Chapter III

Data Schema Integration in Web-Enabled Systems

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ABSTRACT

In the recent years, most enterprises have started to experience the use of the Web for work cooperation to improve efficiency and information interchange. As a consequence, enterprise information systems are being migrated onto the web, and methods and tools to effectively access data provided on the web in different formats from the autonomous heterogeneous data sources are required. In particular, integration tools are required to obtain a uniform data representation by abstracting from the formats in the origin data sources and thus to build a global information space suitable for query and access interface.

The chapter will be devoted to discuss the characteristics of data schema integration in web-enabled, and to describe a comprehensive integration scheme for organizing heterogeneous information sources over the web, to enhance the capability of information interchange and interoperation among web-enabled systems.
INTRODUCTION

In recent years, most enterprises have started to experience the use of the Web for work cooperation to improve efficiency and information interchange. As a consequence, enterprise information systems are being migrated onto the Web, and methods and tools to effectively access data provided on the Web in different formats from the autonomous heterogeneous data sources are required. In particular, integration tools are required to obtain a uniform data representation by abstracting from the formats in the origin data sources and thus to build a global information space suitable for query and access interface (Parent & Spaccapietra, 1998).

In the literature, several approaches and tools for handling heterogeneous data sources have been developed, and information integration architectures based on mediator/middleware data models and ontologies have been proposed (Castano, De Antonellis & De Capitani di Vimercati, 2001a, 2001b; Fernandez, Florescu, Kang, Levy & Suciu, 1998; Garcia-Molina et al., 1997; Haas et al., 1999; Levy, Rajaraman & Ordille, 1996; Papazoglou & Milliner, 1998).

More recently, XML has emerged in the framework of markup languages and it is candidate to become a standard for information dissemination over the Web. As a consequence, in modern Web-enabled enterprise information systems, an interconnection scenario can be envisaged, where XML is adopted for representing exchange documents/data and their structure. In this context, powerful integration mechanisms for organizing and searching information can be developed using information provided by XML document/data structures (Arocena & Mendelzon, 1998; Deutsch, Fernandez, Florescu, Levy, & Suciu, 1998; Levy et al., 1996), and by exploiting semantic document content and knowledge provided by shared ontologies (Decker et al., 2000).

The chapter will be devoted to discussing the characteristics of data schema integration in Web-enabled systems and to describing a comprehensive integration scheme for organizing heterogeneous information sources over the Web, to enhance the capability of information interchange and interoperation among Web-enabled systems. The integration scheme has the goal of producing a global, integrated descriptions of the sources in a semi-automated way. Starting from conceptual descriptions of the Web data sources, a schema matching process is first performed based on affinity and clustering techniques, with the purpose of evaluating the level of matching of different sources for integration. A global view is then derived to provide an integrated description schema of clusters of matching elements that can be queried through a Web-based interface. The chapter will then give an overview of the future trends in the area of information integration for Web-enabled systems.
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