Chapter 2
Towards a Reference Architecture for Collaborative Work Environments

Vassilios Peristeras
National University of Ireland-Galway, Ireland

Antonia Martínez-Carreras
University of Murcia, Spain

Antonio F. Gómez-Skarmeta
University of Murcia, Spain

Wolfgang Prinz
Fraunhofer/FIT, Germany

Peyman Nasirifard
National University of Ireland-Galway, Ireland

ABSTRACT

In this article the authors provide an overview of the Ecospace reference architecture which constitutes a reusable high-level representation for building Collaborative Work Environments that are interoperable, context-aware and highly personalised. Based on this architecture they have already developed a number of prototypes that at the same time use and validate the proposed design. Here they present an example, specifically a prototype that demonstrates interoperability and context-awareness as important features of the Ecospace architecture.

INTRODUCTION AND MOTIVATION

In the past CSCW and groupware research has yielded a number of applications that support cooperative processes. These include synchronous applications that support audio- and video-conferencing, instant messaging, and/or application-sharing. Typical asynchronous applications are email, shared workspaces, forums, blogs, or task-management and workflow systems. Each of these applications focuses on a specific aspect of cooperative work. However, users do not separate their individual or cooperative work

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into such application classes. Their focus is on the whole work process, which typically involves a number of different cooperation acts. Thus a work process requires the use of different cooperative applications in a flexible and interchangeable way, as well as the exchange of product and meta-data between these applications. Therefore in order to comprehensively support flexible work processes, interoperability between all involved applications is required.

Interoperability can be achieved using either a proprietary approach or an open standard. Typical examples of a propriety approach are vendor-specific cooperative work environments such as Lotus Notes or Microsoft SharePoint. They provide a comprehensive set of cooperation functionalities enabling their combination in different work settings. However, although such an integrated approach is a first step for users of a single cooperative work environment, new problems are raised when users from different organisation that use different systems wish to cooperate. In such a case, interoperability between the different cooperative work environments must also be achieved. Thus the problem has not been solved by using large integrated environments; it has only been raised to a new level.

The aim of this article is to propose a reference architecture for Collaborative Work Environments (CWE) that shall support the development of interoperable cooperative applications. An early approach towards this direction can be found in (Benford, et. al. 1993), however this early approach is more focussed on a functional integration, while our approach is service oriented; a technology that was not yet widespread at that time. Our approach also goes beyond previous approaches, such as (Dewan, et. al. 99), in which primarily synchronous applications have been integrated. Our approach is similar to (Dewan, et. al. 2001) in that it focuses on integrated environments.

In the remainder of this article we will first present the Ecospace reference architecture that has been developed in the context of an EU-funded project on CWE. This architecture consists of different layers that are described in detail. This is followed by a section providing application examples following the architecture previously explained. Finally, we deal with the conclusions and future work.

THE ECOSPACE REFERENCE ARCHITECTURE

The motivation for a reference CWE architecture has been discussed in the previous section. In this section, we provide an overview of the foundations of our approach and the main components of the architectural design.

Technical Foundations

There are currently some fundamental technology and information systems paradigms that drive web-technologies research and development. These are:

- Service Oriented Architectures (SOAs)
- Semantic Web
- Web 2.0

These three trends form a triangle of web technologies presented in Figure 1. Interestingly, in the intersections of these technologies hybrid approaches emerge:

- Combining SOA and Semantic Web, Semantic Web Service (SWS) and semantic SOAs exist. This is a very active research topic which has already led to standardization activities like WSMO (WSMO, 2005), OWL-S (OWL-S, 2004), WSDL-S (WSDL-S, 2005) and SA-WSDL (SA-WSDL, 2007).
- Combining Semantic Web and Web 2.0, Social Semantic Information Spaces and