Semantic Web-related

KnowledgeWeb (NoE)

http://knowledgeweb.semanticweb.org

In a nutshell, it is the mission of Knowledge Web 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: We will jointly set up an Ontology language, tool, and method set that covers all the major tasks in working with ontologies. Developing standards helps to solve the interoperability problem. It includes benchmarking, compliance testing, usage scenarios, cookbook style textbooks with best practices, and definition of tool environments based on slightly coupled Web Services. We will also push the creation of an Ontology Registration Authority (ORA).

- Outreach to Education: The goal will be to establish a Virtual Institute for Semantic Web Education (VISWE) which will act as the principal focus for educational activities on the Semantic Web. In working towards this end, we will build on the experience of several leading European University groups in designing and delivering courses in this area to provide up to date learning materials, curricula and, ultimately, new degree programmes. At the same time we will enhance the delivery of course materials by making use of novel Semantic Web technologies in combination with more traditional e-learning environments. VISWE will be without parallel elsewhere in the world and will provide a competitive advantage to European research and industry.

- Coordination of Research: We will join our research efforts on combining Semantic Web with web service technology. This is a very interesting problem in two respects: It is a very difficult problem (the declarative description of software has challenged computer science for quite a while) and when it is solved this solution will deeply impact on the next generation web. We will establish a Virtual Research Centre to further the coordination of research.

Partners:

- Universität Innsbruck, Institut für Informatik, Austria
- École Polythechnique Fédérale de Lausanne, Switzerland
- France Telecom, France
- Freie Universität Berlin, Germany
- Free University of Bozen-Bolzano, Italy
- Institut National de Recherche en Informatique et en Automatique, France
- Informatics and Telematics Institute, Greece
- Learning Lab Lower Saxony, Germany
- National University of Ireland Galway, Ireland

- The Open University, UK
- Universidad Politécnica de Madrid, Spain
- Universität Karlsruhe, Germany
- University of Liverpool, UK
- University of Manchester, UK
- University of Sheffield, UK
- University of Trento, Italy , Germany
- Vrije Universiteit Amsterdam, the Netherlands
- Vrije Universiteit Brussel, Belgium

SEKT (IP)

Semantically Enabled Knowledge Technologies

http://sekt.semanticweb.org

Progress in the development of the Information Society has seen a truly revolutionary decade, with the advent of widespread networked information services. A new social revolution is imminent, involving the transition from Information Society to Knowledge Society. SEKT aims to position the EU IT industry at the core of this, by developing the essential semantic knowledge technologies for realizing the European Knowledge Society.

The vision of SEKT is to develop and exploit the knowledge technologies which underlie Next Generation Knowledge Management. We envision knowledge workplaces where the boundaries between document management, content management, and knowledge management are broken down, and where knowledge management is an effortless part of day to day activities. Appropriate knowledge is automatically delivered to the right people at the right time at the right granularity via a range of user devices. Knowledge workers will be empowered to focus on their core roles and creativity; this is key to European competitiveness.

The SEKT strategy is built around the synergy of the complementary know-how of the key European centres of excellence in Ontology and Metadata Technology, Knowledge Discovery and Human Language Technology, a leading commercial exponent of semantic technology, together with a major European ICT organisation.

The execution of SEKT is based on the integration of fundamental research, component development and integration driven by real world case studies in the public and private sectors. SEKT will provide new insights on knowledge technologies together with open reference implementations for others to build on.

Partners:

- British Telecommunications Plc., UK
- Empolis GmbH, Germany
- Jozef Stefan Institute, Ljubljana, Slovenia
- University of Karlsruhe, Institute AIFB, Germany
- University of Sheffield, UK
- University of Innsbruck, Austria

- Intelligent Software Components S. A., Spain
- Kea-pro GmbH, Switzerland
- Ontoprise GmbH Intelligente Lösungen für das Wissensmanagement, Germany
- Sirma AI Ltd, Bulgaria
- Vrije Universiteit Amsterdam, Netherlands
- Autonomous University of Barcelona, Spain

VIKEF (IP)

Virtual Information and Knowledge Environment Framework

ALVIS (STREP)

http://cosco.hiit.fi/search/alvis.html

The new economy is based on innovation, and innovation is based on up-to-date information. The semi-static Internet alone has in the order of 1000 million pages of information, and search has become a fundamental service required both by individual citizens and businesses alike. Search facilities have an impact on almost any task related to the information society. Reports indicate that European consumers are dismayed with the US saturation of existing services (as reported by the BBC, May 2, 2002). Moreover, only a few corporations have broad access to rich terabyte repositories of web data that can be used to provide unique value-added services in areas such as shopping, human resources, and business intelligence.

The vast quantity of information sets new challenges for even the best commercial search engines. Building next generation search engines is not just a question of scaling existing techniques. What is needed is a departure from the existing keyword search that has made current search cumbersome even for the skilled. Qualitatively better ways are needed to allow more meaningful, semantically aware queries, to allow search by example of a few select documents, to allow search based on automatically extracted theme, style, topic and word semantics, and to provide responses targeted to the users context, i.e., personalized to incorporate their prior interests and allow feedback.

Search can also be viewed as a knowledge sharing service on the Web, an interface to the Semantic Web . While some automation in building the Semantic Web has been achieved, it remains in part a labour intensive annotation process with problems in scaling up to the full free-text Web. Semantic-based search (which in the proposed model lacks a real ontology and uses implicit concepts rather than explicit knowledge) along with the services it provides could be viewed as a key infrastructure for more complete Semantic Web development, and arguably, as a safety net for it.

Current search systems with their centralized, monolithic model imply a business infrastructure with high barrier to entry that makes the economics of developing a centralized search engine impractical. Thus a radically new, cost-effective model for delivering search is also needed, one that allows piecemeal growth. Distributing search services is the obvious candidate and information retrieval research shows this can be done by distributing content according to topic. It is arguably impractical any other way if Web traffic is to be conserved. Thus automatic, hierarchical classification of both documents and queries becomes a central task for the success of the system in order to perform routing and manage the hierarchies.

Modern intelligent Web technology and advances in information retrieval research can make search peer-to-peer, personalized, and semantic-based, with fine-grained topic, style and synonyms automatically produced and maintained. Open source licensing and peer-to-peer functioning can make search an integral part of the Web infrastructure, equally contributed to by both businesses and the public sector. The repositories of classified Web data along with their semantic metadata can then become available for valued-added knowledge industries.

Partners:

- Helsinki Institute for Information Technology
- Unite Mathematique, Informatique et Genome, Institut National de la Recherche Agronomique
- Ecole Polytechnique Federale de Lausanne, Distributed Information Systems Lab
- Lund University, Department of Information Technology
- Technical University of Denmark, Center of Knowledge Technology
- Index Data Aps
- Exalead SA
- Universite Paris-Nord, Laboratoire d'Informatique
- ALMA Bioinformatica, S.L
- Jozef Stefan Institute, Department of Intelligent Systems
- Tsinghua University, Department of Computer Science and Technology

NEWS (STREP)

News Engine Web Services

http://www.it.uc3m.es/news-int/

The goal of the NEWS project is to extend the reach and delivery capabilities of online content provision and syndication services by developing a semantic-based news intelligence system that supports advanced personalized news discovery, analysis and presentation, and fosters interoperability across the news content provision and fruition lifecycle.

News content provision and syndication services have started to adopt basic information filtering tools, but go little beyond basic search and categorization. In keeping with "Semantic-based Knowledge Systems" strategic objective, NEWS addresses these shortcomings through a program of research and developement aimed at:

- Using Semantic Web standards to define ontologies for the news content industry;
- Implementing a content annotation component whikch automatically applies Semantic Web standards for the news industry to newswires;
- Developing news content intelligence components with multilingual and multimedia capabilities, which use automatic news content annotation to support the semantic-based analysis, search, navigation, personalisation and delivery of knowledge from newswires, and
- Integrating news content annotation and content intelligence components as Web services into a standard interoperable platform that enables end users and applications alike to find and utilise service components dynamically.

Partners:

- Textology Ltd
- Agenzia ANSA S.C.R.A.L.
- Deutsches Forschungszentrum für Künstliche Intelligenz GmbH
- Agencia EFE, S.A.
- Universidad Carlos III de Madrid

Web services

DIP (IP)

Data, Information and Process Integration with Semantic Web Services

http://dip.semanticweb.org/

The major mission of DIP is to further develop semantic web and web services, with the goal of enabling their combination into one. Web Services are the proper means for accessing semantically enriched data, and semantic enrichment of web services is essential for scalability and the maturation of the idea of Web Services. The new area that will be produced from the fruitful combination of the Semantic Web and Web Services may be called Semantic Web Services. Significant research work needs to be done before the infrastructure underlying Web Services can make the vision behind the idea a reality. In a nutshell, it is the mission of DIP to make Semantic Web Service become a reality as the new infrastructure for eWork and eCommerce. The successful creation of such an infrastructure could potentially change the way electronic cooperation and business is conducted to the same extent that the original Web revolutionised electronic information access. This mission translates into the following core objectives:

Make Semantic Web technology a reality. An important objective of DIP is to further develop the vision of the semantic web based on machine processable semantics as a new communication and cooperation infrastructure. Machine-processable semantics enable the mechanization of information access and processing.

Combine Semantic Web technology with Web Services for semantics-based services. Web Services based on the Semantic Web may provide the killer application for Semantic Web technology, and the combination of both may provide an infrastructure that will revolutionize not only information processing but the general way we access computational resources. It will provide a completely new infrastructure for eWork and eCommerce.

Apply Semantic Web Services as an infrastructure in real world scenarios within an organization and between organizations and its customers/partners. We aim to ensure that we will develop practical technology, and DIP will illustrate in practice its impact on new methods for eWork, eGoverment, and eCommerce. The main types of applications are:

Intelligent Information Management: This involves improving human information access to unstructured and semi-structured information.

Enterprise Application Integration: This is the integration of data, processes, and applications within an organization.

Dynamic & Smart eCommerce: B2B Applications provide Semantic Web Services as a new infrastructure for intra organization cooperation enabling virtual and smart organizations in commercial and non-commercial environments. Here we talk about the integration of data, processes, and applications between different organizations introducing higher requirements on openness, heterogeneity, and change.

The main problem to be dealt with within the framework of DIP is the integration problem. DIP stands for Data, Information, and Process integration. With the networked economy coming ever closer, integration efforts between organizations must increase significant ly. Integrations costs are the major bottleneck for realizing the full potential of electronic cooperation and business. Studies estimate that up to 30% of future IT budgets will be spent on integration activities within companies. This can become a major bottleneck and will likely strongly limit the cost-effectiveness of external cooperation, i.e., eCommerce, where the requirements of mature technology and scalability of integration solutions are even higher. DIP will therefore strive to develop Semantic Web Services as a scaleable and cost effective solution to the integration problem, dealing with one of the key bottlenecks of the modern networked society based on electronic communications.

Partners:

- National University of Ireland Galway - Digital Enterprise Research Institute (DERI)
- EPFL Lausanne
- University of Innsbruck - Institut für Informatik (IFI)
- British Telecommunications Plc.
- ILOG
- SAP AG
- Tiscali S.p.A. (Nuovo Mercato, Milan: TIS)
- FZI Karlsruhe
- The Open University, Milton Keynes
- Vrije Universiteit Brussels
- Inubit
- iSOCO
- Netdynamics
- Unicorn Solutions
- Bankinter
- Essex County Council
- Berlecon Research
- OntoText

Content-based multimedia

ACEMEDIA (IP)

http://www.acemedia.org

Future market viability of multimedia services requires significant improvements to the tools, functionality, and systems to support target users. aceMedia will research and develop a system, integrating knowledge discovery and embedded self-adaptability, to enable multimedia content to be self organising, self annotating, self associating; more readily searched (faster, more relevant results); and adaptable to user preferences and environments (self reformatting).

R&D objectives:

- Knowledge and context-assisted content analysis techniques based on a multimedia ontology infrastructure to support semantic entity detection and tracking of ACE content
- High-level semantic reasoning tools for automatic annotation and generation of the ACE metadata layer
- Query analysis tools and intelligent ACE search, retrieval, ranking and relevance feedback mechanisms
- Intelligent mechanisms to manage ACE communication, and methods to produce aesthetically appealing content and enhanced visualisation for navigation and rendering
- User interfaces and adaptivity support for aceMedia target applications

Partners:

- Motorola Ltd (Co-ordinator)
- Fraunhofer FIT
- Philips Electronics Nederland
- Thomson
- Queen Mary, University of London
- Universidad Autonóma de Madrid (UAM-GTI, UAM-NETS)
- Fratelli Alinari
- Telefónica Investigación y Desarrollo
- Dublin City University
- Informatics and Telematics Institute
- INRIA
- France Télécom
- Belgavox
- University of Karlsruhe
- Motorola SAS

AIM@SHAPE (NoE)

http://dlforum.external.forth.gr:8080/AIM@SHAPE/index.html

AIM@SHAPE is aimed at coordinating research on representing, modelling and processing knowledge related to digital shapes, where by shape it is meant any individual object having a visual appearance which exists in some (two-, three- or higher- dimensional) space (e.g., pictures, sketches, images, 3D objects, videos, 4D animations, etc.).

What is common to all shapes is that they all have a geometry (the spatial extent of the object), they can be described by structures (object features and part-whole decomposition), they have attributes (colours, textures, names, attached to an object, its parts and/or its features), they have a semantics (meaning, purpose), and they may also have interaction with time (e.g., history, shape morphing, animation, video).

Objectives:

- Establishing a new multi-disciplinary research field, which deeply integrates Computer Graphics and Vision with Knowledge Technologies.

- The core of the integration resides in the homogenisation of the approach to modelling shapes and their associated semantics using knowledge formalisation mechanisms, in particular metadata and ontologies which will provide the rules for linking semantics to shape or shape parts.

- Through a common formalization framework, it will be possible to build a shared conceptualisation of a multi-layered architecture for shape models, where the simple geometry is organized in different levels of increasing abstraction: geometric, structural and semantic layers.

Partners:

- Consiglio Nazionale delle Ricerche
- Università di Genova DISI
- Swiss Federal Institute of Technology EPFL
- Fraunhofer IGD
- Institut National Polytechnique de Grenoble
- INRIA
- Center for Research and Technology Hellas
- Université de Genève
- Max-Planck-Institut für Informatik
- SINTEF
- Technion CGGC
- Darmstadt University of Technology
- Utrecht University
- Weizmann Institute of Science

MUSCLE (NoE)

Multimedia Understanding through Semantics, Computation and Learning

http://www.cwi.nl/projects/muscle/public/general/intro.shtml

Due to the convergence of several strands of scientific and technological progress we are witnessing the emergence of unprecedented opportunities for the creation of a knowledge driven society. Indeed, databases are accruing large amounts of complex multimedia documents, networks allow fast and almost ubiquitous access to an abundance of resources and processors have the computational power to perform sophisticated and demanding

algorithms. However, progress is hampered by the sheer amount and diversity of the available data. As a consequence, access can only be efficient if based directly on content and semantics, the extraction and indexing of which is only feasible if achieved automatically.

MUSCLE aims at creating and supporting a pan-European Network of Excellence to foster close collaboration between research groups in multimedia datamining on the one hand and machine learning on the other in order to make breakthrough progress towards the following objectives:

- Harnessing the full potential of machine learning and cross-modal interaction for the (semi-)automatic generation of metadata with high semantic content for multimedia documents;
- Applying machine learning for the creation of expressive, context-aware, self-learning, and human-centered interfaces that will be able to effectively assist users in the exploration of complex and rich multimedia content;
- Improving interoperability and exchangeability of heterogeneous and distributed (meta)data by enabling data descriptions of high semantic content (e.g. ontologies, MPEG7 and XML schemata) and inference schemes that can reason about these at the appropriate levels.
- Through dissemination, training and industrial liaison, contribute to the distribution and uptake of the technology by relevant end-users such as industry, education, and the service sector. In particular, close interactions with other IP's and NOE's in this and related activity fields are planned.
- Through accomplishing the above, facilitate the broad and democratic (i.e. obviating the need for special expertise) access to information and knowledge for all European citizens (e.g. e-Education, enriched cultural heritage).

Partners:

- European Research Consortium for Informatics and Mathematics
- Centre for Mathematics and Computer Science
- Advanced Computer Vision, Austria
- Aristotle University of Thessaloniki, Greece
- Albert-Ludwigs-Universitat Freiburg
- Austria Research Centers, Seibersdorf Research, Gmbh, Austria
- CMM, Ecole des Mines de Paris
- Bilkent University, Turkey
- Cambridge University UK
- Commissariat a l'Energie Atomique, France
- Centre National de la Recherche Scientifique
- Institute of Information Theory and Automation, Czech Republic
- Ecole Nationale Superieure des Telecommunications, France
- Ecole Nationale Superieure de l'Electronique et de ses Applications, France
- Foundation for Research and Technology Hellas, Greece
- France Telecom R and D
- Institute fur Bildverarbeitung und angewandte Informatik e.V, Germany
- INRIA-Ariana, INRIA-Imedia, INRIA-Parole, INRIA-Texmex, INRIA-Vista
- Instituto di scienza e Tecnologie dell'Informazione A. Faedo
- Royal Institute of Technologie, Sweden
- LTU Technologies

- National Technical University of Athens, Greece
- Computer and Automation Research Institute of the Hungarian Academy of Sciences
- Tel Aviv University, Israel
- Trinity College Dublin, Ireland
- Israel Institute of Technology, Israel
- Technical University of Crete, Greece
- Graz University of Technology
- Vienna University of Technology, Austria
- University College London, UK
- University of Surrey, UK
- Universitat Politecnica de Catalunya
- University of Ulster, UK
- University of Amsterdam. Netherlands
- Technical Research Centre of Finland

METOKIS (STREP)

Methodology and Tools Infrastructure for the Creation of Knowledge Units

http://www.salzburgresearch.at/research/projects_detail_e.php?proj=79

METOKIS will create an architecture and tools for producing, exchanging, and trading knowledge units. Such units are conceived as self-describing knowledge and content structures that are tailored to support defined tasks within the overall workflow of knowledge workers.

For the knowledge units, METOKIS will develop a prototypic carrier architecture which builds on open standards as well as models of units that are created from multimedia assets and contain state-of-the art semantic annotation.

Based on task analyses in three knowledge workers' scenarios, METOKIS will also build real-world applications - each with differing knowledge content requirements. The three scenarios include definition and evaluation of treatment protocols for clinical trials; an educational on-line learning system for migrants; and a decision support system for senior executives.

Partners: ?

SIMAC (STREP)

Semantic Interaction with Music Audio Contents

http://www.semanticaudio.org

SIMAC's main task is the development of prototypes for the automatic generation, visualization, retrieval and organization of music collections. One special feature is the development and use of semantic descriptors. That is, ways to tag music that are close to the user's way of describing its contents. We are going to develop tools to be used by music consumers, music distributors, and music creators.

Semantic: SIMAC is about software tools to enhance our music enjoyment experience. The term semantic refers to well-defined representations of knowledge about music, which will improve the cooperation between people and computers.

Interaction: SIMAC is about bringing active involvement in the music listening process, it is about sharing views and music knowledge among music lovers. Interaction means new ways of describing, displaying, explaining, exploiting, discovering, playing and organizing music collections.

Music Audio Contents: SIMAC is about music metadata, about what you can say of a piece of music, on what is hidden in a music file, in a collection of music files, and in the collective knowledge of a community of music lovers. Music Audio Contents can be automatically extracted with the SIMAC tools in order to open up new navigation and retrieval strategies, or in order to get suggestions for discovering potentially interesting (but unknown!) music.
SIMAC will make possible to step beyond music information retrieval and move towards the realm of music content discovery.
There are 3 axes of research and technological development in SIMAC:

- Semantic descriptors of music
- Similarity in music
- Musical structure

Partners:

- Universitat Pompeu Fabra
- MATRIX DATA
- Austrian Research Institute for Artificial Intelligence
- Philips Research Eindhoven
- Queen Mary University of London

Knowledge-based adaptive systems

REWERSE (NoE)

REasoning on the WEb with Rules and SEmantics

http://www.rewerse.net

The objective of REWERSE is to strengthen Europe in the area of reasoning languages for Web systems and applications, especially Semantic Web systems and applications aiming at enriching the current Web with so-called intelligent capabilities for data and service retrieval, composition, and processing.

REWERSE's research activities will be devoted to:

1. Rule mark-up languages: aiming at unified mark-up and tools for reasoning Web languages

2. Policy specification, composition, and conformance: aiming at user-friendly high-level specifications for complex Web systems
3. Composition and typing: aiming at methods and rules for software interoperability in the Web context
4. Reasoning-aware querying: aiming at a query and transformation language for the Web with reasoning capabilities
5. Evolution and reactivity: aiming at specifying the evolution of Web-based data repositories
6. Web-based decision support for event, temporal, and geographical data: aiming at enhancing event, temporal and location reasoning on the Web
7. Towards a Bioinformatics Semantic Web: aiming at adding semantics to the Bioinformatics Web
8. Personalised information systems aiming at user-adapted Web information and teaching systems

In addition, REWERSE will develop university education and training as well as technology transfer and awareness activities so as to spread excellence within its research field in Europe.

Partners:

- University of Munich
- …

DIRECT-INFO (STREP)

http://www.joanneum.at/en/joanneum/presse_detail.php?p_iid=JR&p_oid=NEWS_133

In January the project DIRECT-INFO (funded by the European Commission under the 6th FP) was started with a kick-off meeting taking place at JOANNEUM RESEARCH in Graz. The project is targeted at the development of a next-generation platform for broadcast logging, monitoring and automated analysis. The DIRECT-INFO project will incorporate best-of-breed technologies and know-how from eight European companies and research centers specialized in automated analysis of digital content. DIRECT-INFO will be co-ordinated by the Institute of Information Systems & Information Management.

Partners: ?

ASPIC (STREP)

Argumentation Service Platform with Integrated Components

ASPIC is focused on knowledge-based services for the Information Society, based on semantically rich logic formalisms called Argumentation Systems. Over the last ten years, interest in argumentation has expanded dramatically, driven in part by theoretical advances but also by successful demonstrations of a wide range of practical applications. Initially, ASPIC will develop a common framework to underpin the services that are emerging as core functions of the argumentation paradigm. These include reasoning, decision-making, learning and communication. The end goal is a suite of software components based on this framework and a development platform for integrating these components with knowledge (e.g. semantic

web) resources and legacy systems. ASPIC will provide a sound basis for discussions of technical standards. ASPIC stresses the need to establish a formal foundation to support the creation, deployment and validation of practical argumentation systems and the core components will be developed using rigorous software engineering techniques. The consortium includes partners experienced in using argumentation systems in e-Health, e-Commerce, e-Government applications and these scientific areas will provide practical domains for testing and validating technology components. Towards the end of the project, the complete ASPIC platform will be used to demonstrate a large-scale application in knowledge management for product development. The consortium includes leading European researchers and experienced industrial partners with unrivalled technical competence and track records. The deliverables of the project will include contributions to basic research, sound and scalable software and innovative applications. The main body of the work is centred on the Priority Thematic Area "Information Society Technologies", objective 2.3.1.7. "Semantic-based knowledge systems" in particular and will also make a significant contribution to the goals of 2.3.1.11 "e-Health".

Partners:

- Advanced Computation Laboratory of Cancer Research UK
- University of Ljubljana (Slovenia)
- Technical University of Catalonia (UPC, Spain)
- IRIT- Toulouse (France)
- University of Surrey (UK)
- University of Liverpool (UK)
- Utrecht University (Netherlands)
- Brooklyn College, City University of New York (USA)
- Navus (Ravensburg, Germany)
- Zeus Consulting (Greece)

Support measures

KB2.0 SSA

AGENTLINK III

http://www.agentlink.org/

AgentLink III is the new European Co-ordination Action for Agent Based Computing, is a network of researchers and developers with a common interest in agent technology. Launched on 1st January 2004, it follows on from AgentLink II, and will continue to provide resources and information on Agent-Based research across Europe.