Chapter IV

A Brief Introduction to Ontology

INTRODUCTION

It is now clear that a careful initial phase of design, above all that it concerns for the complex Web information systems, it is essential to assure the quality of the final system. To reduce the necessary time development effort in order to get the final output, it is important to have tools that allow quickly obtaining tangible results; in few words, it is important to quickly obtain a consistent part of code for the final application. In this way, it is possible to provide the customer with a first draft of the information system in order to have a first validation of the design.

The key point in order to make fast the transition from the design to the development is to translate in a formal language the design choice made up by the designer. In this way, it will be possible to instruct and to configure some tools that allow, according to the MDA® (model-driven architecture®) producing the necessary code to make the design previously made tangible.

Based on these considerations, the design of complex Web Information systems is supported, in the present job, by a set of tools that will not only facilitate in the phase of validation of the result of the design, but also in the following phase of development.
The input of these tools is a machine-readable representation of several design methodologies used in the design phase. It is important, therefore, to have both a machine-readable representation of the business processes and a machine-readable representation of the Web application design. As it will be possible to see in the following chapters, with the goal of obtaining a design that link together the know-how coming from the design of the business processes and the know-how coming from the design of the Web application, we will introduce some methodological guidelines that, opportunely translated in a machine readable format, will be the input for the automatic generation of the complex Web information system.

The problem to face, at this point, is to select a simple and flexible standard language, that allows representing all of its complexity the information systems.

The language that appears most appropriate for this purpose is the ontological language OWL (W3C, 2004) (a standard W3C). It is useful because it exploits the facilities made available by the ontologies and it provide a set of semantic constructs that allow to represent in its entirety the various aspects offered by the methodology.

Before explaining the use of this language that we intend to do within the design of complex Web information systems, it is essential to provide a brief introduction about the ontologies and their usage within the semantic Web.

The representation in the ontological format of the methodologies exposed in this job has followed a precise methodological approach; in the following part of this chapter, we expose, therefore, some of the ontology design methodologies created in the international scientific panorama and among these which will be selected as most appropriate for our purposes.

**DEFINITION OF ONTOLOGY**

There are many definitions of the concept of “ontology” in the philosophical field, but surely that which is more suitable to this job is the definition given by Gruber in 1993: “ontology is a formal, explicit specification of a shared conceptualization.” The term “conceptualization” is the abstraction of some concept through the definition of its peculiar characteristics; the term “explicit” is connected to the fact that the constraints that contribute to the precise definition of the concept have to be expressed in a formal way, and finally the concept of “formality” points out that an ontology must be defined through a formal language.

The ontology, in conclusion, is a collection of terms and relative definitions or a map of concepts related to a well-precise domain in which it is possible to navigate.
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