

3DBlogosphere: A Multi-synchronous Approach of Virtual Worlds to Sustain Companywide Communication

Francois-Xavier Aeberhard and Steve Russell

Abstract—In this paper we consider an industry use case of collaboration: companywide communication within Siemens AG, in contrast to the traditional CSCW interest for small team collaboration. We argue that some features of Virtual Worlds sustain this kind of scenario better than traditional synchronous communication mean. A methodology to create this class of applications is proposed based on the principles of multi-synchronous communication and of mapping web pages into the virtual environment. We describe a prototype application based on those principles, the 3D Blogosphere.

Index Terms— collaborative virtual environment, multi-synchronous communication, social medias, virtual worlds, weblog.

I. INTRODUCTION

Broadly speaking, there are two paradigms for groupware development [1]: first, asynchronous (or non-real-time), groupware provides electronic spaces where users can share documents (via portals), edit them (using wikis), and communicate through threaded discussions (through forums, weblogs and e-mails). On the other hand, synchronous (or real-time) groupware allows for communicating in an instantaneous manner (with teleconferencing, videoconferencing, web conferencing and instant messaging (IM)).

Collaborative Virtual Environments (CVEs) belong to the second category, as synchronous groupware based on a spatial metaphor. The capacity of CVEs to support distributed teams has been widely studied during the past years. In practice, only the 3D versions of those environments were adopted, and mainly for leisure use (World of Warcraft and Second Life). To include non-work related activities, 3D-CVEs are now referred to as Virtual Worlds (VWs). Depending on specific implementations, VWs can include most of the functionalities that other synchronous mediums provide such as voice communication, IM and shared applications.

The the question remains: why have VWs failed to be widely adopted as a team collaboration tool. In recent review papers [2], [3], it has been argued that research on VWs

should adopt a more holistic approach and switch from technology engineering to social engineering. Adopting this perspective prompts us to consider VW research which is not based on technical details or on the study of a particular phenomenon, but instead is based on well-defined business goals and how the VWs can support those objectives.

Based on these principles, we identified a relevant collaborative scenario: companywide collaboration within Siemens AG. This scenario contrasts with the usual focus of CVE research, where only small teams are considered. We will first define the goals of this use case and how an existing system, the corporate blogosphere, addresses those goals. Based on the available research, we assess how VWs can further improve this corporate collaboration, while. Finally, we describe our solution, the 3D Blogosphere, which is based on the observations detailed below.

II. GOALS OF COMPANYWIDE COMMUNICATION

Siemens AG. is a worldwide company, employing about 450 000 employees in nearly 190 countries. Siemens has a highly distributed working environment, with more than 15 divisions and 600 production sites.

We consider here the whole Siemens community as a single huge team. As most global companies, its efficiency is characterized by: 1) the ability of a given employee to easily find and share their knowledge (*Goal 1: enhance the ability to efficiently create, share and find knowledge*), 2) how well the employee is connected to the overall network, so he knows where to find domain experts and is able to create new synergies (*Goal 2: ensure strong network connectivity*). Those goals are different than those of a local team in a particular division, where the collaboration is defined by well described tasks rather than by potential work opportunities.

The relationships between the team members are also different: in a smaller divisional unit, people know each member and their function in the team. At a larger scale, a member merely knows the rest of the team and what topic they are working on. Siemens uses common business tools to accomplish communication goals in this type of situation: information push (mailing lists, company newspapers, etc.) to provide knowledge sharing, and organized unit-level meetings to strengthen the inner network connectivity (for example, internal conferences or themed events).

III. SIEMENS BLOGOSPHERE

In 2006, Siemens launched a companywide internal weblog platform, the Siemens blogosphere (from now on we will refer to weblogs simply as blogs). Fully integrated with the corporate intranet, the blogosphere allows each employee

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Steve Russell, Ph.D., is consultant for Siemens Corporate Research, Princeton, NJ 08450, USA. (e-mail: steve.russell@siemens.com).

Francois-Xavier Aeberhard is doing a Ms in Computer Science at the Swiss Federal Institute of Technology, Lausanne, Switzerland and work as an intern for Siemens Corporate Research, Princeton, NJ 08450, USA. (e-mail: francois-xavier.aeberhard.ext@siemens.com).

to create their own blog and to read and comment on others. Employee blogging soon became a recognized success with a constant growth of blogs, posts and comments, and without a single case of abuse [4].

Overall, the behavioral patterns found within the Siemens blogosphere are typical of internal corporate blogging [5] and meet the goals defined above. *Goal 1*: employees can post about a new technology or best practice he developed (information push) or ask a question to the community (information pull). In addition, blogs allow employees to discuss a posted piece of information (collaborative knowledge creation). *Goal 2*: Through blog posts or comments, employees can advertise themselves and their work, and thus create new connections based on reputation and technical authority within the company. Furthermore, personal opinions and non-job related stories allow building closer interpersonal relationships.

The usage of social media is obviously a big change of paradigm for many companies, and Siemens is an example of a global industry that is moving strategically toward the use of internal blogs [6].

IV. OPPORTUNITIES OF VWs FOR COMPANYWIDE COMMUNICATION

A. Synchronous tool for large team communication

We have noted the distinction between the synchronous and the asynchronous class of groupware. In practice, it appears that virtual teams are better supported by a mix of both technologies [7], which is called multi-synchronous communication. Surprisingly, the vast majority of VWs are self-centered platforms which allow little interconnectivity with other applications. Thus, a priority for our application will be providing a more flexible platform that will allow the employee to use VWs in conjunction with most of their other communication tools.

Synchronous communication, by providing an additional communication channel, can give a voice to employees who are not comfortable with blogging. Indeed, it has been observed that corporate blogging creates many more network connections for publishers than for readers [8].

One of the specific attributes of our scenario is the size of the team in question. There exist many tools for web conferencing that support relatively small teams, but few of them allow for synchronous communication at a larger scale where tens or hundreds of employees may be simultaneous participants. Indeed, current tools would be flooded by an overly large number of communicators, resulting in an unmanageable list of contacts.

Through the utilization of a massively multi-user spatial environment, VWs easily support crowded situations. They allow the users to split in smaller groups and to have concurrent conversations in the same space (the person's voice is louder if that person is closer to the listener). It is also easier to follow a conversation due to the spatial positioning of sound (the user knows who is talking according to the directional origin of the sound). Finally, the use of a virtual space allows a flexible and efficient way of organizing the conversation (the avatars can face the current speaker to acknowledge that they are listening to him and listeners can use visual clues such as a podium to assess the role of the speaker). Indeed, VWs are the only collaborative platforms used for large scale events where the involvement of each

participant is generally desired (for instance, at a virtual product fair or industry conference).

B. Higher investment in the communication

In a VW, the user is embodied in the form of an avatar. By providing a shared space and embodied interactions, VWs allow a deep feeling of virtual co-presence. Co-presence is defined as "the sense of being together in a shared environment" [9].

Using an environment with a high level of co-presence improves many aspects of team collaboration: the motivation to collaborate [10],[11], the capacity to negotiate [12], the mechanism of trust creation between the team members and the occurrence of unplanned encounters through informal communication [13]. These aspects may not be so centrally important in a small team, where each member typically knows the other members, and where there are common tasks to accomplish. But in the considered company-wide collaboration scenario, these parameters become key factors, since there are fewer incentives for employees to collaborate, and since the other participants are often strangers to one another.

By sharing the same work environment, employees get a great awareness of the rest of their particular division. But do they get the same awareness of the rest of the company when it is spread all around the globe? We could argue that the current web-based blogosphere is this common place where employees meet. But a synchronous environment and physically realistic environment provides a much more convincing illusion.

C. Space vs. Place Metaphor

In their work [14], S. Harrison and P. Dourish highlight the difference between the notion of *space* and *place*. Whereas the first term only refers to the disposition of artifacts in the environment, the other refers to the social function invested in those artifacts. As an example, an auditorium has a different meaning depending on whether it is used as for a conference or for a concert, and the attendees behave according to this purpose of the location and not to the spatial settings. In this perspective, only places can efficiently support team communication since they provide a situational context in which interactions can occur.

Based on this definition, each blog in the blogosphere represents a space-free place. A given blog refers to a topic or a person and thus conveys a social meaning: the function is defined by that blog's theme. We cannot say the same for many of the existing CVE spaces. It is thus not surprising that critical review papers argue that the lack of meaningful content is one of the key limitations of collaborative VWs [15].

I. 3D BLOGOSPHERE DESCRIPTION

Based on the observations in A) and B) above, we reached the following conclusion: the VW and the blogosphere should be linked in order to allow for the use of either solution as appropriate, thus creating a true multi-synchronous working environment. We also recognized that blogs provide a fair amount of *places* that should be used instead of any arbitrary organization of the VW's space.

We decided to map the hypermedia space of blogs to our virtual worlds using a city metaphor. In this city, each blog is represented by a building. Since each blog already has a

certain amount of tags provided by the writer, we used those to calculate the distance matrix, which describes how close in interest blogs are to one another. We used a Multi-Dimensional Scaling (MDS) algorithm to project the blogs to a 2D plan. As a result, the blogs are organized in “neighborhoods” of common interest where blogs with similar-topic are closer to each other. Over time, as blog posts get old and new posts occur, the neighborhoods change along with the changing collection of topic data. The resulting map is used both in the browser view and in the VW view, as a referential that links one platform to the other. It will also provide us with a space within which to place the users, thereby creating a community-wide sense of activity awareness.

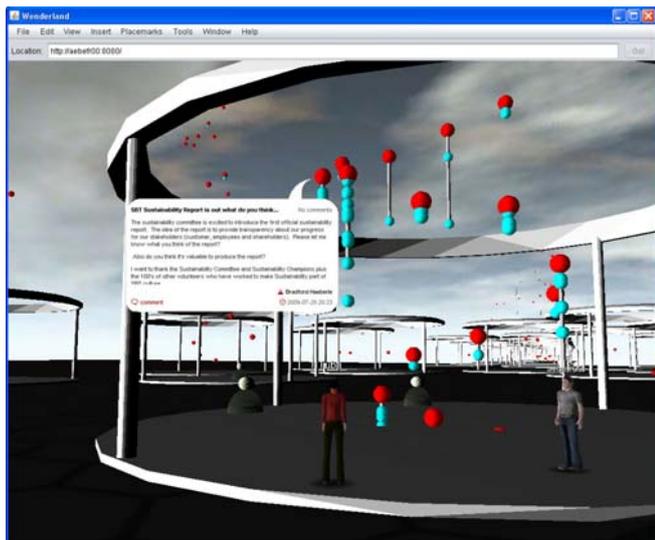


Fig. 1: 3DBlogosphere in the VW

In the VW, each user’s blog is displayed as a building whose height represents the activity of producing entries for that blog [Figure 1]. More active blogs will then appear taller. Additionally, we added a single larger building to represent the blogosphere homepage. In each building, the posts themselves are displayed as floating objects, where the vertical axis height of a given blog entry represents the age of that post. Comments are represented by smaller bubbles linked to their originating post. The user can view the content of each post by clicking on it. The user can post a new comment or a new blog entry directly from the VW by clicking on the corresponding blog building (for entries) or individual blog post (for comments). The user click results in a prompt with an input form, similar to what the blog author would find in his traditional web-based blog.

To synchronize the browser with the VW, we use a server that logs the activity of each blogger: which kind of access they used (browser or VW) and where they were positioned on the blog map (the current visited blog). This awareness server provides information on both of the entry points to the blogosphere. In the VW, the users are represented by avatars if they are “in-world”. Those employees who are using browser access appear to in-world users as phantom shapes. The in-world user can click on the phantom and ask that user to join him in the VW so they can interact in the virtual environment.

Our blog-map is displayed in the browser based 2D blog page. We added a new box to the regular company blog where users are displayed with 2D or 3D icons, depending on

the kind of access they are using. This map provides the user with awareness of who is visiting which blog and on which platform. The traditional 2D user can click anywhere in the blog-map, to “jump” into the virtual world.

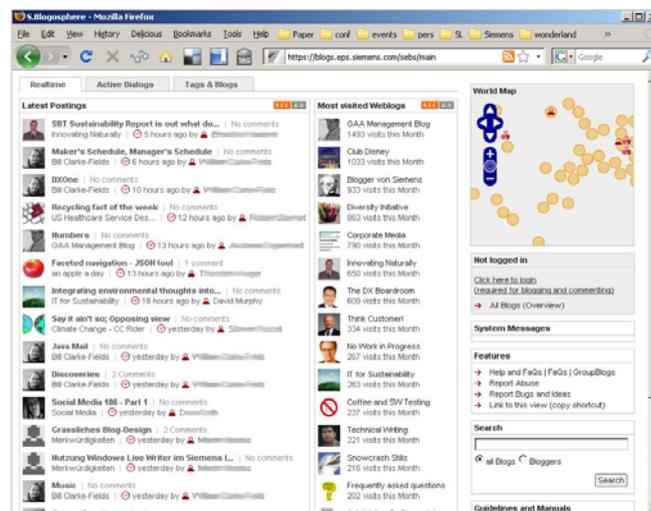


Fig. 2 3D Blogosphere in a browser

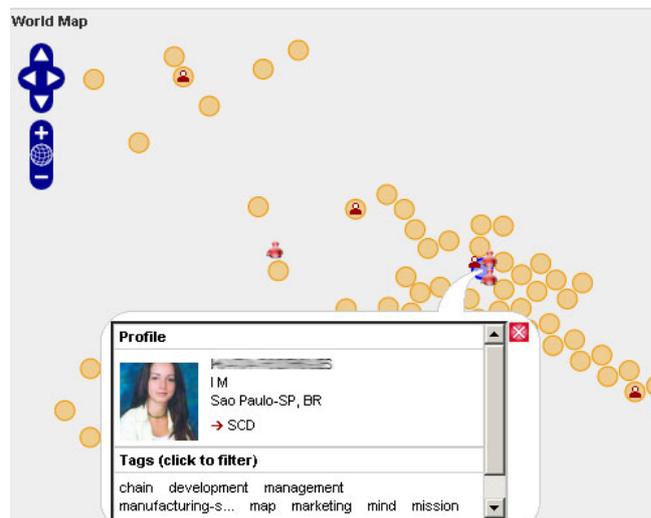


Fig. 3: Detail of the 3D Blogosphere map

II. IMPLEMENTATION DETAILS

Most of the time, VWs are complex platforms which are been less reliable than traditional web-server. We thus decided to leave all of the data management on the regular web server and to use XSL transformations to aggregate the data for the VW. In this way, we ensure the integrity of data and the continuous access to the browser-based version of the blogs in case of a failure of the VW server.

We chose Sun’s Project Wonderland [16] as a VW platform since it provides most of the common tools found in regular web meeting applications (voice conferencing, IM, file sharing, access rights management). The usage of Java Web Start allows an easy connection to the VW without having to download or install a client. Finally, the world in Wonderland is described as XML documents, which allows us to feed it directly with the result of our XSL transformations of aggregated data.

III. RELATED WORK & DISCUSSION

Several project already investigated social navigation through providing awareness in a similar way. Some provide

awareness in the web browser [17], [18], some in a VW space [19], [20]. Those projects aim to improve the web navigation by learning of each other web search. In practice, social navigation was mainly realized through the concept of *folksonomy*: social bookmarking, rating and sharing. This is mainly due to the permanent nature of those asynchronous techniques, as the information provided by awareness in a synchronous is lost when the user disconnects.

We argue those projects missed the main advantage provided by the usage of awareness platforms: building relationship between the users. Those close bounds which are difficult to create through web-based communities can be strongly improved through the usage of a VW. This is the kind of interactions we observed in the 3D Blogosphere. An employee from Brazil will have someone from New-Jersey as a neighbor, because they both blog about environmental matters. A third user will be able to go to this *green area* of the blogosphere. This is the main improvement of the 3D Blogosphere: every user now shares a place, which is not based on geographical position of the user, but based on their interest. The 3D Blogosphere emulates a shared space, as if the whole Siemens company could work in the same building.

IV. CONCLUSIONS

The main contribution of this paper is to open a new collaboration use case where the utility of VWs is particularly relevant for big enterprises: large scale collaboration.

We provided a new methodology to create this class of applications: mapping document spaces to a VW and interconnecting document access to the VW, thereby providing multi-synchronous communication. The next step will be to test our prototype on a larger scale. We have to recognize that, as for many social networking tools, the usefulness of the application is greatly dependent on the size of the network and thus cannot be studied in a lab setting. Nor can the actual acceptance and measured utility be predicted with any certainty. As a result, we will have to find a business unit within the corporation that is willing to set up a large scale experiment.

Another research opportunity that interests us is to apply the same methodology to other document spaces and other large scale collaboration situations (such as libraries, project management tools, and scientific data exploration). We do think that this approach opens new spaces for meaningful VW research by providing a more attractive and rich information environment for real business productivity.

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