Chapter 21
Interoperability in the Building of Next Generation of Collaborative Working Environments

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ABSTRACT
This chapter describes the most important problems of current Collaborative Working Environments (CWEs), indicating some of the requirements for next generation of CWEs collected by the Expert Group@Collaboration. Moreover it analyzes Service-Oriented Architecture technologies and semantic concepts for fulfilling the requirements previously analyzed. After that, it describes a reference architecture for future CWEs which is based on technologies analyzed before and that satisfies the requirements introduced to overcome the problems of CWEs. In order to show how this architecture can help in the building of future CWEs three of the applications are depicted based on it, indicating some of the advantages and disadvantages presented.

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INTRODUCTION

Nowadays organizations deal with complex social networks for the collaboration between other companies, customers and their own employees. For maintaining these relations, enterprises need the use of collaborative applications and approaches which constitute the underpinnings for communication and coordination between their stakeholders (Stanoewska-Slabeva and Hoegg, 2006). The use of collaboration may bring important advantages such as the improvement of innovation and creativity, reduced cost and obtaining new knowledge from other partners (Pallot and Sandoval, 1998).

The term collaboration has taken several definitions regarding Computer Supported Cooperative Work field (Borghoff and Schlichter, 2000). More concretely, with the term of collaboration we refer to the coordination of team members in order to find the best way in which to arrange task-oriented activities and resources with the aim of fulfilling common goals.

Several collaborative tools have emerged for different purposes such as communication, collaborative writing or electronic learning. Prominent examples of these systems in the business area are Shared WorkSpaces (SWSs), Electronic Meeting Systems (EMSs) or Instant Messaging (IM). One step beyond in collaboration is the emerging of Collaborative Working Environments (CWEs), also named as Cooperative Environments (CEs). These CWEs consist of a range of computer and collaborative technologies such as e-mail, instant messaging, chat rooms, discussion boards, shared whiteboards, mobile communication, media spaces and videoconferences among others (Fontaine et al., 2004; Laso-Ballesteros, 2006).

Although there are several integrated CWEs which incorporate some collaborative functionality, such as Basic Support for Cooperative Work (BSCW)¹, Alfresco², Business Collaborator (BC)³ or OpenGroupWare⁴, they lack of the accurate mechanisms for transferring information to other systems that organizations may manage and including between them. Indeed, the main problem of the use of these different kinds of tools is the lack of interoperability between them. Additionally, the interoperability between systems should allow the creation of complex activities which may involve the use of different systems and are perceived as a whole activity by users, avoiding them changing between systems. This aspect is not a new problem and it was identified by Hofte (1998) who stated that users were overloaded with the logging on to a variety of applications, copying data between applications and moving the result from one application to another for performing complex activities in the organization. Nowadays, this problem prevails and namely, Prinz et al. (2006) asserted that professionals, called e-professionals, need integrated CWEs which facilitate them to carry out their daily tasks.

Additionally, the concept of activity is not reflected in current CWEs. According to Harrison et al. (Harrison et al., 2005) people think in term of activities which may be decomposed in several tasks. Hereafter, we understand an activity as a set of independent and related tasks with a specific goal and a task as the smallest unit of work. Consequently, people in a CWE should work in activities overriding the problems mentioned by Hofte and covering the needs indicated by Prinz, and thus, the whole activity should provide the cohesion and interoperability between the different systems.

In this line the Expert Group on Collaboration@Work (Expert Group on Collaboration@Work, 2006) indicates that current CWEs are not interoperable and integrated. Furthermore, they do not support the concept of activity. In this same report, the Expert Group stated that next generation of CWE needs to provide features such as usability, activity-oriented, interoperability, scalability, context awareness, security, low cost of entry and high quality services. In order to build future interoperable CWEs, Information and Communication Technologies (ICT) have to be considered for gluing the different collaborative