1. INTRODUCTION

In recent years, much progress has been made in developing ideas and tools to enable the growth of the Semantic Web. The core standard recommendations have reached a level of maturity that allows them to be widely adopted. A range of open-source and commercial software tools is now available. Commercial organizations are also increasingly using Semantic Web technology. However, the Semantic Web still has some distance to go before it reaches a point of widespread adoption.

There are many benefits that would be attained with the extensive adoption of the Semantic Web vision. For example, it would become easier for individuals to find information of interest on the Web and perform computation on that data. Yet, it is expected that many of the initial implementations of Semantic Web technologies will occur within commercial enterprises, and that these will pave the way for the creation of more general applications that operate on the Semantic Web. Consequently, it is very important that state of the art Semantic Web tools are able to meet the scalability, availability, and reliability requirements of commercial organizations.

This chapter reviews some of the business and technology challenges that companies are facing today, and describes how a number of these difficulties could be overcome with the use of Semantic Web tools and technologies. An
overview is then given on the state of the art of these tools and technologies. Use cases are provided that describe real world implementations and areas in which there would be significant benefit in the deployment of Semantic Web technology based solutions. Further, the chapter highlights why it is expected that mainstream adoption of the Semantic Web will initially occur within an enterprise setting.

2. BUSINESS AND TECHNOLOGY DRIVERS OF THE SEMANTIC WEB

Commercial organizations are always under pressure to perform financially. They need to ensure that they meet shareholder expectations while operating under increasingly stringent regulatory controls. Modern companies need to ensure that they can respond rapidly to changing business conditions, as the world continues to move at an ever-quickening pace. Companies are beginning to recognize that information technology can provide a strategic advantage in responding to key business drivers.

Companies today have a growing interest in being able to integrate all data related to the core components that drive their success. Consolidating information about key concepts—such as employees, customers, competitors, operations, and products—enables them to make decisions based on a comprehensive understanding of their business environment. Achieving this vision, however, is no easy task.

Organizations need to integrate not only structured data, but also the increasing volume of unstructured data that they collect and generate. Such unstructured data can take the form of text documents, emails, and presentations. As this unstructured data includes valuable, and sometimes hard-won knowledge, it is especially critical that these resources can be accessed and effectively used across the organization.

Many industries are moving toward more collaborative business models. For example, in the life sciences industry, it is common for companies to outsource various components of their pipeline from drug discovery to clinical evaluation. It is necessary for companies to have flexible data architectures so they can integrate data from collaborators with internally generated data. This becomes a real challenge when companies have many partners and have to manage many interrelated projects.

Increasingly, companies conduct business in many countries around the globe. Ensuring that their operations meet the legal requirements of each country is a complex and dynamic challenge. In addition to archiving information related to those operations, companies may have to record the