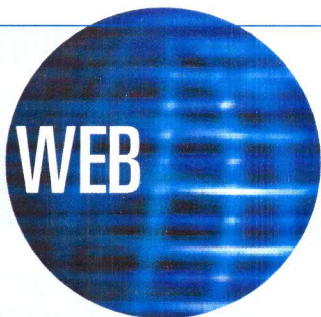


SPINNING THE WEB



Spinning the Web is a new column designed to keep ACS staff informed about innovative and interesting developments in Web technology. *The Phoenix* welcomes contributions from staff members who have found useful or cutting-edge Web applications.

Looking Ahead: The Semantic Web *By Svetla Baykoucheva*

Anyone who has typed a couple of key words into the dialog box of a search engine and drawn thousands of hits has felt the drowning sensation of Web searching. Directories were originally created to address this lack of precision. This provided a partial solution for searching static pages, but, increasingly, information sites on the Web include audio/video formats or broadcasts. In the near future, television programs, too, will be accessed more frequently through the Web.

For several years, the information community has been looking for ways to make searching the Web less chaotic. Several new developments promise to make searches much more efficient and enable users to retrieve information from catalogs and proprietary databases not currently accessible through search engines. Metadata tags, for example, will allow search engines to provide more enhanced retrieval options for their users, who will be able to search the Web as if it were one giant database. The rich metadata that will populate the Web will be machine readable, intuitive, and semantically flexible.

Efforts are underway to build the foundation for a global, intelligent, reactive knowledge exchange system. The Semantic Web is the next step in the Web's evolution. It is a web of data—something like a global database. Tim Berners-Lee, founder of the World Wide Web Consortium (W3C) and inventor of the Web, first coined the term "Semantic Web". Under his guidance, the W3C has developed tools that, if widely adopted, could make the Semantic Web a reality. Berners-Lee invented the World Wide Web in 1990 while working at CERN, the European Particle Physics Laboratory in Geneva, Switzerland. A graduate of Oxford University, he is now direc-

tor of the W3C and a principal research scientist at the Massachusetts Institute of Technology Laboratory for Computer Science. Berners-Lee's account of his invention and its growth, *Weaving the Web: The Original Design and Ultimate Destiny of the World Wide Web by Its Inventor* (New York, NY: Harper, 1999), is now available in the ACS Library & Information Center. In this book, the author describes how his drive to make communications easier and more direct within a scientific community matched the world's desperate need to manage an explosion of information. According to the 44-year-old Berners-Lee, the future advancement of the Web should be directed to two major developments: the intuitive Web (he describes it as a closer linking between humans and computers), and the Semantic Web, the need to define data of all kinds so that it can be processed by machine.

In the narrowest sense, semantics is the science that studies how and why meanings are assigned to certain words. Efforts to apply semantics to the Web look, for the first time, at why certain kinds of information have specific significance and how this significance should affect the arrangement of information. The Semantic Web will organize Web-accessible content semantically, rather than through syntactic and structural methods, and will contain more than just raw content. Meaning itself is embedded in the framework of the Web, and its infrastructure reflects and communicates the relationships among Internet resources. Semantics results in deep understanding of content, allowing highly relevant and fresh results, better personalization, and exceptional targeting. The semantic search is the most precise and freshest search for integration of dynamic Web pages. The Semantic Web will pro-

vide an explicit, machine-readable conceptual structure for the Web.

Base technologies for enabling the Semantic Web are being developed, including XML and the Resource Description Framework (RDF), a "metadata" framework that allows semantic relationships to be expressed in structures that can be read and processed by computer programs. Extensible markup language, or XML, is a way of tagging information with hidden codes to enrich data on the Web and allow software to automatically process instructions where human intervention was previously required. XML is only the first of several building blocks that make the Semantic Web work. Other components include vocabulary, logic, and validation.

A workshop on the "Semantic Web" was held in Lisbon, Portugal, in September 2000, as part of the European Conference on Digital Libraries. Sixty-three participants from 22 countries discussed models, architecture, and management problems of the Semantic Web. The goal of the workshop was to promote the formation of a multidisciplinary community working on the theory and implementation of the Semantic Web.

The Semantic Web provides a basis for handling information overload. It creates a global information infrastructure and an environment for learning and decision making. It will also make the Web much more powerful. Exactly what form the Semantic Web will take is still difficult to imagine, but it has the potential to radically change the way people and machines interact. Meanwhile, tune up for two new buzzwords that you will be hearing in the near future: DAML and DARPA. Both will be featured in future issues of *The Phoenix*.