Chapter XIV
Technologies for Semantic Project-Driven Work Environments

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INTRODUCTION

As computer and Internet applications became ubiquitous, most daily business must handle an increasing amount of information via several applications and systems such as e-mail applications, file systems, business software, databases, or other systems. Dealing with information flows is not restricted to a special skill level or field of work; it is rather a significant attribute of any computational work environment.

Most ongoing tasks in companies are in the context of a project since management strategies force process-driven business and organization. During a project, a large volume of knowledge arises that is connected to the output of the project (products and services) as well as to know-how regarding the project realisation and the use of resources.

The important aspect of capturing this knowledge in some form is to impart and recycle organizational knowledge to gain raising efficiency in doing business. This knowledge capture may

result in the creation of (digital) documents like, for example, project plans, resource plans, reports, product sheets, and so on. But there is also a second aspect of knowledge capture, regarding a kind of *semantic glue* between those assets that should be captured in order to be able to relate them to each other (e.g., who did what on a certain project, how do requirement documents and project reports relate, and so forth), that is, to define their context.

The Present

This second aspect of knowledge capture is ignored by most systems and methodologies in place today. Consider, for example, the common practice of storing the majority of project documents on a shared file server. Semantic information about the *meaning* of a certain document or about its relation to other documents in the same or in other projects can only be captured in a most restricted way (e.g., by using file name and/or file path conventions or by describing such relations in these documents themselves).

The result of this approach is that it is very cumbersome to find documents on such a file server as soon as it grows to a certain size. This document management strategy supports the finding of documents only by browsing a strictly hierarchical directory structure that follows a certain naming convention, or by searching for low-level metadata features (e.g., creation date) or for some text in the document (full text search).

Specialized software (e.g., project management software) was meant to overcome these shortcomings. Hundreds of tools have been developed in this area—nevertheless most of them are fairly closed-box systems that are difficult to customize and that force a company to shape its business processes to fit the software's requirements, rather than the other way around. Furthermore such systems—where used—do not fulfil all of the requirements in a project-driven working environment.

The Future

It is our opinion that highly collaborative semantic systems are needed to advance the state of the art in knowledge capture and reuse in the context of project and document management. Any system that supports users in managing their documents must be able to *capture the semantic glue* between these documents in some form. We suggest that a mixture between natural language (for users) and formal description languages (for computers) would be very beneficial here.

Capturing the semantics of documents and their interrelations supports *finding*, *exploring*, *reusing,* and *exchanging* digital documents. Furthermore, this context information may be an essential aspect of the long-term preservation of such these documents. We believe that the process of capturing semantics must take place when the system users have maximum knowledge about a certain document (i.e., when the document is created or updated) and should interfere with a user's normal workflow as little as possible. As every organization has slightly different internal workflows and requirements for such a system, the underlying software must be highly configurable and easily adapted towards the organization's (changing) needs. Furthermore—as project work is always team work—we want to emphasize the need for a strong collaborative character of such systems.

The various aspects of information capture and the distributed nature of the utilized information sources furthermore demands an infrastructure that supports interconnection and integration of multiple heterogeneous data sources. We observe a demand for semantic systems in areas in which knowledge work and collaboration is required, for example for managing liability cases, audit reports, or inspection reports; in software development, product management, management consultancy, or innovation management. Knowledge is one of the most important assets of organisations in these fields, which accounts for the demand for semantic (knowledge) work environments.