Chapter 1
Integration of Cloud Services for Web Collaboration: A User-Centered Perspective

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ABSTRACT
The ubiquitous and pervasive availability of the Internet, and of Web-based services, is dramatically changing people’s lives. Meanwhile, man’s presence on the Web is growing fast, enabled by the offerings of low-cost devices and wireless broad-band Internet connections. On the other hand, users are adopting on-line applications and services more and more, both for personal and business purposes, in order to get in touch with other people and to manage documents, pictures, and many other types of artifacts in a ubiquitous environment that does not impose the usage of a specific end-user device. The naturally arising question is thus the following: if these projects, activities, and collaboration teams are developed all around, why do we need to deal with large numbers of separate services, each one operating in a separate representation of reality, instead of performing tasks in a unified environment integrating such different services automatically? This chapter discusses this aspect of current user collaboration and presents an infrastructure for the development of user-centered clouds of services that enable the user to interact with her favorite applications from a unified environment managing her workspaces and collaborations. The management of such collaborative service clouds is enabled

DOI: 10.4018/978-1-4666-0023-2.ch001
by an open architecture, which provides services and data synchronization coupled with a set of core applications supporting essential aspects of the functionality of the environment, such as workspace awareness, user groups definition, and user cooperation to the management of shared tasks involving the usage of heterogeneous services.

**INTRODUCTION**

The availability of Internet connections almost everywhere, not only at office and at home, but also in the streets, coffee-shops, airports and on the beach, has changed our life. Reliable and fast wireless connections, and a wide range of mobile devices such as small laptops, PDAs and smartphones, enable us to navigate the Web and ubiquitously access on-line services.

Thanks to the availability of such infrastructures, many services and tools, supporting business and everyday activities at different levels, are offered on the Web. Cloud computing (Creeger, 2009; Dikaiakos et al., 2009) is emerging as a lead paradigm for distributing infrastructures, platforms and resources over the Net, avoiding the need of owning expensive and “heavy” hardware or software systems. Moreover, the concept of *service cloud* is emerging, as a paradigm for offering Web-based services based on an open, distributed architecture: many computer-supported activities are provided on the so-called Web 2.0 (O’Reilly, 2007), which enhances the possibility of sharing information and resources, and thus the support to on-line collaboration. Office automation and business management software are offered in a Software-as-a-Service (SaaS) modality (Turner et al., 2003); collaboration among colleagues and partners takes place on the Web (e.g., ActiveCollab, 2011); communication is mediated by the Net (e.g., Skype: http://www.skype.com); e-learning and e-commerce are growing fast; social interaction takes place mostly on-line; videos, music and pictures are published (and shared) on the Web (e.g., Facebook: http://www.facebook.com); and so on. In other words, the Web, with its *clouds*, is becoming the place where most human interaction and collaboration take place.

Services provided on the Web make our work and life much easier than before: transferring money electronically, chatting with far away friends, sharing the pictures and videos of your holidays, participating in a meeting with your colleagues in Berlin without moving from your office are activities that have become easy and fast when performed on-line. However, in order to manage these activities, people usually have to store lots of different bookmarks, pointing to the various services; they have to remember different login/password couples and to define many times the lists of contacts to be involved in activities (in an email thread, in a chat, in a document sharing tool, etc.). People usually receive lots of notification messages from the services they are subscribed to and they have to install different clients (on their laptops or smartphones), in order to access such services.

This heterogeneity impose a heavy overload on the end-user. To quote Jacob Nielsen: “a bunch of stand-alone tools will provide a disconnected user experience, causing employees to waste inordinate amounts of time moving between environments” (Nielsen, 2009). Although Nielsen is talking about Intranet users, this claim also holds for generic Internet users, especially because it is important “to avoid burdening users with double work. Don’t, for example, force users to update their profile or photo in both the traditional employee directory and a Facebook-like social connection tool” (Nielsen, 2009).

We think that a major step towards this goal is to offer a single place on the Net where all the services needed to coordinate people life are...