

Position Paper: How the Semantic Web can work with the Web Services?

Naohiko Uramoto (uramoto@jp.ibm.com)
IBM Research, Tokyo Research Laboratory and
National Institute of Informatics

The goal of the Semantic Web is to make the Web machine processable by using:

- Sets of assertions with RDF
- Inference
- Ontology

The Semantic Web is a very emerging technology for modeling web of the Web. However, the another trend of modeling the Web is Web Services based on:

- Sets of operations (functions) with SOAP
- Service description and binding
- Directory (UDDI)

Many companies including Microsoft, IBM, HP, and so on are very keen on supporting the Web Services in their products. The goal of the two is the same, but they have very different approaches.

My interest is that what is the essential difference between them, and how to integrate the two technologies, since they should not grow separately.

We can imagine how to integrate them.

- The Semantic Web on the Web Services. We can define a Web services that provide assertions and ontology information. By using discovery framework provided by UDDI, we can find appropriate assertions without knowing where they are.
- The Web Services on the Semantic Web. By processing assertions and ontology information, we can provide intelligent services. It is very useful in the real world, since many business middleware will support Web services soon. At this moment, many useful tools are available for free.

There are some common constructs for both technologies. For example, digital signature is one of very important for them. Semantic Web requires it for establishing a "trust model" to qualify assertions. Web services needs it since security is an important building block for developing real B2B or B2C systems.

Another my interest is how to make trust system on the Web space. As many people pointed out, keeping consistency of assertions in distributed environment is very difficult. Digital signature is a good tool, but it is not enough.

We are now developing a set of core security services including digital signature, encryption, and access control. These services can be applied to Semantic Web applications. Digital signature is used to qualify assertions and protect integrity of them. Encryption is required to keep confidentiality of valuable assertions. Access control for any elements of XML documents are very important technology to maintain assertions. The services are being developed based on standard technologies from W3C, IETF, and other standard bodies. We are using open-source tools such as Apache XML tools.

Semantic Web at this moment is a vision, but we should create something that can run in the real world (like XML and HTML). To develop real tools, I think we need a shared "playground" for developing tools and evaluating new ideas. The playground provides a set of assertions written in RDF and other language, database, and ontology. Only small environment is enough for early stage, but we must improve scale of it since scalability is very important for the Semantic Web research.