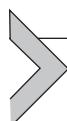# RDF and the Semantic Web Stack

In Chapter 2, we presented the main characteristics of database management systems available on the market. Recall that such a system corresponds to a complete software used to define, create, manage, query, and update some set of data. Of course, an RDF database management system (we use the term *RDF store* interchangeably) handles RDF data. To motivate and understand the details of these systems, we begin this chapter with a presentation of an important part of the Semantic Web stack. This stack regroups some general notions that have emerged in the context of Artificial Intelligence (AI), such as Knowledge Representation (KR), and that support the description of reasoning services over schemata and facts expressed in this extension of the current Web. Note that this inference aspect is a main peculiarity of the systems we are covering in this book—that is, standard database management systems do not natively support inference features.

3.1 SEMANTIC WEB

From its inception at the beginning of the 1990s, the Web has evolved. From a static version, mainly supported by HTML and CSS, it evolved into a more dynamic and write-intensive Web, qualified as 2.0. Nevertheless, both of these versions can be qualified as syntactic because the languages they are built upon only convey information toward rendering in web browsers. The Web evolution is far from being finished, and some obviously make reference to the next extension as Web 3.0, to include the addition of semantics-supported features. In this book, we prefer the term *Semantic Web* because it refers to a computer science field that emerged in the early 2000s (Berners-Lee et al., 2001). In contrast, the Semantic Web provides meaning to the information contained in Web documents.

This description and its interpretation are supported by a stack of technologies that have been designed and recommended by the World Wide Web Consortium (W3C) since 1999. This stack is frequently referred to as the *Semantic Web cake*, and one of its generally adopted current versions is presented in Figure 3.1. The layer organization of this technology stack implies that the elements described at a given layer are compliant with the standards defined at the lower layers. In this book, we are only concerned with the five bottom layers.

The lowest layer of this stack provides a global identification solution for the resources found on the Web. In Figure 3.1 they are referred to as *uniform/internationalized*