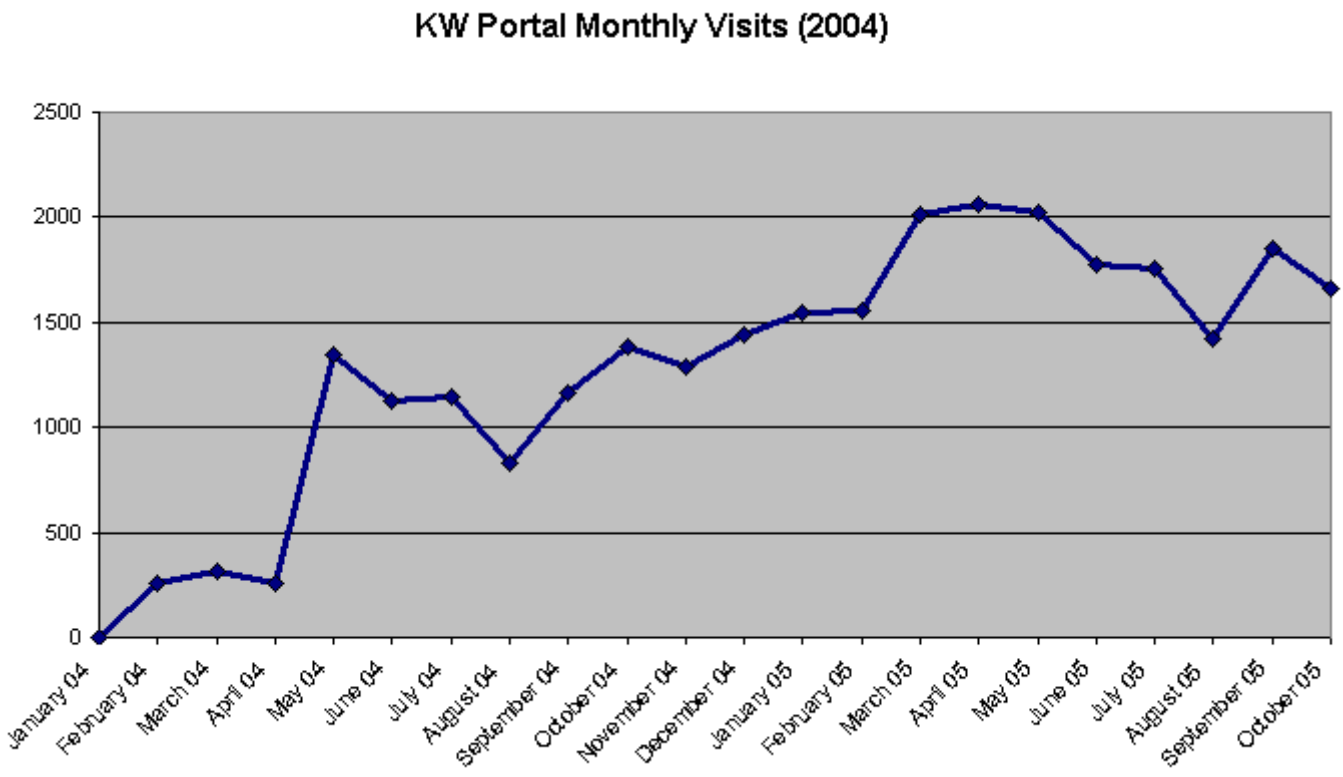


Figure 1: KW visits since March 1st 2004 until October 31st 2005.

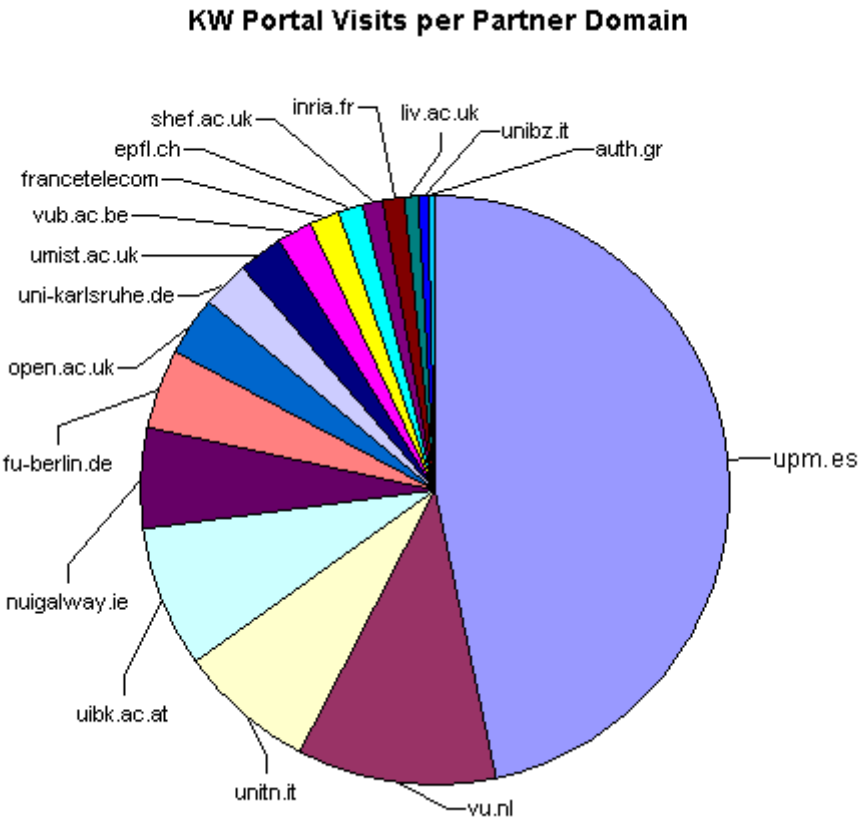


Figure 2: Visit's distribution by partner domain

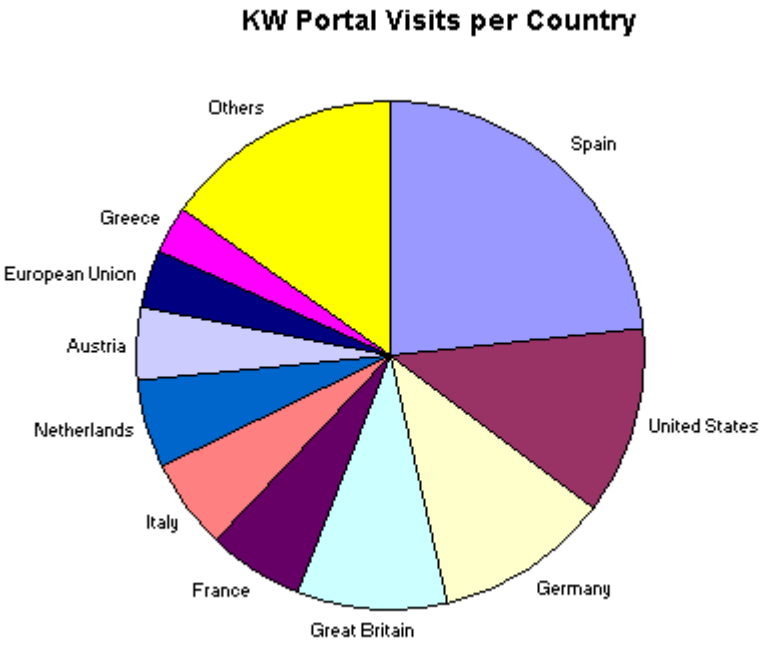


Figure 3: KW visits per country.

References

Corcho, O.; Gómez-Pérez, A.; López-Cima, A.; López-García, V.; Suárez-Figueroa, M.C. 2003. "ODESeW. Automatic Generation of Knowledge Portals for Intranets and Extranets". International Semantic Web Conference 2003 (ISWC03). Lecture Notes in Computer Science (2870). PP: 802-817.

User Involvement, Promotion and Awareness :: Projects/Clusters

Events and Projects with which project co-operates/clusters closely

FP6 Projects

Data, Information, and Process Integration with Semantic Web Services (DIP)

FP6 - 507483

http://dip.semanticweb.org/

Semantically-Enabled Knowledge Technologies (SEKT)

FP6-506826

http://sekt.semanticweb.org/

FP6 Networks of Excellence

Agentlink III

FP6-002006

http://www.agentlink.org/

Rewerse

FP6-506779

http://www.rewerse.net/

ProLearn

IST - 507310

http://www.prolearn-project.org/

FP6 Projects

Ontogrid
FP6-511513
http://www.ontogrid.net/

User Involvement, Promotion and Awareness :: Main Events

Prolearn Workshop: “Creating eLearning Courses for Use in Corporate Education”

25 April 2005

L3S Research Center, Hanover,

http://www.l3s.de/~diederich/cecc/index2.php

LREC 2006 - 5th Conference on Language Resources and Evaluation

24-26 May 2006

Genova, Italy

http://www.lrec-conf.org

The Third European Summer School on Ontological Engineering and the Semantic We (SSSW-2005)

10-16th July 2005

Cercedilla, Spain

http://babage.dia.fi.upm.es/sssw05/

The Second European Semantic Web Conference (ESWC05)

29 May-1 June 2005

Heraklion, Greece

http://www.eswc2005.org/

FOMI 2005 - 1st workshop Formal Ontologies Meet Industry

CASTELNUOVO DEL GARDA (VR) – ITALY

9-10 June 2005

http://fandango.cs.unitn.it/fomi/

Dagstuhl Seminar on Semantic Grid Convergence of Technologies

3-8 July 1005, Seminar Nº 05271

Wadern, Germany

http://www.dagstuhl.de/05271/

The Third European Summer School on Ontological Engineering and the Semantic Web (SSSW-2005)

10-16 July 2005

Cercedilla, Spain

http://babage.dia.fi.upm.es/sssw05/

EUROLAN-2005: Language Resources and Technologies for Multilingual Semantic Webs

Venue: Cluj-Napoca, heart of Transylvania, Romania

25 July-6 August 2005

http://www.cs.ubbcluj.ro/eurolan2005/

1st International IFIP/WG12.5 Working Conference on Industrial Applications of Semantic Web

25-28 August 2005,

University of Jyväskylä, Jyväskylä, Finland

http://www.jyvaskyla.fi/international/

Third International Conference on Business Process Management (BPM 2005)

6-8 September 2005

Nancy, France

http://www.deri.at/events/workshops/bpm2005/

FOnt 2005 - Foundational Aspects of Ontologies

11 September 2005

Koblenz, Germany

http://www.aifb.uni-karlsruhe.de/WBS/phi/FOnt2005/

Third International Conference on Knowledge Capture (KCap05)

2-5 October 2005

Banff, Canada

http://www.kcap05.org/

Semantic Web Days

Munich, Germany

6-7 October 2005

http://www.semantic-web-days.net/

2005 AAAI Fall Symposium Series

3-6 November 2005

Arlington, Virginia, USA

http://www.daml.ecs.soton.ac.uk/AAAI-FSS05/

4th International Semantic Web Conference (ISWC2005)

7-11 November 2005

Galway, Ireland

http://iswc2005.semanticweb.org/

"ECOWS 2005 - The European Conference on Web Services (ECOWS)"

14-16 November 2005

Växjö, Sweden

http://wscc.info/ecows2005/

SEMANTICS 2005 - Semantic Systems in the Knowledge Society - Challenges & Opportunities

23 – 25 November 2005

Vienna, Austria

http://www.semantics2005.net/

2nd European Workshop on the Integration of Knowledge, Semantic and Digital Media Technologies (EWIMT)

30 November -1 December 2005

London, UK

http://www.acemedia.org/ewimt2005

Future Work

After the first year the revision of the joint programme of activities corrected some defect in the initial plan.

At this stage it is safe to say that the network is in full working order. We do not foresee major changes in the next plan beside strengthening the work to be performed within the workpackage as well as intensifying the relations between these.

Overall, we plan to intensify our actions towards industry actors by developing teaching material targeting them more specifically and welcoming visits of company employees within the T-Rex programme of researcher exchanges.

The network is currently performing a self-assessment which will lead to a new JPA. At this stage it is safe to say that we do not foresee major changes in the network. There will however be some natural focus changes. Whereas the research work packages have mainly worked internally in the first year, we expect to see more cross fertilization between work packages in the second year. Also, the exchange program is expected to grow significantly, possibly also including visits from employees of industry board members to network partners as well as exchanges with other IST networks. With respect to outreach, the network is expected to focus even more on showcase applications to demonstrate clearly the added value of semantic-web technology to foster uptake by newcomers. We expect more organizations to join the industry board, including non-profit organizations. There will also be a steady flow of Knowledge Web output to the various standards bodies. The summer school will be continued but the network will consider organizing also educational activities for members of the industry board. In addition, educational modules will become available, supported by semantic-web technology. We are looking forward to the second year of the network.