Handout for WWW-2003 Panel on
Semantic Web Services: Obstacles and Attractions

Chair: Benjamin Grosof (MIT Sloan School of Management) <bgrosof@mit.edu>

Panelists: Christoph Bussler (Oracle), Avi Bernstein (U. Zurich),

Bijan Parsia (U. Maryland); *in absentia:* Sheila McIlraith (Stanford U.)

Resources Page: http://ebusiness.mit.edu/bgrosof/#SWSPrimer, esp. -> quick list of resources

Topic of the panel: is Semantic Web Services, and what it will take, from the R&D community, and from industry and standards bodies more generally, to make them become real. The focus is twofold. First, what are important obstacles we can anticipate? How can they be overcome or avoided? Second, what are their attractions? What, who, and when will be the drivers to invest in creating the technologies and in adopting the technologies? Is it more likely that the area will be driven from Semantic Web side or from the Web Services side? Which industries or tasks will be the early adopter areas? Which particular R&D or business or standards communities today are lacking sufficient interaction? What history must be remembered, or doomed to be repeated? What aspects of the obstacles and attractions have not yet received enough attention? What will be the "killer applications"?

Background about the Topic: Semantic Web Services (SWS) is the convergence of Semantic Web (SW) and Web Services (WS). First, SWS can be parsed as Semantic (Web Services). This includes, e.g., knowledge-based service descriptions of (parts of) general Web Services, or knowledge-based descriptions of (parts of) deals (e.g., pricing, guarantees, problem resolution) about general Web Services. Such descriptions of a service and/or of a deal about a service can be used for multiple higher-level tasks about services, including their discovery (search), invocation, negotiation, selection, composition, execution, monitoring, and verification. Another kind of Semantic (Web Services) includes services that provide specific integrated knowledge. Second, SWS can be parsed as (Semantic Web) Services. This includes, in particular, infrastructural services to support the Semantic Web, e.g.: the service of providing generic capabilities for integration of knowledge/info/DB, for inferencing, and/or for translation between different forms or locales of knowledge/databases. Overall, however, a consensus definition and conceptualization of SWS is still forming. To date, Semantic Web and Web Services have been largely decoupled in industry standards and development efforts. However, as of mid-2002, a research community with aspiration towards standards has been forming around SWS, especially in the US and EU. The largest focus of work to date in the US has been the DARPA Agent Markup Language (DAML) Program in the US; this has a group working on DAML-Services, a specification for SWS service descriptions. Other efforts within DAML, e.g., MIT SWEET, have been addressing application scenarios for SWS, including in e-contracting and financial services; these have motivated an increase in focus on rules in SWS, along with techniques to integrate rules with ontologies. The largest focus of work to date in the EU has been the Web Services Modeling Framework (WSMF), around which a number of researchers and companies have expressed interest. WSMF researchers are oriented especially to providing mediation functionality between services. Both the DAML-S and WSMF efforts are attempting to stack more SW layers of functionality and protocols above the lower-level ("conventional") WS functionality and protocols that are the main focus of current Web Services standardization efforts. There is as yet only a relatively weak connection between the SW and WS communities, which poses dangers that current SWS efforts may be ignored or bypassed by the future trajectory of WS. There are a number of potential application areas for SWS that are being discussed in the SWS community. One area is e-contracting and supply chain management including procurement, e.g., in: computer/electronics manufacturing, where RosettaNet is a forerunner; automotive, where Covisint is a forerunner; and office supplies where OBI is a forerunner. Another area is retailing, e.g., shopbots and salesbots that provide comparisons, recommendations, or dynamic pricing; these already use knowledge-based and XML techniques. E-contracting and inter-enterprise e-business communication are the subject of extensive standards activity, e.g.: Oasis ebXML and eContracts; UN UBL; and EDI. A third area is what one can call "cyber" goods which are essentially informational in nature, e.g.: financial services; news; travel "agency" -- tickets, packages; and military intelligence (e.g., funder and early adopter of DAML). In each of these, knowledge-based XML techniques are in commercially deployment. A longer list of potential SWS application areas are in earlier stages of research and standardization along the path to commercial deployment. These include, e.g., auctions, insurance, international aspects of e-commerce, security authorization policies, reputation systems, dispute resolution, computer games, advertising, bioinformatics, and the (scientific) Grid. However, which will be the most important early adopter areas for SWS, and why, is as yet unclear.