Web services technologies are advancing fast and being extensively deployed in many different application environments. Web services based on the eXtensible Markup Language (XML), the Simple Object Access Protocol (SOAP), and related standards, and deployed in Service-Oriented Architectures (SOAs) are the key to Web-based interoperability for applications within and across organizations. Furthermore, they are making it possible to deploy applications that can be directly used by people, and thus making the Web a rich and powerful social interaction medium. The term Web 2.0 has been coined to embrace all those new collaborative applications and to indicate a new, “social” approach to generating and distributing Web content, characterized by open communication, decentralization of authority, and freedom to share and reuse.

For Web services technologies to hold their promise, it is crucial that security of services and their interactions with users be assured. Confidentiality, integrity, availability, and digital identity management are all required. People need to be assured that their interactions with services over the Web are kept confidential and the privacy of their personal information is preserved. People need to be sure that information they use for looking up and selecting services is correct and its integrity is assured. People want services to be available when needed. They also require interactions to be convenient and personalized, in addition to being private. Addressing these requirements, especially when dealing with open distributed applications, is a formidable challenge. Many of the features that make Web services an attractive approach for distributed applications result in difficult security issues. Conventional security approaches, namely those deployed for networks at the perimeter level, such as firewalls and intrusion detection systems, are not able to protect Web services and SOAs. Web services and SOAs are very dynamic in terms of their interactions and compositions and moreover they are seldom constrained to the physical boundaries of a single network. As SOA-based applications may consist of a large number of components from different security administration domains, each using different security techniques, security interoperability is
a crucial issue. Data exchange applications built using Web services organized according to SOAs very often need to pass through intermediaries, and therefore trust and strong protection of transmitted contents is essential.

In the context of such trends, this book aims at providing a comprehensive guide to security for Web services and SOAs, with the twofold goal of being a reference for relevant standards and of providing an overview of recent research. As such the book covers in detail all standards that have been recently developed to address the problem of Web service security, including XML Encryption, XML Signature, WS-Security, and WS-SecureConversation. With respect to research, the book discusses in detail research efforts and proposals covering access control for simple and conversation-based Web services, advanced digital identity management techniques, and access control for Web-based workflows. The discussion on such research topics is complemented by an outline of open research issues. The book also covers relevant open research issues, such as the notion of security as a service as well as the privacy for Web services, and introduces all relevant background concerning Web services technologies and SOAs.

We trust that the contents of this book will be of interest to a diverse audience, including practitioners and application developers, researchers, and students.

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