Methods Enabling Web Information Service Engineering on the Semantic Web (Extended Abstract)

Terje Wahl

Department of Computer and Information Science,
Norwegian University of Science and Technology,
Sem Sælands vei 7-9, N-7491 Trondheim, Norway
`terje.wahl@idi.ntnu.no`

This paper concerns a recently started research project[1] investigating methodology issues regarding The Semantic Web (SW). The SW envisions adding structure and semantic information to the content of webpages, enabling machines to understand and reason about information on the Web in a generalized manner. So far several representation languages have been specified, including RDF for resource descriptions, OWL for specifying ontologies, OWL-S for describing Semantic Web Services and various other languages for representing business process models. Currently the research community also focuses on issues related to automated reasoners, trust and security for the SW. The areas of Semantic interoperability and usage of Software Agents for utilizing Semantic Web Services are also receiving a lot of attention.

Model-driven application development is central in Web information systems and service engineering. Many problems encountered when building applications of information systems and services involve the manipulation of models. The problem becomes more evident when the process is distributed. Moreover, during the system development process the heterogeneity of the fragments increases due to the highly interactive and iterative nature of the development process and to the different, sometimes conflicting, view of the problem and solution taken by the different stakeholders. Current SW prototypes seem to be built in an ad-hoc way. There has been a good deal of focus on representation languages for the SW, but not so much on methodology for how to use these specifications together to develop a useful solution for the users. A cohesive methodology for developing Web information systems and services is needed if the SW is to move from the research community into general use.

The overall objective of the author's thesis is to contribute to the development of methods and tools for establishing information services in the context of the SW. It is *not* a goal to develop yet another representation language, but rather to utilize existing

---

ones to look at methods for how these can be used together to develop Web information services and systems. An integrated approach for ontology and information service engineering will be developed, including techniques for information service provision and consumption and techniques for quality management of the process and product in Web information systems development. A cohesive methodology must be developed to facilitate the coordination and management of the service development process, and a methodological approach for integration and manipulation of all information produced during the project should be developed. Web information systems and service development should also be supported by providing means for semantic interoperability and management of specification fragments independently of development phase, model perspective, view, or representation language.

Another closely related and interesting research question is adaptation and configuration of SW systems and services for non-technical users. If the SW is to attain a global reach, the author believes that it must be simple to use for non-technical business users. This means that business users must themselves be able to semantically enrich data-sources that are not automatically enriched, and perform work by composing SW Services into business processes and executing them. This will require a strong user-friendly framework as a basis for work, and a robust methodology to guide users in their work.

Existing approaches for information modeling and meta-modeling will be combined with the workflow modeling approach from the PhD-student working on Workflow Modelling (also in the WISEMOD-project) to form a comprehensive methodology for Web information service and application engineering. The result will be a new model-based methodology for the engineering of Web information services and applications, resulting in better SW applications than what can be achieved with current approaches.

So far, some research regarding state-of-the-art in SW technology has been performed. A study of issues for utilizing and enabling the global SW has been conducted. Various methodologies and their quality will be surveyed to examine what types of methods may be best suited for developing SW services and systems. This may include both methods specifically targeted to Web service development and more general software development methods. These more general methods will be surveyed by investigating to what extent they can be adapted to support Semantic Web Services development. A combination of empirical and analytical approaches will be used. A proof-of-concept prototype tool will be built to support the suggested development process and be used as a basis for practical experimentation. The practical usefulness of the suggested approaches for information service engineering will thus be evaluated. Experience reports from the various studies undertaken will form the evaluation part of the thesis.