

Thoughts on the Next Generation of Lightweight Cooperation Systems

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Abstract

Today's collaborative work environments tend to be complex monolithic systems. The interoperability between them and quick adaptation to new user requirements is barely impossible due to a long development turnaround circle. In this position paper we briefly want to review design aspects and sketch the shape of the next generation lightweight groupware.

1 Introduction & Background

The current work environment of knowledge workers is moving from monolithic cooperation systems to a more lightweight ecosystem with a vast choice of available systems (Jeners and Lobunets, 2013). Although monolithic groupware systems support many kinds of cooperation patterns, they are not used at full capacity. Users apply smaller subsets of functions, e.g. document management and sharing, while the rest of the features are rarely or never used. Figure 2 shows small working groups working with lightweight collaboration tools. The selection of these tools is individual and reflects users' previous experience and personal preferences. Later on, the results of local collaborative work are distributed using either a monolithic groupware or email. Email plays a special role due to its simplicity. Email is the backbone of professional communication and cooperation and it is still the primary medium for electronic cooperation within and between organizations (Prinz et al., 2009).

In the following, we are facing three questions: “Why are groupware applications shifting towards a lightweight work environment? How would the next generation of collaboration systems look like? What are the building blocks of such a groupware?”

There are two aspects of interaction with information depending on how it is stored and organized, and how it is presented, discovered and consumed. This reflects a well-known problem of *information access versus information display* (Kaptelinin and Czerwinski, 2007). We believe that in the collaborative software, which is designed specifically to help people at work, the key factor of the successful adoption and usage is the user interface (UI) and the user experience (UX) delivered by this software. How information is stored, organized and processed (*information access*) should not be exposed to the end user of the system. The UI/UX (*information display*) should hide all the backend complexity and should be

created following user-centered task-oriented design approaches. The most of the monolithic groupware systems are mainly focused on implementing more functions under one roof for their users but they fail in delivering a clear and easy-to-use experience. Therefore, users tend to apply specialized collaboration tools for various cooperation patterns. In the following we will show how to integrate them.

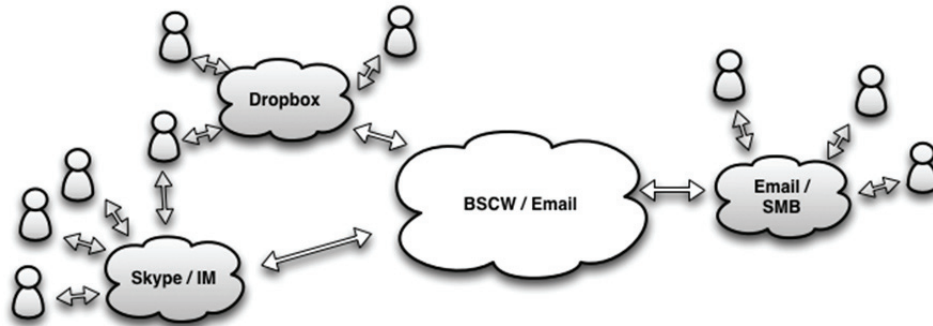


Figure 2. Work in small groups and interaction between them in a big project.

2 Concept

A lightweight collaborative work environment (CWE) is defined as a loosely coupled set of tools with the purpose to support knowledge workers. Every tool itself is lightweight, which means ease of use and without much user involvement (Dourish and Bly, 1992).

Let us consider different types of existing groupware systems in order to elaborate on which features the next generation of the collaborative system should incorporate. We will also try to figure out how the problem of information access versus information display is solved there. Of course it is difficult to assign a specific groupware to one of the types since it can provide several views. Generally speaking it is a question of user's intention. We can distinguish four different types of design solutions in the collaborative systems: (1) Activity-centric, (2) People-centric, (3) Object-centric, and (4) Dashboard.

The *activity-centric* groupware systems place special emphasis on the activities performed by the users within the system, e.g. social activities or any other system event. An activity is defined in terms of the Activity Streams Specification: An *actor* performs an action (*verb*) on an object (*target*). The enterprise social network Yammer and Facebook are examples of activity-centric systems. This representation is an important view on the information that solves the problem of awareness in the workspaces (Ott and Koch, 2012).

People-centric systems can be represented by such examples as Skype or any other instant messenger that supports file exchange. In this kind of systems the list of people takes the 1st place in the design. All actions and objects are arranged around the person or a group of persons. On our opinion this is the most important information representation in the digital working environment, where people are working together (Prinz and Kolvenbach, 2012).

Object-centric systems focus around documents, folders and their hierarchy. Other types of objects are also included in this hierarchy. The design of the interaction with objects resem-

bles the desktop computer file system metaphor. BSCW (Basic Support for Cooperative Work; Appelt and Busbach, 1996) and Dropbox represent such an object-centric system. This kind of metaphor has been around for more than 30 years.

Dashboard-based systems use the mixed approach combining activity, people, and object views on the corresponding widgets on a single screen. This approach gives an overview of the groupware activities, people and objects, without the requirement of additional interaction with the UI. Dashboards represent different chunks of information from various systems (including activities, people and content of workspaces) (Jeners et al., 2009).

Each of the types described above has its benefits and the success of the software product and its usability depends on the final implementation. The monolithic systems require more development efforts for the wide functionality and thus provide a complex UI and a poor UX. This kind of UI/UX combination does not create a “lightweight” feeling. We argue that a lightweight collaborative system should expose a lightweight UI/UX additionally to a loosely coupled integration with other tools.

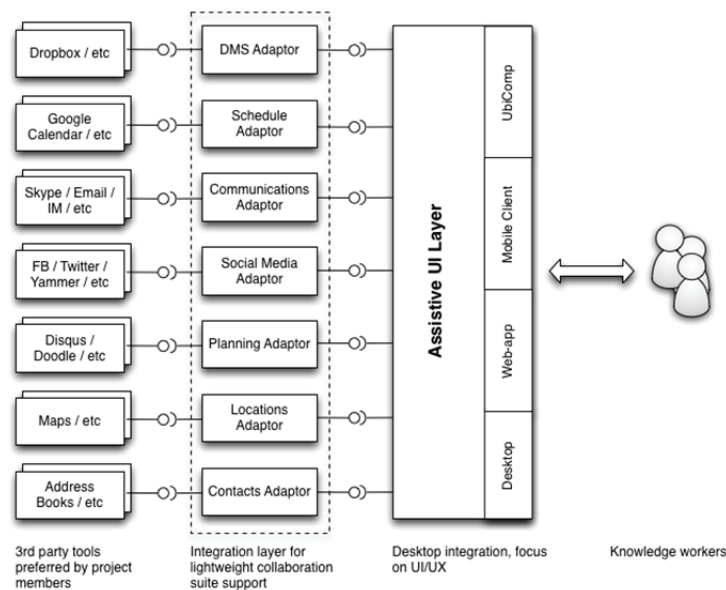


Figure 3. Integration of lightweight collaboration tools with an assistive UI layer.

The concept of the next generation lightweight collaborative system is shown in the Figure 3. It corresponds to the definition of a lightweight collaborative system and includes the design aspects mentioned above. First of all, this groupware model is not a monolithic system, but rather integration with existing ones. Integrating each of the third-party systems would require implementation of an adaptor that should harmonize the characteristics of a specific provider. For example, a Document Management System (DMS) adaptor would unify the API with interchangeable backend, such as: Dropbox, or BSCW. An assistive UI layer is a user-facing component of the groupware, developed on top of the harmonized API to different features, which are provided by third-party services. The assistive UI should support traditional UI and emerging technologies of the Future Smart Office (FSO). The characteris-

tics of the assistive UI layer include (but not limited to): (1) native UX and desktop integration (referring to the success of Dropbox), (2) context awareness (to deal with information overload and attention management), (3) support for mobile computing, (4) support for smart environments (FSO).

3 Conclusions & Future Work

The idea of the integrated work environment is not new (Prinz et al., 2006; Kaptelinin and Boardman, 2007). We have analyzed the use of different groupware system over several projects (Jeners and Lobunets, 2013). Our proposal of the integrated approach consists in changing and integrating UI/UX without writing a groupware from scratch (Karger, 2007), building on top of existing lightweight tools, following the usability guidelines for UI/UX (native look and feel, desktop/working environment integration, conforming to well-known and accepted standards), supporting ubiquity of the groupware & providing availability across various devices (cf. Lachenmaier et al., 2012).

For the moment of writing we are working on the implementation of the prototype (BACW – Basic API for Collaborative Work) that tries to provide a harmonized API to different third-party systems and thus simplify integration with UI on different platforms (desktop, mobile, smart environment). Furthermore we are investigating different UI/UX solutions for the collaborative work as part of students' master thesis work and this year's CSCW Experiences Lab. These solutions include lightweight UI alternatives to BSCW, instant files exchange by sending and/or sharing, native groupware integration into the desktop environment and extension of a digital working environment in the FSO.

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