Chapter XI

Mediation in a Dynamic Context: Arguing for a Request-Oriented Approach and Structuring It

Christophe Rey and Michel Schneider
University Blaise Pascal, France

ABSTRACT

Approach by mediation to make multiple sources interoperable was essentially investigated when one known or when one can extract a priori the schema of each source. This approach is not appropriate for an opened and evolutionary context where sources are not identified a priori, where sources can evolve all the time, where requests of the users do not take place in a frame fixed in advance. It is a question of identifying sources and of discovering their properties in an automatic or partially automatic way while requests are formulated. We suggest in this chapter a request oriented approach which does not require a preliminary integration of the entire schemas of the sources. Only elements related to the request are detected, extracted and integrated. We explicit the different steps of such an approach and we discuss how existing techniques and recent research results can contribute to their feasibility. We characterize also remaining open problems.

INTRODUCTION

The interoperability of multiple heterogeneous sources represents an important challenge considering the proliferation of numerous information sources as well in private networks (Intranet) as in public networks (Internet). The heterogeneity is the consequence of the autonomy: sources are designed, implemented and used in an independent way. The heterogeneity appears for different reasons: different types of data, different representations of data, different management software packages. The interoperability consists in allowing the simultaneous manipulation of these sources so as to join and fuse the data which they contain. In numerous domains, it is necessary to make different sources interoperable: electronic business, environment, economy, medicine, genome.

Interoperability problems appear in a very different way depending on whether sources are structured (data bases), semi-structured (HTML or XML pages), or non-structured (any file). The access interfaces also influence the possibilities of interoperability. For example two data bases can be difficult to make interoperable when they are only accessible through specific web interfaces.

An interoperability approach which has been studied for several years is based on mediation (Wiederhold, 1992; Garcia-Molina et al., 1997). A mediator analyses the request of a user, decomposes it into sub-requests for the varied sources and reassembles the results of sub-requests to present them in a homogeneous way. The majority of mediation systems operate in a closed world where one knows a priori the sources to make interoperable. This gives several advantages. At first it is possible to build an integrated schema which constitutes a reference frame for the users to formulate their requests. Then it is possible to supply the mediator with various information which are necessary for the interoperability and particularly for the resolution of the problems of heterogeneity. Different solutions were studied and experimented for the resolution of these problems. Let us quote in particular (Hull, 1997; Saltor et Rodriguez, 1997; Kedad and Métais, 1999).

When one operates in a dynamic world where sources are not selected a priori and can evolve all the time, the elaboration of an integrated schema is a difficult task. It would be necessary to be capable of reconstructing the integrated schema each time a new source is considered or each time an actual source makes some changes. We suggest in this chapter an approach which does not require a preliminary integration of source schemas but is request oriented. The ideal request oriented mediation would be the following: the user request is rewritten in the terms of a domain specified through one or several ontologies. Potential sources are identified from the elements of this request. Schemas for each of these sources must then be extracted. The user request is another time rewritten for every source according to its information capacity (sources not offering a sufficient capacity are no longer considered). Every source is then interrogated. Results are then formatted and
Web-Based Corporate Governance Information Disclosure: An Empirical Investigation


www.igi-global.com/chapter/web-based-corporate-governance-information/37748?camid=4v1a