

USING THE ECONFERENCE TOOL FOR SYNCHRONOUS DISTRIBUTED REQUIREMENTS WORKSHOPS

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Abstract

eConference is an XMPP-based conferencing tool that supports synchronous, structured communication in distributed scenarios. We present the usage of eConference in the context of distributed requirements engineering, where groups of stakeholders from different organizations are temporarily involved in communication-rich processes such as requirements workshops. We also describe an initial evaluation of the tool in the context of student project works.

1. Introduction

A requirements workshop is a requirements engineering (RE) technique for eliciting or negotiating software requirements where stakeholders are brought together to form a group, share information and take decisions with the help of a facilitator [16]. RE is the most communication-rich process of software development and then its effectiveness is greatly constrained by the geographical distance between stakeholders, as in the case of global software development [7]. For this reason, the need to develop a tool infrastructure to support teams of geographically dispersed stakeholders when developing requirements has been acknowledged in the past [23].

In [5] we presented P2PConference, a text-conferencing tool to enable synchronous, structured communication in distributed scenarios. In this paper we present the new version of our tool, now renamed as eConference and based on the XMPP protocol, an IETF standard for instant messaging and presence awareness [21]. We have initially focused on text-only communication because multipoint audio-video communication poses significant practical barriers (e.g., expense, infrastructure, support) to deployment outside of research institutions. Erickson and Kellogg draw attention to the powerful characteristics of text-based communication: it is easy to use, persistent, traceable, and it enables the use of search and visualization technologies [9].

In the next sections we first describe how the tool works and report about an initial evaluation for distributed requirements workshops in the context of student project works. We then include related work and point out further work.

2. Description

The primary functionality provided by eConference is a closed group chat with agenda, whiteboarding and typing awareness capabilities. The tool allows participants to communicate by typing statements that will appear on all participants' message boards. Around this basic feature, other features have been built to help organizers control discussion.

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The tool screen has six main areas: agenda, input panel, message board, hand raising panel, whiteboard, and presence panel (see Figure 1). The agenda indicates the status of the meeting (“started”, “stopped”) as well as the current item under discussion. The input panel enables participants to type and send statements during the discussion. The message board is the area where the meeting discussion takes place. Statements are displayed sequentially, tagged with the time of when they were sent and the sender’s name. The whiteboard is used to synthesize a summary of the discussion. The presence panel shows participants currently logged in and the played role.

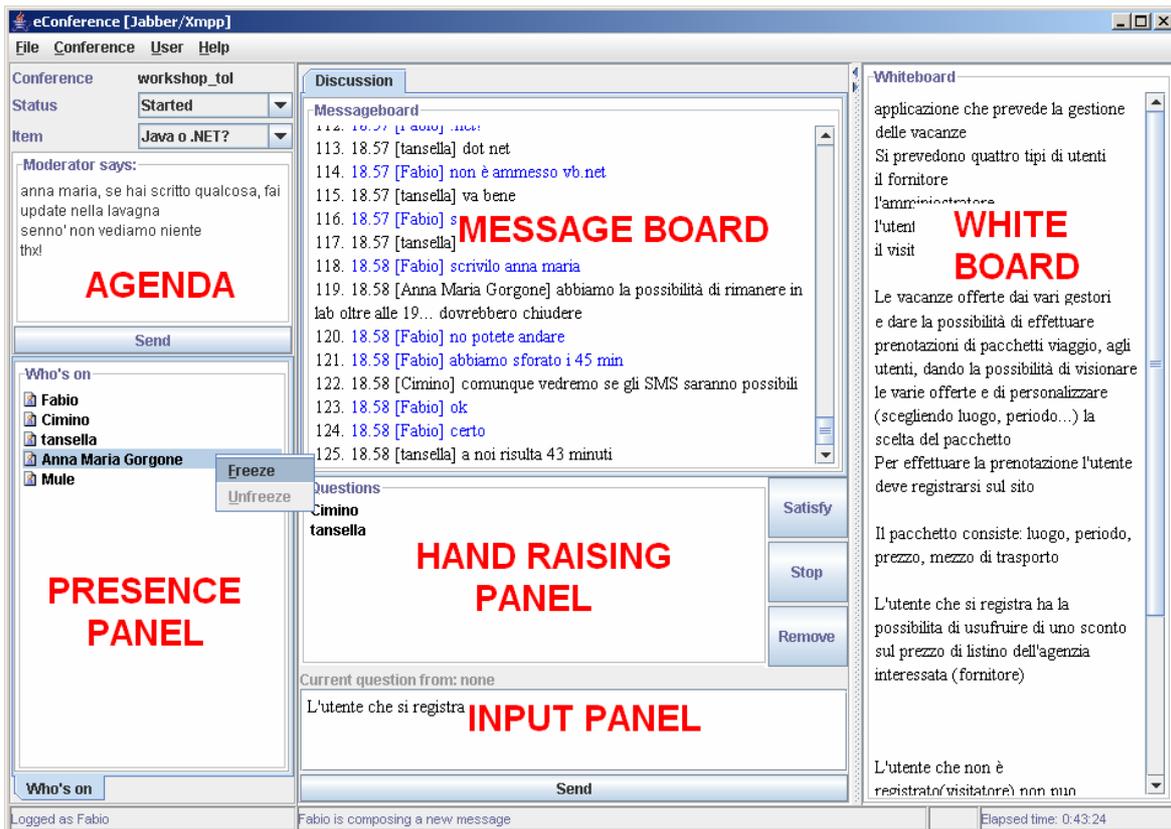


Figure 1. eConference screenshot

The tool usage is illustrated in this section using the following scenario: XYZ is a small firm based in Canada that has embarked a project for the development of an e-commerce platform. For this project, XYZ is outsourcing part of the software development to an Italian offshore vendor. However, due to the considerable cost and effort of traveling and local arrangements, it is not feasible to organize face-to-face meetings on an ongoing base. Hence, people must meet remotely. Requirements workshops will involve three groups of stakeholders:

- The customers and the onshore personnel, located in Victoria, Canada.
- The offshore developers, located in Bari, Italy.

2.1 eConference Organization

Daniela is the project manager. For the requirements workshops, she intends to use text-based communication to mitigate the language disparity issues. However, as an organizer, she does not want the communication to be unconstrained; also, she wants the organizers to have control power over participants. Hence, she opts for eConference to organize and run the requirements workshops,

as the tool accommodates the needs to have both structured communication and control over stakeholders. Using a wizard, Daniela is guided through a few steps, necessary to collect all the required information (see Figure 2). The organization of an eConference follows a strict protocol, inspired by CeBASE eWorkshop [3].

Figure 2. eConference organization wizard

Daniela is the director: being the actual workshop organizer, she is supposed to choose the type of eConference to set up, define the main topic and the other items of the discussion agenda, schedule the conference, training sessions, if necessary, and finally send invitations by e-mails.

In eConference there are three different types of conferences Daniela can choose among:

- Meeting. It ensures a limited control power since the moderator can only “freeze” disturbing participants (i.e., forbid them to type and send statements). This conference type models simple, remote brainstorming.
- Presentation. This is a more complex kind of conference: one special invited expert, the speaker, delivers his own virtual, text-based speech and the other participants can ask questions, after “raising their hands”.
- Panel. It is a generalization of presentation, since there is more than one speaker, the so-called panelists.

Among the three groups of stakeholders involved, Daniela has identified some key stakeholders, because she believes they will be able to foster the discussion. Then she chooses to organize the requirements workshop as a Panel and therefore invites the key stakeholders as panelists.

Daniela invites Philip to act as a moderator. As such, he will be responsible for monitoring and focusing the discussion. During a presentation or a panel, the moderator will also have to manage the queue of the asked questions. Philip will also be responsible for assessing and setting the pace of the discussion, that is, deciding when it is time to move the discussion to another item.

As a scribe, Daniela invites Sylvia. As the discussion moves from one item to another, then Sylvia will have to capture and organizes the results displayed on the whiteboard area of the screen. Thus, the content of the whiteboard becomes the first draft of the requirements meeting minutes. Finally, Daniela decides to allow Philip, the moderator, taking part actively in the conference, but not Sylvia, the scribe, so as to keep her focused on the discussion flow [11],[16].

2.2 Running eConference

The Italian developer Tommaso has been invited to participate to the requirements workshop. Hence, he got an email from Daniela that informed him about the event, and how to launch eConference by Java Web Start² [8] and join the workshop. The concerted day, Tommaso clicks on the link and runs eConference.

2.2.1 The Moderator Perspective: a Smooth Discussion

Philip enters eConference as the moderator. Once joined, as any other stakeholders, he can broadcast file to the other participants: thus, Philips shares the documents that he will refer to during the event to facilitate the discussion (see Figure 1). He has waited for all the stakeholders to join. There is a single participant who is late, but he decides to start the discussion anyway: he is not worried about that since, once joined, any latecomer will automatically receive foregoing discussion, whiteboard history and shared files.



Figure 3. File broadcast

After starting the discussion (see Figure 4), the stakeholders are allowed to “interact” as follows:

- *key stakeholders* have been invited as panelists and, hence, are always granted to speak;

² Java Web Start is a technology that eases the deployment of Java applications: with a simple click on a web link, it automatically downloads, searches for updates and runs applications for you.

- *other stakeholders*, instead, are allowed to speak by raising their hands.

Instead, the other participants invited as observers can only observe the proceedings passively.



Figure 4. The agenda (moderator perspective)

Philip selects the first item in the agenda and the panelists (i.e., the key stakeholders) start discussing about it directly. The other invited stakeholders, instead, must press the “raise hand” button: Ann presses it and a small window pops up. Now Ann has to select the panelists whom she wants to ask her question. Though not mandatory, she fills out the text area with the question and sends it (see Figure 5).

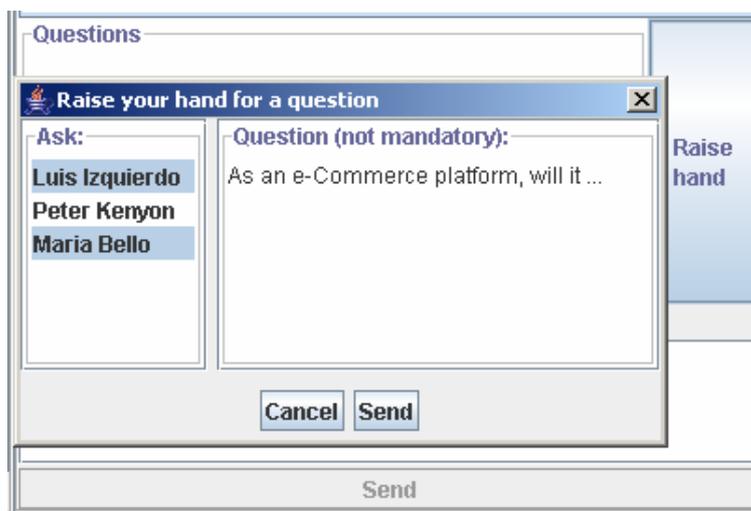


Figure 5. Hand raising panel (participant perspective)

Each time a question is sent, it is displayed in the question queue. When hovering the mouse pointer onto an element in the queue, each participant can get a preview of the question: this is a useful feature to let the moderator decide whether a question is to be moved up or down in the queue, or even completely removed (see Figure 6).

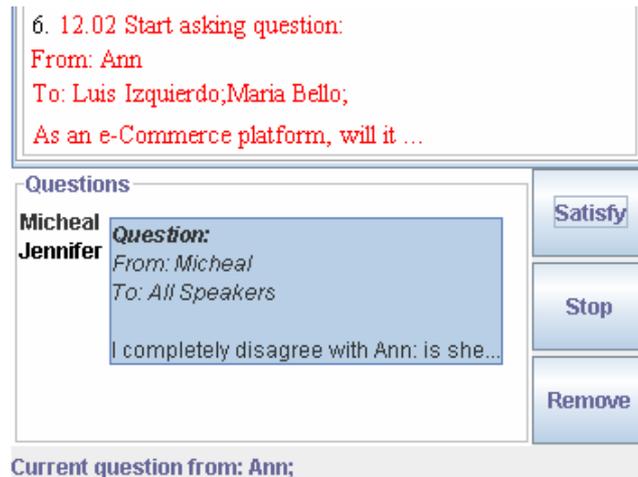


Figure 6. Hand raising panel (moderator perspective)

Philip considers Ann’s question as a relevant contribution to the current discussion and so he decides to satisfy it. Now Ann’s input panel is enabled, so she can start to type and send statements. Meanwhile, two other questions have entered the queue: the former, from Michael, is also appropriate for the current item. The moderator can satisfy any number of questions at the same time. Instead, the second question, from Jennifer, is off topic and, hence, removed from the queue. Michael is now allowed to send statements too: he disagrees with what Ann said in the *N-th* statement. To mean that he is referring to that statement precisely, he starts typing his one like this: “*N: I completely disagree with you Ann, since...*”. Each time eConference receives a statement that starts with a number followed by a colon, it turns it into an HTML anchor. Thus, when stockholders click on such anchors, the message board scrolls to make visible the referenced statements.

Two key stakeholders, Peter (an onshore developer) and Maria (an offshore developer) have flaming behaviors: they are arguing because Maria fears that onshore developers are pushing management to outsource the less appealing part of the job. To calm them down and avoid a “we versus they” condition, Philip freezes them (see Figure 7): now both of them cannot actively take part in the discussion in that:

- *Peter* cannot send statements anymore.
- *Maria* cannot raise her hand anymore.

The moderator also writes in his private text area of the agenda a recommendation to the other stakeholders for not “flaming” as well.



Figure 7. Presence panel (moderator perspective)

Discussion goes on until Philip decides that the current item has been debated enough, since participants seem to have reached a consensus on it. Hence, he stops all the current questions (i.e., disallows to keep sending statements) and announces that the discussion is now moving to the next item. Also, Philip thinks that both Peter and Mary, the two heated participants, have calmed down now. Thus, he unfreezes them. Again, all stakeholders begin to discuss the selected item, typing directly or raising their hands, according to their roles.

2.2.2. The Scribe Perspective

As Michael, Ann and the other panelists involved were debating on the first item, Sylvia, the scribe, has summed up both their own views on it and the common consensus reached. Thus, she presses the update button to propagate the whiteboard content to all of the other participants (see Figure 8). As discussion is moved on the next item by the moderator, Sylvia begins to write down the other most relevant observations; and so she will do for all of the items in the agenda.

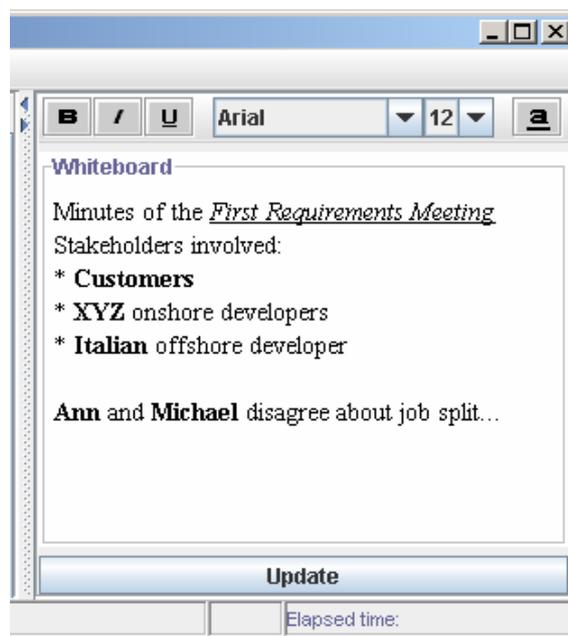


Figure 8. The whiteboard (scribe perspective)

2.2.3 Ending Discussion

Once all of the items in the agenda have been discussed, Daniela announces that the event is over and Philips stops the discussion. After leaving the eConference, each stakeholder finds the logs of both the message board and the whiteboard locally stored into HTML files.

The whiteboard log, in particular, will serve as a draft to edit a more structured requirements document.

3. First Experience With The Tool

eConference has been used at the University of Bari to organize and run sixteen distributed requirements workshop. Our main intent was to test the tool itself. The participants were Master students in computer science, attending a web engineering course. As final course assignment they were required to develop an enterprise application, including both analysis and design documentation, working in groups of three to five people. All the sixteen workshops have been conducted during the course in a time frame of 5 weeks. The participants received one demo presentation of the tool. To provide further help, a detailed usage scenario was made available online. To simulate the geographical dispersion of the stakeholders, the students were also allowed to use the tool from home and laboratories in our department.

Hence, the stakeholders involved in the workshops were:

- One of the researchers, acting as both workshop organizer and facilitator.
- One PhD and one graduate student, acting as customers.
- The students, playing the role of the developers, except one who was selected to act as scribe to produce the meeting minutes.

Unlike a JAD session, the scribe was free to contribute information to the workshop. The minutes edited by the scribe were the main outcome of the workshops. They contained a general description of the application to develop, a high-level list of the features to implement, all the decisions taken and the constraints imposed by the clients, both technical and functional. Afterwards, the minutes were first used by the developers, to edit a full requirements specification document for their own application, and then by inspectors that cross checked the aforementioned requirement specification using the IBIS tool [14].

To characterize the requirements workshops, in the following we provide a brief report of the data gathered from the tool logs. Table 1 shows the duration and the number of messages sent for each workshop. Duration was computed considering the time span between the first and last message sent by any participant. System notifications of logon or presence were ignored because not relevant. It is remarkable that the shortest meeting (36 min., Grp 8) is not the event with fewer messages (134, Grp 10). The longest meeting, instead, went on for 66 min. Given the small standard deviation (8,7 min), we can state that a workshop lasted in general for a few less than one hour (mean = 49,2 min.).

The feedback from the participants, received through interviews and direct observation, allowed us to spot enhancements other than those already present on our to-do list. Most of the suggestions we received were technical feature requests, such as extending the whiteboard to support drawing, and

adding a feature that allows the scribe to paste text highlighted from the message board with a single mouse right-click. More interestingly, some students reported that they felt constraining and useless the floor control features available. Conversely, the customers reported floor control to be useful to prevent the discussion to become messy, especially when groups of five developers were involved.

	Duration (in min.)	Messages
Grp 1	55	208
Grp 2	60	333
Grp 3	39	201
Grp 4	66	314
Grp 5	63	250
Grp 6	47	230
Grp 7	47	268
Grp 8	36	138
Grp 9	47	143
Grp 10	43	134
Grp 11	53	157
Grp 12	45	301
Grp 13	48	154
Grp 14	54	378
Grp 15	46	241
Grp 16	38	203

Table 1. Duration and messages exchanged for each workshop

4. Related Work

Conducting a long-running, productive conversation through a digital medium can be very challenging, especially if there are more than a few people involved. Thus, multimedia meetings and their facilitation have been deeply studied in the last two decades [6],[2],[19],[12],[1],[11]. Many of the existing distributed meeting tools use the metaphors of meeting rooms or shared workspaces. TeamRooms [20] and TeamSpace [10] are collaborative workspaces for managing work processes and maintaining shared artifacts in a distributed projects, typically spanning months or years. Their most remarkable features is the ability to seamlessly switch between synchronous and asynchronous support. Moreover, TeamSpace also supports different work modes, namely social/corridor-talk and meeting. These tools support synchronous and structured communication, but include no floor control features. Among the recent research projects, Meeting Central [22]. The tool includes a valuable number of visual cues to convey “social aspects” during meetings, presentation and browser sharing, VNC viewer for desktop sharing, and, finally, it provides means for using existing PSTN or VoIP infrastructure. Interestingly, Meeting Central does not provide any control channel features or roles, because its aim is to leverage social protocols inherent in any discussion, be it computer-mediated or face-to-face. This approach is in contrast with Moors’ SmartPhone [18], which augments telephony by using a computer to add symbolic control channel.

Other than general purpose CSCW tools, there are specific collaborative RE tools which have been proposed. EasyWinWin [4] is a tool that implements the WinWin approach using the Group

Support System (GSS), a commercial collaborative toolset. EasyWinWin defines a set of activities guiding stakeholders through a process of gathering, elaborating, prioritizing, and negotiating requirements. The use of the basic GSS tools is also reported in [23]: brainstorming, voting and group outliner are used during JAD sessions to help elicit requirements. RM-tool [15] is a web-based collaborative tool to support distributed stakeholders in requirements management. It is implemented on a commercial groupware infrastructure, namely Lotus Notes Groupware. RM-tool is focused on structured requirement modeling, thus it offers no synchronous group decision support. CRC [17] tool is a specialized electronic meeting system to facilitate communication amongst a distributed, multidisciplinary group engaged in the early stages of a software development project. In [13] a P2P toolset for Requirements Elicitation is presented. It was developed for Groove, a P2P platform based on the metaphor of shared workspaces. The toolset includes tools for authoring and delivering interviews, defining requirements according to the RQML structure and voting. Also, there is a workshop tool for brainstorming sessions, which is comparable to eConference, except for the absence of any control channel feature.

5. Future Work

We have presented eConference, a tool to support synchronous and structured discussion in a distributed context, such as requirements workshop. The features of the tool have been outlined drawing its use in a plausible offshore development scenario. We have also reported our first experience with the tool while conducting requirements workshops at the University of Bari.

As future work we intend to add features which are specific to requirements workshops, and elicitation in particular. We are currently improving the tool by making the tool fully pluggable to implement useful custom extensions. This change will transform the tool into a framework and will allow us to develop both features tailored for RE and generic collaborative features, such as a voting tool (to help measure the attainment of a common consensus) and presentation/browser-sharing (to achieve a richer collaboration).

Finally, we intend to run controlled experiments to assess whether control channel is inherent also in a computer-mediated discussion, as hypothesized in [22]. We aim to understand whether synchronous distributed requirements workshops can inherently capture those social protocols and rules which usually determine who can actually speak in non-moderated face-to-face meetings. We also want to discover how synchronous distributed requirements workshops are affected by factors like the number of participants and their mutual relationships, the number of foregoing meetings and familiarity with chat.

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