The Semantic Web is a collaborative effort by the W3C to standardize the representation of Web content and to enable its automated processing. After years of research and standards activity, there is growing interest in finding real-world applications for Semantic Web technologies, e.g., RDF, RDF Schema, OWL. Tim-Berners Lee emphasized this in his keynote address at the 2003 WWW conference. Products involving Semantic Web technologies are emerging from start-ups such as Semagix and Network Inference. But Semantic Web applications have not yet made a large impact on the mainstream.

Real-world applications are subject to real-world requirements. The opportunity is at hand for the database community to address challenges faced by Semantic Web applications. Indeed, the database community is becoming more visible in the Semantic Web world. The 2002 Amicalola Report invited senior researchers from within and outside of database and information systems community to discuss DB-IS Research for Semantic Web and Enterprises. VLDB 2003 saw the first workshop on the Semantic Web and Databases and the International Semantic Web Conference had the first workshop on Practical and Scalable Semantic Systems.

The theme of the March 2002 Data Engineering Bulletin was "Organizing and Discovering the Semantic Web." It focused primarily on search technologies, e.g., computing Web page importance, classification, etc. This issue has a follow-up theme – "Making the Semantic Web Real." We begin with a commentary by Frank Manola who provides his perspective on the Semantic Web, comparing it to a heterogeneous distributed database system. He then makes some acute observations about the practical viability of the Semantic Web and discusses relevant database research challenges.

The remaining articles are organized into two sections, the first addressing core technology challenges in realizing the Semantic Web and the second describing Semantic Web applications and application frameworks. The article by Vassilis Christophides et al. presents their Semantic Web data integration middleware that uses Datalog-like rules to map XML and relational data to RDF where it can then be processed with Semantic Web tools and query languages. The article by Laks Lakshmanan and Fereidoon Sadri also proposes mapping data sources to a semantic model. They describe query processing and optimization techniques that use semantics of the data sources such as foreign keys and functional dependencies.

The article by Paulo Pinheiro da Silva et al. addresses information *provenance* and presents an infrastructure for managing provenance at varying levels of detail. Provenance, and the related notion of context, is an important issue for the Semantic Web where information is retrieved and derived from multiple sources. The article by Wilkinson et al. discusses challenges in storing and retrieving large RDF data sets and the implementation of RDF persistence in Jena, a Semantic Web developers' toolkit.

The first application article is by Amit Sheth and Cartic Ramakrishnan. It argues that "a little bit of semantics" can significantly improve applications, that complex reasoning is not always required. It then presents the Semagix Freedom architecture, an application framework that embodies this notion. The article by Nathalie Morena et al. presents another application framework. It has tools for developing storage schema, querying and annotating content, including the ability to annotate content from the *Deep Web*, i.e. generated content.

The article by Joseph Kopena and William Regli describes the use of Semantic Web technologies for complex design repositories. This enables components to be described and reused based on functional characteristics rather than just the physical characteristics captured by current design repositories. The issue concludes with Christoph Bussler's article on the relevance of Semantic Web technology to Enterprise Application Integration and the extension to semantic web services.

We hope you find these articles interesting and that they suggest ideas for future research. And, we want to thank the authors for their excellent contributions.