

# Experiences from Semantic Web Service Tutorials

Michael Stollberg<sup>1</sup>, Matthew Moran<sup>2</sup>, Liliana Cabral<sup>3</sup>, Barry Norton<sup>3</sup>, John Domingue<sup>3</sup>

<sup>1</sup> DERI Austria, University of Innsbruck, Austria  
michael.stollberg@deri.org

<sup>2</sup> DERI Ireland, National University of Ireland, Galway, Ireland  
matthew.moran@deri.org

<sup>3</sup> Knowledge Media Institute KMI, Open University, Milton Keynes, UK  
{l.s.cabral,b.j.norton,j.b.domingue}@open.ac.uk

**Abstract.** We have given around 20 tutorials on Semantic Web Services in international events during the last two years. This position paper presents our experiences and depicts central aspects relevant for education, dissemination and exploitation of Semantic Web and Semantic Web service technologies in academia and industry.

## 1 Introduction and Overview of Tutorials

The potential of the Semantic Web will only become tangible if it is widely used. The pre-requisite therefore is that many people need to know what it is, how to do it, and how to use it. In order to contribute to the education and dissemination challenge for the next generation of Web technologies, we have given a series of tutorials on Semantic Web services. This paper presents our experiences and exposes critical aspects we have identified for a wide application of Semantic Web technology.

Centered on the Web Service Modeling Ontology WSMO [2] as the most comprehensive framework for Semantic Web services, the aim of our tutorials is to provide a thorough overview of the field. Most tutorials are given as full day events. The morning session introduces the ideas and challenges, and explains the concepts and definitions of prominent frameworks for Semantic Web services as well as the techniques developed for semantically enabled discovery, composition, mediation, and execution of Web services. The afternoon session introduces execution environments for Semantic Web services as prototypes for semantically enabled service-oriented computing, and concludes with a hands-on session wherein attendees practically apply the presented technologies.

Starting in 2004, we have presented around 20 tutorials in international events [1]. The audience has been between 10 and 30 attendees, mainly comprised of students, academic researchers, and industrial practitioners. We observed the following ratio of attendees with respect to previous knowledge on the field, naturally varying for particular events: 40% newcomers, 50% researchers or developers that work with related technologies, and merely 10% of experts in semantic technologies.

## 2 Critical Aspects for Education and Dissemination

Through the tutorials we depict certain aspects as critical for achieving the aspired proliferation of the Semantic Web and Semantic Web services. We list these and expose recommendations that should be addressed by the Semantic Web community in order to successfully proliferate and establish the Semantic Web.

- Ontologies are the backbone technology for the Semantic Web. Every data item that is published, communicated, and interpreted by machines shall be based on ontologies. The pre-requisite therefore is that a shared understanding of domains is explicated in ontologies. However, we have experienced very limited abilities in conceptualizing and formalizing for ontology creation  
=> *Ontology Engineering should become a central topic of academic education*
- The central pillar of Semantic Web services are *formal descriptions*. These need to be correct (conceptually and formally) – otherwise no mechanized Web service technology works. We have experienced even less abilities in formal specifications than for ontology creation  
=> *Formal Specification is central competence for Semantic Web engineers*
- Most Semantic Web and Semantic Web service technologies rely on or extend existing AI technologies (e.g. knowledge representation, planning, data integration, process algebras, etc.). Especially for people working in the Semantic Web, we have experienced fairly limited basic knowledge in related AI techniques  
=> *education in Artificial Intelligence is the basis for Semantic Web research*
- In every tutorial, especially from industrial practitioners but also from researchers, questions were raised on the availability of software tools for modeling ontologies and Web service descriptions, for reasoning, or for execution environments  
=> *Tool Provision is a pre-requisite for broad adoption of the Semantic Web*
- Service-oriented computing is seen as the paradigm for the next generation of IT systems, with Web services as the base technology. We have experienced very limited real-world scenarios for the use of Semantic Web services in SOA.  
=> *practical SOA scenarios will drive the adoption of Semantic Web services*

To conclude, an extensive set of technologies has been developed by the Semantic Web service community. To demonstrate the attainable benefits, these need to be applied in broad scale. In consequence, we successively enhance our tutorials and broaden our activities on education (i.e. academic courses) and dissemination (i.e. industrial training) of semantic technologies with respect to the identified aspects.

## References

1. Stollberg, M. (ed.): WSMO Tutorial. WSMO Working Draft D17, 06 June 2006; online at: <http://www.wsmo.org/TR/d17/>.
2. The Web Service Modeling Ontology WSMO, see homepage: [www.wsmo.org](http://www.wsmo.org)