Chapter XIV

A Case Study in Supporting Distributed, Loosely-Controlled and Evolving Engineering of Ontologies

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Editors’ Notes

York, Christoph, Sofia, and Steffen bring forward a critical theme. Many times advanced knowledge and learning systems do not meet our expectations. Decentralized and individualized knowledge work, which in fact is a key enabler of knowledge-oriented performance in knowledge intensive organizations is the focus of their analysis. This chapter is very interesting, and we would like to take the opportunity to express our deepest respect for the research in the Institute AIFB, which is one of the top research centers worldwide. We encourage you to visit the home page of AIFB to browse valuable information concerning publications (free to download) and projects.

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Abstract

Knowledge management solutions relying on central repositories sometimes have not met expectations, since users often create knowledge ad-hoc using their individual vocabulary and using their own decentral IT infrastructure (e.g., their laptops). To improve knowledge management for such decentralized and individualized knowledge work, it is necessary to, first, provide a corresponding IT infrastructure and, second, deal with the harmonization of different vocabularies/ontologies. In this chapter, we briefly sketch the technical peer-to-peer platform that we have built, but then we focus on the harmonization of the participating ontologies. Thereby, the objective of this harmonization is to avoid the worst incongruence by having users share a core ontology that they can expand for local use at their will and individual needs. The task that then needs to be solved is one of distributed, loosely-controlled, and evolving engineering of ontologies. In this chapter, we present a corresponding process template and a case study.

Introduction

The knowledge structures underlying today’s knowledge management systems constitute a kind of ontology that may be built according to established methodologies such as the one by Schreiber et al. (1999). These methodologies have a centralized approach toward engineering knowledge structures requiring knowledge engineers, domain experts, and others to perform various tasks such as requirement analysis and interviews. While the user group of such an ontology may be huge, the development itself is performed by a — comparatively — small group of domain experts who represent the user community and ontology engineers who help structuring.

In virtual organizations (Camarinha-Matos & Afsarmanesh, 2003), organizational structures change very often, since organizations frequently leave or join a network. Therefore, working based on traditional, centralized knowledge management systems becomes infeasible. While there are some technical solutions toward peer-to-peer knowledge management systems (e.g., Bonifacio et al. 2003) — and we have developed a technically sophisticated solution of our own (Ehrig et al. 2003) — traditional methodologies for
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