Chapter VIII
A Workflow Management System for Ontology Engineering

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ABSTRACT

The Semantic Web approach based on the ontological representation of knowledge domains seems very useful for improving document management practices, the formal and machine-mediated communication among people and work team and supports knowledge based productive processes. The effectiveness of a semantic information management system is set by the quality of the ontology. The development of ontologies requires experts on the application domain and on the technical issues as representation formalism, languages, and tools. In this chapter a methodology for ontology developing is presented. It is structured in six phases (feasibility study, expliciting of the knowledge base, logic modelling, implementation, test, extension, and maintaining) and highlights the flow of information among phases and activities, the external variables required for completing the project, the human and structural re-

sources involved in the process. The defined methodology is independent of any particular knowledge field, so it can be used whenever an ontology is required. The methodology for ontology developing was implemented in a prototypal workflow management system that will be deployed in the back office area of the SIMS (Semantic Information Management System), a technological platform that is going to be developed for the research project DISCoRSO founded by the Italian Minister of University and Research. The main components of the workflow management system are the editor and the runtime environment. The Enhydra JaWE and Enhydra Shark are well suited as they implement the workflow management standards (languages), they are able to manage complex projects (many tasks, activities, people) and they are open source.

INTRODUCTION

Knowledge has always been recognized as an important social resource, and its application and diffusion is a priority of all the evolved societies. Anyway, only in the last 30 years organizations have faced the knowledge management issue with a scientific approach, and only in the '90s the first results on the value of "intellectual capital" (Edvinsson & Malone, 1997) and on creation of organizational knowledge (Nonaka & Takeuchi, 1995) were published.

From a technological point of view, this issue impacts the applications for managing organizational knowledge resources, in more practical worlds: cataloguing, storing, searching, and accessing data, information, knowledge and even people. The application to the knowledge management systems of ontological descriptions and of the Semantic Web approach promises a more effective and knowledge focused environment.

An ontology is a vocabulary of concepts about a knowledge domain, where concepts are connected through relations. Concepts and relations represent items and their relations extracted from the real world. A particular relationship that connects items is the "Is_A" relation, through which a hierarchy of the elements, generally called taxonomy, can be arranged. Ontologies represent the real world as possible objective so they are able to embrace different views of the same context (Gruber, 1993). In this way, the same ontology could be used by users with different scientific and professional backgrounds. For these reasons, strong efforts need to develop ontologies; then usability and re-usability are important parameters for evaluating the developed ontology.

There are a few methodologies about how to develop ontologies (Uschold, 1996). In this chapter we will present a domain independent process. The defined methodology brakes down the process into different phases underlining the team involved, the inputs and outputs and the relations among phases. This methodology was defined with the aim to automating the process of ontology development in a workflow management environment. As creating an ontology is a complex project requiring people to collaborate, to exchange data and information related to the domain and to the technological platform in which the ontology is deployed, it is important that the interaction process will be codified and organized. Workflow management systems enable monitoring processes and permit people to be focused on their work and, at the same time, to be disinterested in process coordination issues, on the flow of documentation, and on the scheduling of all activities. These issues are the topics of the methodology for ontology development. In a workflow management system, each member of the team receives on his/her desktop the planned activities with the required input and resources without any needs to search for other important documents.