

Semantic Web Services

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Preface

All students interested in researching the Internet are living in very interesting and exciting times. From the Internet's beginning in the 1960s up to the present day, the Internet has grown to become a vast platform where there are now 2 billion users of this global infrastructure.¹ Predictions are that this number will rise to over 4 billion with the advent of the Mobile Internet, providing access to the Internet via mobile devices including mobile phones. We are also witnessing a number of other trends which are driving the popular use of the Internet. Firstly, we have the Web, which now contains over 1 trillion resources with over 10 million added each day. At the end of 2009 alone, there were 234 million websites of which 47 million were added in the year. Secondly, we have the Web 2.0 phenomenon where the focus is on prosumers who play a dual role of consumer and producer. Enabling the general community to create and publish online material has facilitated the creation of content at unprecedented rates. For example, the current upload to Flickr is equivalent to 30 billion new photos per year and YouTube now serves over 1 billion videos per day. A final, general Internet phenomena, has been the rise of user generated applications on mobile devices as exemplified by Apple's iPhone and iPad Apps within the iTunes Store. The combination of public interest and a relatively simple creation and publishing process have resulted in over 200,000 Apps now being available for the iPhone and iPad and have led to Apple's share price surpassing Google's. For a researcher, especially in ICT, a great interest lies in making an impact on our present world in some way. Whilst this impact is usually seen in the economic or commercial arenas, it may also have important social implications. A particularly interesting phenomenon which has emerged over the last century is the transition of the Global Economy from the one based on manufacturing (and before that on agriculture) to the one based on services, sometimes known as the third sector. As defined in Wikipedia, a service is the non-material equivalent of a good where the provision of a service does not result in ownership which distinguishes a service from providing physical goods. From small beginnings at the turn of the twentieth century, services now dominate the Global Economy, accounting for 63% of the world's Gross

¹<http://www.internetworldstats.com/stats.htm>.

Domestic Product at \$37 trillion in 2009. In a fundamental respect, this textbook examines the link between the above mentioned through the inclusion of two main technologies: Web services and technologies associated with the Semantic Web. In a technical sense, Web services are computational components which can be invoked using standard Web protocols. More importantly, Web services can act as proxies for business services that can be used to deliver some functionality for clients or users which adds value. It is this second feature of Web services as online substitutes for business services that has caused tremendous interest in the corporate sphere. After initial interest, however, a number of problems emerged related to how online services could be found, invoked and composed. Over the past decade Semantic Web technology has been applied to address this through the delegation of certain portions of the above tasks to automated or semi-automated systems. This textbook examines the combination of Web services and the Semantic Web from a number of core ingredients, exploring the fundamental essence of its constituents. In particular, the Web services and the Semantic Web are broken down into a set of underlying principles and explained using simple examples. Connections to the real world and industrial deployment are outlined using a number of non-trivial use cases and through examination of the technologies supporting the commercial Web service search company Seekda. An associated website at www.swsbook.org facilitates the inclusion and use of additional learning material. More generally, this book benefits from research experiences gained in three large European projects: DIP, SUPER and SOA4All which together have a combined budget of over 50 million euros. When combined with the extensive research track record of the authors, it is difficult to think of a more useful intellectual source for finding out about the Semantic Web Services area. If you are just embarking on a career as an ICT researcher, you are interested in services and/or semantics, or if you simply wish to catch up on the latest research in the Semantic Web area, then I thoroughly recommend that you read this book.

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