

TeamRooms: Groupware for Shared Electronic Spaces

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ABSTRACT

Teams whose members are in close physical proximity often rely on team rooms to serve both as meeting places and repositories of the documents and artifacts that support the team's projects. TeamRooms is a prototype groupware system designed to fill the role of a team room for groups whose members can work both co-located and at a distance. Facilities in TeamRooms allow team members to collaborate either in real-time or asynchronously, and to customize their shared electronic space to suit their needs.

KEYWORDS: Groupware, CSCW, shared electronic spaces

INTRODUCTION

Johansen et. al. [2] describe how team rooms have become a central device used by business teams to organize their work. Team rooms provide a permanent shared space used by the team, serving as a meeting room, work area, a place to store documents that are needed by the team's projects, and more generally, as a focus for communication within the group.

Traditional team rooms rely on the physical proximity of the team members and their easy access to the room. We describe here a prototype groupware system called TeamRooms that supports the team room concept for teams whose members work either co-located or at a distance. It combines aspects of both real-time and asynchronous groupware to provide the team with a shared electronic space. The system is highly customizable, allowing the team to design their electronic room on the fly to suit their needs, as they do with their physical meeting rooms.

Users run a TeamRooms client that connects over a network to a server providing a number of rooms. Each room contains both generic communication tools (a chat tool and a backdrop acting as a shared whiteboard) and any number of

applets needed to support the group's work. Typical applets would be diagramming tools, outliners, brainstorming tools, browsers for information such as web pages, notes to other team members, as well as more frivolous items such as card games. When team members are in a room at the same time, they see each other's actions both through changes in the room's artifacts and through mechanisms such as multiple telepointers. As with real rooms, all artifacts in the electronic room persist even when no one is in the room.

TeamRooms is implemented using our groupware toolkit GroupKit [3], augmented to support centralized processes, user authentication, a versioned persistence repository, and embedded conferences. Each applet is built as a standard GroupKit application, which allowed us to easily move a number of existing applications into TeamRooms, and to rapidly create new ones.

TEAMROOMS INTERFACE

Figure 1 illustrates the user interface of the TeamRooms client, where the user (Carl) is in a room called "Ideas for Papers" with two other users (Saul and Mark). Along the bottom of the screen are a text-based chat tool and different colored pens for drawing on the "walls" of the room (a shared whiteboard). Also shown are three applets: a group outliner, a sticky note, and a URL pointer.

Each applet is embedded in its own frame, in a similar fashion as Opendoc or OLE components. Users select new applets from the Tools menu, as well as delete, move and resize them. All changes are immediately visible to all users in the room. TeamRooms also keeps a complete version history for each applet, allowing users to retrieve an earlier version. This creates a new instance of the applet in the room, allowing comparison between versions.

Interestingly, TeamRooms has led us to construct several applets that we would never have considered in conventional groupware. For example, one tool allows inserting a pointer to outside information (a URL, which can be changed by any user), which when selected will invoke a user's World Wide Web browser. Another tool contains a pointer (again as a URL) to an image to be displayed in the room. This allows

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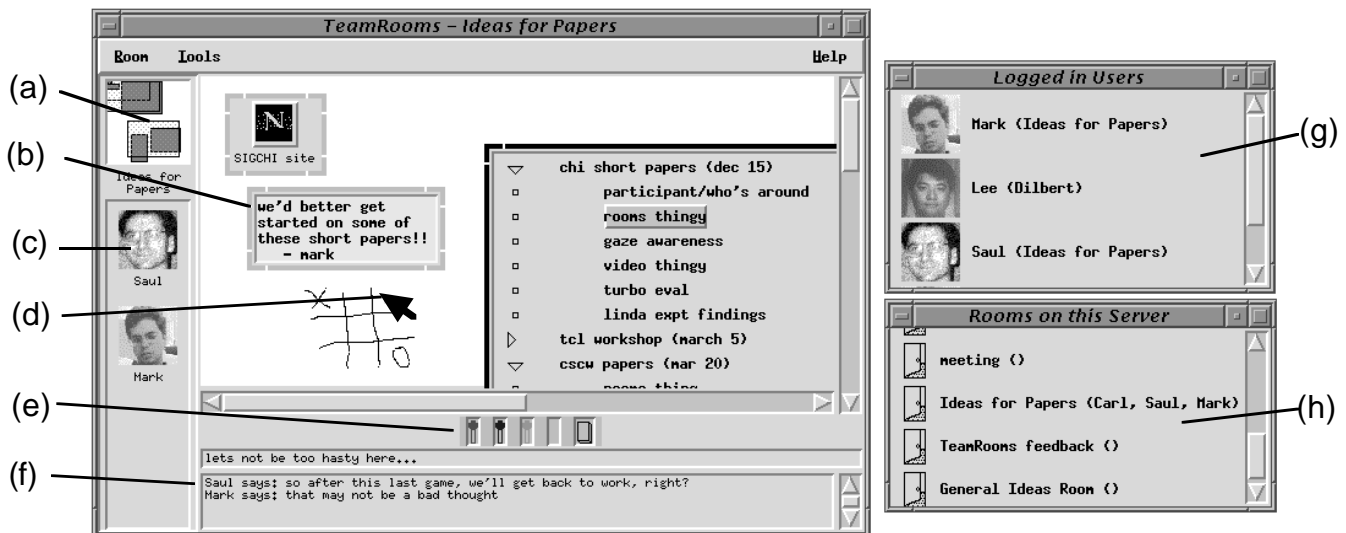


Figure 1. TeamRooms User Interface, showing (a) radar view of room; (b) applets; (c) image stills of users in room; (d) telepointer; (e) whiteboard pens; (f) text-chat area; (g) list of users currently around; (h) list of rooms.

a team to create a room by importing or referring to relevant outside information (or at least information of interest; our most common image was the daily Dilbert comic).

TeamRooms also provides several facilities for maintaining awareness of other team members. The two windows on the right of Figure 1 show who is around and in which rooms they are working. Within the current room, its participants are always visible. Telepointers show users' fine-grained activities. Because rooms can be larger than a user's window, the radar view shows a miniature of the room, indicating the position of applets (dark boxes) as well as other users' views into the room (light stippled boxes).

RELATED WORK

Conventional real-time groupware systems often focus on a "meeting" or "session". Such systems support distributed teams through isolated activities (e.g. a shared whiteboard session), but provide limited and heavyweight support for other team activities. In contrast, asynchronous groupware (such as workflow or email) often does not support real-time activities. Neither are successful at providing the overall collaboration support offered by conventional team rooms.

A popular class of systems that parallel the team rooms idea are Multi-User Dungeons (MUDs). Traditional MUDs are text-based systems where users connect to a central server. Once connected, they enter any number of different rooms, chat with other users in those rooms, and create and modify artifacts in the rooms. Though primarily used socially, MUDs have been used to support collaborative work, though their text-only presentation has proved limiting.

We are not unique in trying to provide more sophisticated media in shared electronic spaces. The Jupiter system [1]

augments a traditional MUD (LambdaMOO) with audio/video conferencing tools and shared whiteboards. The wOrlds system [4] also supports audio/video conferencing as well as numerous other tools. TeamRooms is most similar to wOrlds, but is more lightweight, does not directly support audio or video (though it could be extended to do so), and emphasizes applets more suitable for real-time collaboration.

CONCLUSIONS

TeamRooms is a prototype groupware system combining the rich applications and interfaces of real-time groupware tools with the persistence and work context provided by MUDs. The result is a system providing the electronic equivalent of a team room for co-located or distributed work groups. Our early usage experiences with TeamRooms are quite encouraging, and we have found that it does afford many of the same behaviors seen when teams share a physical space.

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