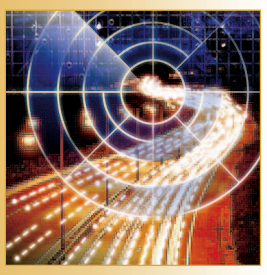

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A Semantic Web Services Architecture

The Semantic Web Services Initiative Architecture (SWSA) committee has created a set of architectural and protocol abstractions as a foundation for Semantic Web service technologies. This article summarizes the committee's findings, emphasizing its review of requirements gathered from several different environments. The authors also identify the scope and potential requirements for a Semantic Web services architecture.

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Formed in February 2003, the Semantic Web Services Initiative Architecture (SWSA) committee's mission is to develop the necessary abstractions for an architecture that supports Semantic Web services. The resultant framework builds on the W3C Web Services Architecture working group report (and is motivated in part by Tim Berners-Lee's vision for the Semantic Web[1]). Other groups developing Semantic Web services frameworks contributed to our discussions, including the Web Ontology Language for Services (OWL-S) consortium, the Web Service Modeling Ontology (WSMO) group at the Digital Enterprise Research Institute (DERI), and the Managing End-to-End Operations-Semantics (METEOR-S; http://lsdis.cs.uga.edu/projects/meteor-s/) group at the University of Georgia.[2,3]

In this article, we describe the protocols exchanged between the interacting entities or agents that interpret and reason with semantic descriptions in the deployment of Semantic Web services. We focus specifically on those capabilities that extend the potential range of Web services; we also discuss security, reliability, and a flexible means of recovery from the problems that can occur in open and evolving environments. The SWSA architectural framework attempts to address five classes of Semantic Web agent requirements – dynamic service discovery, service engagement, service process enactment and management, community support services, and quality of service (QoS) – which we cover in detail here as well.

Multiple Distributed Environments

Systems developed via Web service technologies are often limited by their need to agree in advance on the syntax and semantics of various communications. Whereas the World Wide Web is successful in part because it makes it easy to interact with and gather information from sites that are discovered dynamically, tra-

 Published by the IEEE Computer Society 1089-7801/05/$20.00