Chapter 4.2
Semantic Web Take-Off in a European Industry Perspective

Alain Léger
France Telecom R&D, France

Johannes Heinecke
France Telecom R&D, France

Lyndon J.B. Nixon
Freie Universität Berlin, Germany

Pavel Shvaiko
University of Trento, Italy

Jean Charlet
STIM, DPA/AP-Hopitaux Paris & Université Paris 6, France

Paola Hobson
Motorola Labs, UK

François Goasdoué
LRI, CNRS et Université Paris Sud XI, France

ABSTRACT

Semantic Web technology is being increasingly applied in a large spectrum of applications in which domain knowledge is conceptualized and formalized (e.g., by means of an ontology) in order to support diversified and automated knowledge processing (e.g., reasoning) performed by a machine. Moreover, through an optimal combination of (cognitive) human reasoning and (automated) machine processing (mimicking reasoning); it becomes possible for humans and machines to share more and more complementary tasks. The spectrum of applications is extremely large and to name a few: corporate portals and knowledge management, e-commerce, e-work, e-business, healthcare, e-government, natural language understanding and automated translation, information search, data and services integration, social networks and collaborative filtering, knowledge mining, business intelligence and so on. From a social and economic perspective, this emerging technology should contribute to growth in economic wealth, but it must also show clear cut value for everyday activities through technological transparency and efficiency. The penetration of Semantic Web technology in industry and in services

DOI: 10.4018/978-1-60566-066-0.ch001

is progressing slowly but accelerating as new success stories are reported. In this chapter we present ongoing work in the cross-fertilization between industry and academia. In particular, we present a collection of application fields and use cases from enterprises which are interested in the promises of Semantic Web technology. The use cases are focused on the key knowledge processing components that will unlock the deployment of the technology in industry. The chapter ends with the presentation of the current state of the technology and future trends as seen by prominent actors in the field.

CURRENT SITUATION

As a result of the pervasive and user-friendly digital technologies emerging within our information society, Web content availability is increasing at an incredible rate but at the cost of being extremely multiform, inconsistent and very dynamic. Such content is totally unsuitable for machine processing, and so necessitates too much human interpretation and its respective costs in time and effort for both individuals and companies. To remedy this, approaches aim at abstracting from this complexity (i.e., by using ontologies) and offering new and enriched services able to process those abstractions (i.e., by mechanized reasoning) in a fully – and trusted - automated way. This abstraction layer is the subject of a very dynamic activity in research, industry and standardization which is usually called "Semantic Web" (see for example, DARPA, European IST Research Framework Program, W3C initiative, OASIS). The initial application of Semantic Web technology has focused on Information Retrieval (IR) where access through semantically annotated content, instead of classical (even sophisticated) statistical analysis, aimed to give far better results (in terms of precision and recall indicators). The next natural extension was to apply IR in the integration of enterprise legacy databases in order to leverage existing company information in new ways. Present research has turned to focusing on the seamless integration of heterogeneous and distributed applications and services (both intra- and inter-enterprise) through Semantic Web Services, and respectful of the legacy systems already in place, with the expectation of a fast return on investment (ROI) and improved efficiency in e-work and e-business.

This new technology takes its roots in the cognitive sciences, machine learning, natural language processing, multi-agents systems, knowledge acquisition, automated reasoning, logics and decision theory. It can be separated into two distinct – but cooperating fields - one adopting a formal and algorithmic approach for common sense automated reasoning (automated Web), and the other one "keeping the human being in the loop" for a socio-cognitive Semantic Web (automated social Web) which is gaining momentum today with the Web 2.0 paradigm[1].

On a large scale, industry awareness of Semantic Web technology has started at the EC level with the IST-FP5 thematic network Ontoweb[2] [2001-2004] which brought together around 50 motivated companies worldwide. Based on this experience, within IST-FP6, the Network of Excellence Knowledge Web[3] [2004-2008] made an in-depth analysis of the concrete industry needs in key economic sectors, and in a complementary way the IST-FP6 Network of Excellence REWERSE[4] was tasked with providing Europe with leadership in reasoning languages, also in view of a successful technology transfer and awareness activities targeted at the European industry for advanced Web systems and applications. This impetus will continue and grow up in the EU IST-FP7 [2007-2013][5].

The rest of the chapter is organized as follows. Four prototypical application fields are presented in Section 2, namely (1) healthcare and biotechnologies, (2) knowledge management (KM), (3) e-commerce and e-business, and finally, (4) multimedia and audiovisual services. Finally, Section