Web services are emerging as the paradigm and the technology of choice for integrating applications on the Web, both within and across enterprises. They represent the natural evolution of integration technologies, from being focused on interoperability among objects residing on the same LAN to supporting interaction of components at coarser granularity and accessed through a WAN, possibly across firewalls. The unprecedented agreements of virtually all major software vendors have made it possible to standardize at least the basics aspects of service description, discovery, and interaction, so that now the majority of application servers support the same concepts and the same basic standards. This appears to pave the way for a successful evolution of this still relatively young area. Indeed, most industry analyst and IT professional believe that Web services will be a driving force in e-business, although their adoption rate is slower than what most people initially predicted.

Besides their appeal from a business perspective, Web services raise a number of interesting challenges from a research point of view. It is not by chance that many academics are also very active in this area. This special issue includes several papers, from both the industry and the academia, that frame the notion of Web services and discuss problems, architectures, and applications of this novel technology. Rather than presenting solutions, the goal of the special issue is to provide an overview of ongoing research projects in this very dynamic area.

The issue starts with a paper by Gustavo Alonso, providing a critical discussion on what is the truth behind common beliefs about Web services. Then, Asuman Dogac et al. address an important and largely unsolved issue: that of describing the semantics of Web services.

The next set of papers focus on languages and infrastructures for Web services. They present the perspectives of major Web services software vendors, e-commerce enablers, and academic research groups. This central part of the special issue starts with a paper by Mike Carey, Michael Blevins, and Pal Takacsi-Nagy of BEA, describing the capabilities of WebLogic 8.0. Next, David Burdett, Qiming Chen, and Meichun Hsu of CommerceOne show how Conductor extends current Web service technology with features supporting secure interaction and collaborative process execution. Roger Barga of Microsoft presents the Phoenix project, whose goal is that of enabling transparent application recovery, freeing developers from the need of writing code for this purpose. The series of industrial infrastructure papers is concluded by a paper describing work done at HP labs on applying business intelligence techniques to managing e-business operations.

These industrial papers are followed by four contributions coming from the academia, all addressing the problem of service composition, although from different angles and in different contexts. First, Enzo Colombo et al. present VISPO, a research project addressing the dynamic composition of services and its applicability in the context of cooperative processes. The paper by Mike Papazoglou et al. combines Web services and artificial intelligence techniques into a framework for specifying services of interest, possibly to be executed by aggregating other services. Next, the contribution by Boualem Benatallah et al. introduces SELF-SERV, a platform for the specification and execution of composite services in a centralized or peer to peer fashion. Finally, Marco Brambilla et al. show a framework for designing and extending Web applications with support for Web services and service composition.

The special issues concludes with two papers describing interesting applications of Web service technology: the first one, by Jens Graupmann and Gerhard Weikum of the University of the Saarland, describes how Web services can be used to support information retrieval that goes beyond portal boundaries. The second, by Mariano Cilia and Alex Buchmann of TU-Darmstadt, shows how Web and active database technology can be used for providing services to car drivers.

We hope that the reader will enjoy this special issue, and we thank all the authors for their excellent contributions.