### Abstract

This deliverable presents the results from the evaluation of the first SOCIETIES prototype, as presented to the three identified user domains, namely the Enterprise Community, the Student Community, and the Disaster Management Community.
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[Work-package leader: Name, company] Mark Roddy, TSSG
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Executive summary

This deliverable sets out to present the results from the evaluation of the first SOCIETIES integrated prototype.

The process of evaluating the SOCIETIES platform and project concepts has been a challenging task. It has been discussed at a number of reviews that our plan of building a stable and scalable complex integrated platform that could be evaluated holistically by our end user domains, would be a difficult one to realise, and so it has proved to be.

That said, this document D8.6 does present the evaluation results from across all three SOCIETIES user domains, and the document presents an overall evaluation of considerable scope. Although at the time of these evaluations certain platform functionality had not been developed to a point where it could effectively be integrated into the platform as a whole, the evaluation process was able to get around these constraints by taking differing approaches, all of which were complimentary to the process.

Two distinct Disaster Management evaluations were performed. The first of these was based on a series of simulated end-to-end experiments that used a Cognitive Walkthrough approach. End users were asked to envisage the scenario presented and emerge themselves in the experience. The second evaluation took a Focus Group approach, where users were presented with the fully integrated services and this was used as a springboard from which to discuss the strengths and weaknesses of the innovations of the platform.

The trial involving the Enterprise user domain took a Participatory approach that was closely aligned to that outlined in the previous deliverables (namely D8.1, D8.2 and D8.3). The trial involved software deployed to target handheld devices, and a number of constraints were circumvented by providing this end user community with their own ‘Guardian Angels’.

For the Student trial it was decided to conduct a 3rd party developer user trial, involving a group of MEng Software Engineering students.

We were not as close to hearing the ‘voice of the user’ as we would like to have been, but we have learned a lot of lessons about the difficulties and complexities of trying to evaluate innovation from both a micro and macro point of view. These lessons learned will be carried over to the final evaluations and have indeed helped prepare and pave the way ahead.

Weiser’s prediction [5] that profound technologies disappear, throws up additional complexity in the evaluation of ubiquitous and pervasive technologies. As the interface between the user and the technology becomes less visible and tangible, how do you evaluate these disappearing technologies? Trust, privacy, learning, context, etc are just some of the meta-enablers of this project that provide platform innovation, but you cannot give these enablers to an end user because they are invisible in nature.

WP8 has concluded that we have helped to contribute to the design process by offering a touchstone evaluation of the platform. WP8 has also been able to evaluate the platform to varying degrees from the holistic high-level view of Discover, Connect and Organise, as well as evaluating some of the more novel and innovative solutions that were presented by the creation of social and pervasive communities.
## List of authors

<table>
<thead>
<tr>
<th>Company</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>TSSG</td>
<td>Edel Jennings</td>
</tr>
<tr>
<td>TSSG</td>
<td>Mark Roddy</td>
</tr>
<tr>
<td>INTEL</td>
<td>David McKitterick</td>
</tr>
<tr>
<td>SINTEF</td>
<td>Jacqueline Floch</td>
</tr>
<tr>
<td>DLR</td>
<td>Patrick Robertson</td>
</tr>
<tr>
<td>HWU</td>
<td>Eliza Papadopoulou</td>
</tr>
<tr>
<td>IT-Sud</td>
<td>Dingqi Yang</td>
</tr>
</tbody>
</table>
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1 Introduction

This deliverable sets out to present the results from the evaluation of the first SOCIETIES integrated prototype.

The methodologies used for this evaluation vary according to the user domain involved and an overview of some of these methodologies is summarised in Section 2.

Overall this was a difficult challenge for WP8. In deliverables D8.2, D8.3 and D8.4 we set out to specify the methodologies to be used for our evaluations, and at that time we envisaged being able to run so-called ‘in the wild’ testing of the platform, with end users being given devices with usable services that showcased the notion of integrated pervasive and social communities. In those deliverables we went to exhaustive lengths to detail the quantitative embedded software harnesses that would be deployed and that would extract the performance and usage data of the innovative platform features.

There were numerous problems that have had to be overcome to finally evaluate the SOCIETIES platform. It has been discussed at a number of reviews that our plan of building a stable and scalable complex integrated platform that could be evaluated holistically by our end user domains, would be a difficult one to realise, and so it has proved to be.

To begin with, the project planning model of integrating innovative functionality into an overall holistic platform has proved to be a very challenging exercise in itself. It could be argued now that the overall approach was just too complex an exercise within a large collaborative project, with many differences in technical expertise and development approaches between project partners. The knock-on impact of this on the work-packages responsible for 3rd party service design and platform evaluation has been quite significant.

The challenges presented to WP8, of planning the evaluation of a work-in-progress development of the platform, with real end users has been evident. The challenges presented to the 3rd party developers, mandated with the task of showcasing platform innovation, was also evident. That said we feel that we have met these challenges and offered pragmatic evaluation approaches from these given constraints.

We decided to perform two separate Disaster Management evaluations. The first of these is described in Section 3 and is based on a series of simulated end-to-end experiments that used a Cognitive Walkthrough approach. The trials were envisaged to take place towards the end of 2012, but at the point of evaluation preparation it was assessed that platform integration with the integrated 3rd party services showed significant issues with stability, performance and scalability. In the end it was decided to take a more loosely coupled integration of the 3rd party services with the platform. This had meant that platform innovations could be evaluated from a conceptual rather than a fully integrated perspective. End users were asked to envisage the scenario presented and emerge themselves in the experience. The second evaluation, as described in Section 4, took a Focus Group approach, where users were presented with the fully integrated services and this was used as a springboard from which to discuss the strengths and weaknesses of the innovations of the platform.

The trial involving the Enterprise user domain took a Participatory approach that was closely aligned to that outlined in the previous deliverables, although fell somewhat short of an ‘in the wild’ evaluation. The details of the methodology and results are documented in Section 5. Although the trial did involve software deployed to target handheld devices, we overcame the constraints imposed by service stability and usability by providing this end user community with an interesting solution that we called their ‘Guardian Angels’.

As described previously, the original intention was to target ‘in the wild’ testing as part of our evaluation. For the Student trial this imposed additional risk, as the idea was to conduct this ‘in the wild’ evaluation as a longitudinal study over a number of weeks. Because of this additional risk it was decided to concentrate our integration and deployment efforts at this user site first. However, towards the end of 2012 it was apparent that any longitudinal ‘in the wild’ testing would have to be postponed because the platform integration and deployment was just not sufficiently stable or scalable. The back-up plan was to conduct a 3rd party developer user trial, involving a group of MEng Software Engineering students and this is documented as part of Section 6.

In Section 7 we provide some overall conclusions and present some recommendations and thinking that should be carried through to the final user evaluation trials.
2 Overview of Evaluation Methodologies

This section of the document presents an overview of some of the evaluation methodologies used during the user trial evaluations.

Participatory research methods have been popularized by the Scandinavian democratic design approach. The value of these approaches has been widely written about in the literature (cf. Muller – third space). The hybridity of the third space in HCI is described as a fertile edge where creative thinking is fuelled by differences between participants and reflexive redefinitions and understandings are forged. The aim of this third space is to create a zone where polyvocal voices, of users, designers, developers and stakeholders are given space to express ideas and be heard.

“There is a very significant differentiation between user-design and user-centered design in that there is an emancipatory theoretical foundation, and a systems theory bedrock (Ivanov, 1972, 1995), on which user-design is founded. Indeed, user-centered design is a useful and important construct, but one that suggests that users are taken as centers in the design process, consulting with users heavily, but not allowing users to make the decisions, nor empowering users with the tools that the experts use. For example, Wikipedia content is user-designed. Users are given the necessary tools to make their own entries.”

“These dialogues across differences and – more importantly – within differences are stronger when engaged in by groups, emphasizing not only a shift from assumptions to reflections, but also from individuals to collectives (Carrillo, 2000).”

Participatory Methods have been employed in a variety of formats for the SOCIETIES first prototype trials. We used a series of three Cooperative Group Walkthroughs, as a type of Distributed Participatory Design approach in a spiral of rapid iterative design and evaluation cycles for the Disaster Management group. We selected to facilitate group participatory demos and scripted role play exercises, followed by group discussion for the Enterprise group trial. We engaged participatory methods on various levels with the student developer group though initial project presentations, engaging in weekly discussions, active exploration of the platform and development using its features by the students through their development of services, developer logs, a Redmine bug management system, continuous responsive support from SOCIETIES researchers to student requests, and a final participatory discussion involving researchers, trial managers and student developers.

Figure 1: Enterprise evaluation trial

\[1 \text{http://en.wikipedia.org/wiki/Participatory\_design}\]
Co Design is a method employed for this evaluation, in the case of the Student Developer Group who engaged with the project’s concepts and innovations, and utilised the SOCIETIES’ open platform software modules to develop their own services.

The Group Cognitive Walkthrough method, credited to Pinelle and Gutwin, was developed to manage multiple users in a dynamic group work, so it is very suitable for communities in SOCIETIES, and was adopted for the Disaster Management trial. Whilst a cognitive walkthrough involves knowing the user and what they know, understanding what tasks the user will expect to complete with the system, and then mapping the likely user actions to plot an individual’s likely success at achieving those tasks with a given prototype; it does not accommodate the variability of complex interactions and task sharing activities that are commonplace in group dynamics. A group cognitive walkthrough extends the approach to consider teamwork, and the mechanics of collaboration as significant along with task work. A set of tasks is devised for a particular system, then a group of users steps attempt to complete the tasks with the tools provided, while vocalising and recording any issues that they encounter. They evaluate how the system in question can accommodate and support their goals, activities, and requirements for task completion. It involves group work in that the dynamics of the group’s social interactions are also of interest.

- The Group Cognitive Walkthrough for the Disaster Management offsite volunteer services involved engaging SOCIETIES researchers directly with the services, where they were asked to try to resolve some information gathering queries, based around an earthquake disaster scenario. The social challenges which presented when using the system were then experienced first-hand by the researchers. The group cognitive walkthroughs were performed iteratively, with widely distributed groups of project researchers, virtually collocated through the SOCIETIES virtual services spaces. The researchers experienced different periods of loose and close coupling of collaborative interactions, during each session, i.e. at some stages researchers were communicating and sharing a group experience whilst at others they were working independently. The social processes involved in attempting to resolve complex information gathering tasks became apparent; such as what factors
influence selecting to work on a particular request, what information is shared with other collaborators and in what medium, what expectations volunteers might have for feedback and support, how might someone be aware of the activities of others in a system, how many different types of communications tools might be required for different messages, and what specific protocols for team organisation and workflow might be required for efficiency.

Figure 3: Disaster Management trial volunteer
3 Disaster Management Trial: Cognitive Walkthrough

3.1 Introduction and Starting Point for the Trials and their Evaluation

As a result of delays in the availability of a functioning platform, which became clear around the end of 2012, the work in WP8 was affected in its capability of finalizing its task planning and actually conducting the trials themselves. This affected the Student, DM and Enterprise trials. One of the technical issues was, for instance, the question regarding the number of supported users and the availability of platform features, as well as the initial difficulties in getting the platform running.

As will be explained in more detail below, early in 2013 the project members reached a stage where they could, for the first time perform a so-called “cognitive walkthrough” of the DM use-case, interacting with the newly developed services. In it, WP8 members tried to assist in a fictive DM scenario. In the period of time during which we were conducting the cognitive walkthroughs, we realized that we as WP8 were actually becoming part of the wider development process. We were learning not only how to organize a trial, but also how our services and platform should behave, and what flaws were evident from the current perspective. We chose to recall the Adaptive Frequency Spiral Model (AFSM) in which phases of very rapid development and evaluation iterations can help to make progress very quickly. Some modifications of the 3rd party services were undertaken directly as a result of the walkthroughs, and this process was conducted outside of the formal information and decision flow in the project that had been used to implement and integrate the first release.

One aspect of this discovery process was the enticing concept of letting users break down larger tasks into smaller sets, such as identifying hospitals in an affected area (perhaps hierarchically) and then spawning sub-tasks with the objective of collecting information for each hospital. A final stage could be to reassemble these results into one coherent summary (such as a map, or textual representation). This paradigm had not been considered prior to the weeks before the first walkthrough, and certainly was not made so explicit in the specification of the first trial. As a result, there was no possibility to really adapt the services accordingly, and ad-hoc approaches were sought to accommodate this kind of volunteer workflow.

As a result we have introduced the notion of co-design into our specification and evaluation methodology: WP8 takes loosely coupled third party services from WP6 and evaluates the user experiences presented by the services on an incremental basis. In this context WP8 are the initial users and subsequent modifications of services (technical) as well as methodology (user instructions, setting, context, evaluation goals, etc) are iterated rapidly. For the reason of documenting the co-design approach, we regard the first two “cognitive walkthroughs” as the first two parts of our three-tier trial. We do not give any bias to the relative weighting of the three individual phases in our evaluation. Each phase served an important purpose (see Figure 4).

Despite our perception as a result of the first walkthrough that the DM services were viable, at least in principle, one of the challenges we faced is the difficulty in directly demonstrating all or most of the key platform innovations. The evaluation of the core innovations is, after all, subject to a proper match between...
these innovations and the trials and how they are reflected in the services. Furthermore, one needs suitably robust, practical and effective evaluation criteria.

During the SOCIETIES plenary meeting in January 2013 we had agreed that some of the platform innovations would be conceptual and found a use-case for which we could make a valid argument. We proposed the scenario where “relevant” volunteers are guided to meet in a train (for instance) to help in a DM situation and this process is facilitated by discovery, connection, and CSS organization. This exemplary use case is presented in Appendix A.1. Hence, the platform would “know” that the volunteers were on the same train but for our evaluation this was assumed knowledge. Conceptually the platform would know volunteer relevancy based on learnt knowledge but again this is assumed knowledge for this particular experiment.

The DM services themselves are integrated with the platform and with each other, showing the functionalities of context and trust through the platform APIs. However, the expectations that might be raised when reviewing the rich scenarios in their “full user experience glory” are very hard to fulfill within the limitations of the foreseen trials. For example, the URNotAlone service filters skills associated with requests from DM experts (or other users) and presents the tool to volunteers with matching skill sets, such as: translation, directions, technical, leadership, organisation, internet research, and infrastructure. But these skills are not learnt automatically from the rich set of data available from the users’ interactions with a plethora of services, because such rich data is simply not available. It is also very difficult to “simulate” such aspects that have such a strong impact on the behaviour of a system with respect to a particular user. Skills of a user are a lot more relevant than say a (simulated) location history or mobile data usage history.

The following Table shows the mapping between platform key innovations and services. It can be seen that a certain set of innovations was integrated into the trial system, while other innovations were validated at the conceptual level.

<table>
<thead>
<tr>
<th>Service Key Innovation</th>
<th>Learning</th>
<th>Community Preferences</th>
<th>User Intent</th>
<th>Trust</th>
<th>Privacy</th>
<th>Context</th>
</tr>
</thead>
<tbody>
<tr>
<td>AnalyzeThis</td>
<td>Possibly conceptual: learn user’s</td>
<td></td>
<td>Implemented</td>
<td>Implemented</td>
<td>Community and user context:</td>
<td></td>
</tr>
</tbody>
</table>
3.2 Trial Description

We shall now present a brief overview of the trials. Subsequent sections will elaborate our trial procedure.

The first cognitive walkthrough was held on 5th March 2013 and lasted roughly 2 hours. It included ‘only’ members of the WP8 team. The roles were: one DM expert and 4 volunteer users. All users were located at their respective workplaces and there was no co-location of users. The experiment included a preparatory phase, the actual experiment and a phase for discussion and review.

The second cognitive walkthrough was held on 15th March 2013. It differed from the first only in the user composition. Naturally, new sets of questions were included in the tasks for the volunteers.

After the second cognitive walkthrough the WP8 team decided to conduct a third trial prior to the preparation of this deliverable. This was to provide more evaluation data and also to incorporate some of the suggestions and developments that were the direct result of the two preceding events; it was seen to be advantageous to use the momentum gathered in the first two trials, in accordance to the Adaptive Frequency Spiral Model and the co-design paradigm, which had been seen to be a major driving force in the first DM trial (see above).

The third trial was no longer targeted to be a “cognitive walkthrough” since it was designed to include three users who were from outside the project and who received no particular guidance during the trial. In the two actual walkthroughs, the users had spent many months and weeks discussing the paradigm of the use cases and applications and were familiar with the services. For this reason we will refer to this setting as the “Third Trial Phase”, but within the overall context of the project’s first user trial. Disambiguation will only be used where deemed necessary.

The Third Trial Phase was held on 30th April 2013. It differed from the second walkthrough in the user composition, services used, and methodology.

3.2.1 Location and Users

The trials took place in a distributed manner. The trial users were located in Ireland, Greece, France, Norway and Germany.

<table>
<thead>
<tr>
<th>User</th>
<th>First CW</th>
<th>Second CW</th>
<th>Third Trial</th>
</tr>
</thead>
<tbody>
<tr>
<td>DM Expert</td>
<td>Germany</td>
<td>Germany</td>
<td>Germany</td>
</tr>
<tr>
<td>Volunteer</td>
<td>Ireland</td>
<td>France</td>
<td>Ireland</td>
</tr>
<tr>
<td>Volunteer</td>
<td>Norway</td>
<td>Norway</td>
<td>Ireland</td>
</tr>
<tr>
<td>Volunteer</td>
<td>France</td>
<td>Ireland</td>
<td>Ireland</td>
</tr>
<tr>
<td>Volunteer</td>
<td>Greece</td>
<td>Ireland</td>
<td>Germany</td>
</tr>
<tr>
<td>Volunteer</td>
<td>---</td>
<td>--</td>
<td>France</td>
</tr>
</tbody>
</table>

Figure 6: Disaster Management: Location of Users

With the exception of one co-location combination (two users in Ireland were together in one office in the third trial) all users were in their own offices.
In total the trial involved a partially overlapping set of real persons. The DM expert role was fulfilled by two different persons. The first and second cognitive walkthroughs included five distinct persons. The third trial phase included six persons.

### 3.2.2 Devices and equipment

For the trials, we deployed between 5 and 7 SOCIETIES Platform Containers on a powerful server. Every user registered on the DM platform had a direct connection to his SOCIETIES container. Through this link we had full integration with the Context, Privacy and Trust functionalities of the SOCIETIES platform – and in particular also the login.

The third party services were hosted on additional servers located in Germany and France. The end-users employed their desktop PCs / Notebooks with no special software installed. The user access to the services was browser based.

### 3.2.3 Services

The following tables specify the development of the Third Party and additional Services used by the users in the trial.

<table>
<thead>
<tr>
<th>Third Party Services</th>
<th>Used by Trial Participants in 1st Prototype User Trials: Yes or No</th>
<th>Passed Functional and Integration Tests in WP7 by which date.</th>
<th>Comments or issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>YouRNotAlone (plus Chat-Tool)</td>
<td>Yes</td>
<td>22.2.2013 and 22.2.2013 for Chat Tool component</td>
<td>Fully functional through all trials</td>
</tr>
<tr>
<td>IWant2Help</td>
<td>Yes</td>
<td>22.2.2013</td>
<td>Fully functional through all trials</td>
</tr>
<tr>
<td>AnalyzeThis (including Crowd Sourced Disaster Mgt Tool)</td>
<td>Yes</td>
<td>22.2.2013</td>
<td>Fully functional through all trials</td>
</tr>
</tbody>
</table>

**Figure 7: Disaster Management: Third Party Services**

<table>
<thead>
<tr>
<th>Third Party Services</th>
<th>First Cognitive Walkthrough</th>
<th>Second Cognitive Walkthrough</th>
<th>Third Trial Occasion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telephone Conference / AC Bridge</td>
<td>Used prior and after the walkthrough, but muted during the actual experiment (processing tasks). The audio was recorded.</td>
<td>Used prior and after the walkthrough, but muted during the actual experiment (processing tasks)</td>
<td>Used only to introduce the experiment and setting to the volunteers; prior to trial</td>
</tr>
<tr>
<td>PiratePad 1 Online Collaboration Tool</td>
<td>Used to organize the trial and to collect feedback</td>
<td>Used to organize the trial and to collect feedback</td>
<td>Not used</td>
</tr>
<tr>
<td>PiratePad 2 Online Collaboration Tool</td>
<td>Not used</td>
<td>Not used</td>
<td>Used by the participants to organize themselves and to collate material during the request processing process</td>
</tr>
</tbody>
</table>

**Figure 8: Disaster Management: Additional Non-Project Tools and Services**
The non-project tools were seen to be useful assets for the end-users in executing their task completion and in collaborating. Naturally, following the same argumentation line as before, we can claim that these services could benefit from tight integration with the platform and its features, such as learning, user intent, etc.

3.2.3.1 Permissions, privacy and ethics, instructions and data management.

Users’ permissions were not explicitly requested for the first and second cognitive walkthroughs since WP8 members were evaluating the platform and services and were fully aware that their colleagues were aware of each other’s identity and actions.

We have anonymised all data and according to the flow chart agreed and specified in the projects ethical guidelines, so for the 3rd trial we provided the project default consent form which was signed by all three non-project volunteers; it included a passage (see Appendix A.2) to reflect the special care needed to ensure that nobody would ask any real persons for help.

3.2.4 Data Collection, Analysis and Interpretation

The following sections describe the data collected for the first and second cognitive walkthroughs as well as the third trial phase.

Figure 9: 1st Cognitive walkthrough with researchers from SOCIETIES

3.2.4.1 First Cognitive Walkthrough

The following sections present a selection of the raw data for the first cognitive walkthrough.

3.2.4.2 User Feedback

We first present the anonymised feedback from the users. Instead of moving it to an annex and attempting to produce a possibly biased summary, we invite the reader of this deliverable to gather their own impressions:
Feedback from user a:
- I am a bit lost, because I did not know where to start - which request to answer.
- I provided some answers, but did not get any feedback. I do not know if my feedback is useful
- I try to structure a bit the work with others, but I did not get any feedback form others
- I am not notified when a new request is posted
- I am not notified when other people give an answer
- I do not know who provide answers, e.g. "user5". Can I trust the answers so they can help me to provide further? I guess the requestor should always ask to provide a link to the source where info was found.
- Too much anonymity
- I get bored very quickly. I was not motivated to answer because I did not know how useful my feedback was
- To get connected with others, I have to go to YouAreNotAlone, and it is cumbersome to do so
- I lack support for structuring requests. For instance a top request for list of hospitals, then a request for more details about each hospital
- I cannot include screenshots

Additional comments (after reflection this week):
- The requests should be marked with deadline (can be part of the heading). I got stressed because I wanted to answer very quickly, but may be this was not the point?
- Some requests may be closed. How do I know that?
- Before when I was using the tool with my "own" identity, I got notification email. I think we should give the choice to the user of giving his/her email (thus enabling email notification)
- It was unclear to me who defined the tasks. Anyone can do it. It is good as it supports to decompose the work, but at the same time I feel more confident in questions risen by organizers/field workers. I know they have urgent needs, I know they have experience and have asked eligible questions.
- Guidelines are needed to relate request together.

Feedback from user b:
- We need to assign tags, or rather specify a set of tags to be used for the trial
- Suggest to use a bigger group of users, not just five or six. Perhaps ten would allow more dynamics. But then not have four groups of five, just have two groups of ten.
- Leader assignment should be indicated to the volunteers: i.e. that they elect a leader or coordinator

Feedback from user c:
- Not sure where to focus. Chatroom, webtool or my search windows.
- I felt quite alone. It was tiring. I wanted to help. I felt competitive about quality of answers.
- Not sure how quickly to share. If I found a link, I wasn't sure whether to share immediately or wait until I had time to research it further.
- I could not list sources, nor see others' sources. Ad-hoc.
- I could not see or create tags in answers.
- I didn't know where best to contact others in the group for specific help - ie chat window or tool. I had no idea what others were working on.
- Feedback - Need a better real time update within tool (ie activity feed) of answers.(i.e not just on request screen or via email). Email is too slow for this type of collaboration.
- Need more clarity on mechanics of collaboration, ie visibility of small scale actions and collaborations. ie activity feed message: "PersonA and PersonB are working on map question"
- Layout. I find the answer space too large. Too far away from the other answers. There is probably a more efficient way to display answers for browsing.
- It it good that we can all discuss aspects of usage of the tool because it means it worked (ie didn't fall over).
• It was reasonable consistent. It behaved as I expected it to behave for the most part.
• Error reduction - I can edit questions, but not answers, or tag other answers that may be incorrect.
• Tags required for task matching - initial assignment/notification of tasks, but also maybe for task control - ie task leader, information/link checker role, and summariser? Also tags required to follow tasks development.
• If people could earn points or badges for specific skills for tool usage – i.e. map marker. It would help focus attention and identify key people suited to a particular task/subtask.
• Need to find a better way of marking subtasks and linking them.

Feedback from user d:
- better to have a leader for each task
- is there someone to confirm the

Feedback from user e:
• I had the feeling that not all the tasks were presented to me, however the pop up menu for the tasks was very clear and useful.
• I had no feedback on my answers
• I had no indication when an answer from another volunteer was posted
• “You are not alone” service was easy to use
• Answers were not presented in a chronological order, so it was a little bit confusing
• I would expect a supervisor for each task
• I didn’t know when to stop searching for info
• Tasks & Subtasks were in the same level, I would expect subtasks to be under the tasks
• I didn’t know if the question was coming from on-site or by another volunteer.

In summary we can say that suggestions and comments addressed all layers of the system and its usage: From issues with the interfaces, to perceived lack of clarity in the services and to problems in coordinating the responses with other team members. In particular, users felt that they were not integrated into the flow at a human level and at the service content level. As will be explained shortly, a number of improvements were implemented for the second walkthrough.

The user feedback can be summarized as follows:
1. The system was seen to work in principle (i.e. there was actually something stable that could be used and criticised).
2. Users felt stressed, lost, bored or alone: Not very positive emotional states.
3. Users made specific feedback: they suggested to elect a leader (this was implemented in the trial third phase).
4. There was criticism as to the workflow. A complete incorporation would have implied a full redesign and reimplementation of the services, which was not feasible.

3.2.4.2.1 Chat Log:

As a component of the URNotAlone service, the so-called Chat-Tool provides volunteers an instant messaging platform for discussion of the questions posted by experts and for feedback from the experts and general interaction. We show the logged chat messages in Appendix A.4.1.

The log clearly reveals that the users grappling on all fronts: from trying to understand the scenario, the different roles of the services, and how to interact. There were also elements of meta-discussion in that points were being raised in the chat that did not pertain to “playing the role of a DM volunteer”, but as “a SOCIETIES project member developing and understanding services and platforms”. A fair comment is the
one indicating that even after 45 minutes into the trial, so ground-breaking progress had been made – at least in perception.

### 3.2.4.2.2 Database Snapshot

In order to capture the interaction that takes place between the experts and the volunteers, we have also instrumented the software to provide snapshots of the database that contains the questions and answers during the three trials. These snapshots encompass the entire state of the trial repository and is available in the form of an SQL dump to the project.

In this first cognitive walkthrough the rate of questions and answers was relatively low in comparison to the second cognitive walkthrough and the third trial.

![Figure 10: Skill Coverage Chart](image)

The chart in Figure 10 is generated from the specified skills of users from the database snapshot. We see a concentration of skills around some dominating topics, such as Singapore, with a complete lack of specified skills in others, such as environmental.

We observed that the registered skill that volunteers have specified for themselves (see 10) do not fully cover the requested skills in the experts’ questions (11).

![Figure 11: Frequency of Requested Skills](image)

Based on the database snapshot the numbers of occurrences of tags for specified skills are counted. We see that the most frequent tag was Singapore, followed by Hospital. A comparison with the skill coverage chart shows that these skills were available in the group of volunteers. Note that the requests were mostly flagged with more than one skill tag.
The following chart (Figure 12) shows the number of requests which each user inserted into the system. During the first cognitive walkthrough three out of five users raised questions. Note that the expert user1 created the highest number of requests compare to other users, which will increase in the second walkthrough and the third trial.

![requests created](image)

**Figure 12: Request Activity of Users**

(We note that the overall number of requests of 7 is fairly low and rose significantly over the three trials)

Users had the possibility to rate (positive and negative) the responses to requests. The rating is forwarded towards the SOCIETIES core platform to recalculate the trust level between the user who was rating and the user whom had given the response. Out of the five participating users only the expert user1 and user5 used the possibility to rate the responses during the first trial (see 13).

![Figure 13: Trust Assignment](image)
The chart in Figure 13 was created from the database snapshot and shows the trust assigned by user X upon user Y. The assignment of trust has been brokered through the platform-supported management of trust.

3.2.4.3 Second Cognitive Walkthrough

For the second walkthrough we made a number of minor changes to the look and feel of the service interfaces.

The main real innovations were:

1) Integrate the Chat Tool more tightly with AnalyseThis and IWanToHelp. Incoming requests and responses were now propagated to the chat tool. It was hoped that this would provide a higher degree of interaction.

2) Better User name management of the Chat Tool (see Section 3.3.1.2).

3) To try and provide more feedback from the DM simulated expert side of the interaction. This was partially achieved by 1) in the sense that responses and follow-ups from the DM experts would be reflected in the chat tool.

4) Ensure that the tags associated with the requests were selected from a sensible set, so that the IWanToHelp service would alert the user that a request matching their expertise was available. In the first walkthrough this function was working, but the keywords did not match in many cases.

The following sections present the raw data for the second cognitive walkthrough.

3.2.4.3.1 User Feedback

We first present the feedback from the users. Instead of moving it to an annex and attempting to produce a possibly biased summary, we invite the reader of this deliverable to gather their own impressions:

Feedback from user:

- note that I can log in as user 5 from 2 different machines but I cannot change username on the 2nd machine
- do the guidelines need to give more info on what the purpose of the two tools is and what a user is supposed to do once they are logged into the two tools
- why did the request not appear in the chat window?
- I didn't understand why I was being asked to do a particular task and this was causing me some concern. what I mean is because I didn't understand why I was being asked to do a particular task I wasn't sure if the person requesting this was sending me off on a wild goose chase or not.
- there is too much information being sent to the chat window, it is impossible to keep up with this. you don't know whether you should concentrate on the task that you were asked to perform or whether you should be checking the chat window
- I made a mistake in my answer. is it possible to edit your answer after you have posted? is it possible to delete your answer after you have posted?
- Imo this would be more effective if the task resolution was structured a bit better, eg in a hierarchy, with a leader dispatching tasks, and volunteers not being distracted by all the noise
- Q: Should we consider how to recommend good quality answers from known routes... ie google maps and wikipedia?
- There is an issue with not knowing whether to focus on speed on quality.
- Feeling that there are three different conversations in parallel and not knowing where to place attention..... Also can't see anyone on chat working on the same question.
- Got one expertise request in green box but no pop-ups - are they the same thing?
- Hard to stop....

Feedback from user:
- Lack a list of keywords (tags) when I define a request. When the purpose is to connect to people skills, I am afraid that the user will not spell tags correctly.

- A bit tricky to define a sub-request i.e. a request related to another when it is recommended to use the same tags.

- Disturbing "ping" from I am not alone

- I miss a request id so I can easily refer to it

- I would like to filter activity feeds related to requests in I am not alone

- I am not Alone: too many activities. I was not able to trace back to requests. For instance I suggest to coordinate a request but missed track of the users who answered. May be I should have told that I was going to break the task down first. I should have done it myself (i.e. define new requests)

- I felt that I answered in an ad-hoc way to new requests. I felt that I had not completed my current task related to supermarkets, but I jump over to other simple tasks... I guess it is because I have access to all requests, not a subset.

Feedback from user:

- suggest using pirate pad as static tool and chat as ticker.

The user feedback appeared more focused than after the first walkthrough; clearly the users had benefitted from their first experience, and the changes to the services were perhaps effective to some degree (e.g. better keyword management for the DM expert initiate requests, incoming requests and responses in the chat now meant that people did not experience loneliness).

In summary we can state that three main issues arose, or were maintained from the first walkthrough:

1) Too high degree of “noise” in the chat room, and therefore distraction.

2) Perceived lack of “leadership” and coordination. This can be seen in conjunction with 1), since leadership was seen as a potential way to better focus the work of others.

3) Lack of workflow support for sub tasks spawned by the volunteers themselves.

3.2.4.3.2 Chat Log

The chat log is shown in Appendix A.4.2.

3.2.4.3.3 Database Snapshot

![Skill Coverage Chart](image)

**Figure 14: Skill Coverage Chart**

This chart is generated from the specified skills of users from the database snapshot. Compared to the previous trial, we see a more even spread concentration of skills over topics.
Based on the database snapshot the number of occurrences of specific skills are counted. We see that the Singapore tag was no longer used at all. This is caused by the a priori notion that the entire group of experts and volunteers was centered around the Singapore context. The scenario that was played by the experts was very much oriented towards assessment of infrastructure, which is reflected in the frequency of this tag. Note that requests were mostly flagged with more than one skill tag.

During the second walkthrough the total amount of requests inserted into the system doubled. Most of the requests were again created by the expert user1.

We see a strong increase in the overall number of issued requests (15) as compared to the first walkthrough. The rating possibility was used more extensive by expert user1, but also decreased in variability. Only user2 rated himself one positive response, which was valuable input to adapt the system to not allow self-evaluation.
**Figure 17: Trust Assignment**

This chart is created from the database snapshot and shows the trust assigned by user X upon user Y. The assignment of the trust has been brokered through the platform-supported management of trust. We note that the usage of the trust assignment functionality by the expert users was still low in this trial.

### 3.2.4.4 Third Trial

Before the third trial, two major changes were made:

1) It was suggested to use a PiratePad collaboration tool in order to coordinate responses. This tool was seen to be “slower” than the chat tool, and much more persistent.

2) Give specific guidelines as to the role of a leader. For the trial, we suggested a leader and this person chose to act this role. The leader introduced themselves to the other members of the group after the start of the trial.

3) Non project users were included.

4) The set of keywords used as the labels was predefined and communicated in the instructions.

The following sections present the raw data, as far as it is printable, for the Third Trial.

#### 3.2.4.4.1 User Feedback

**3.2.4.4.1.1. Feedback from one of the volunteer users who is also a project member**

“We need to script the introduction as it took nearly an hour. We should insert the dates into the relevant section in the consent form and include a line for signatures. Are signatures necessary? Would this not make more sense as an anonymised terms and conditions checkbox or compulsory page to enter the system?

What is more important – the disaster scenario, the crowd sourcing scenario, or the co-location scenario? Why the emphasis on co-location?”

**3.2.4.4.1.2. Feedback from first non-project volunteer**

The feedback from the first non-project volunteer was collected and has already been summarized by the project member interviewee. It is presented in the following:

*Skills*

The list of skills was too vague and required further clarification to be usefully employed. One participant in particular did get the pop-ups relevant to his/her skills.
Team Composition
The question of how to prevent malicious users joining the team was discussed. It was suggested that there could be a reputation system linked to personal profiles, where registration with known organisations such as the RedCross, would be identifiable by the system, and weighted as more trustworthy. This could also be extended to networked trust, where being well connected to trusted individuals could earn on more points.

Usage of tools needs to be more disciplined as it was felt, to streamline the efforts of the offsite volunteers to respond. Three, different tools might be too confusing and should be clarified further at the beginning. It was difficult to know where to focus one’s attention. There was a lot of flicking between tools initially as participants tried to figure out what was happening.

Chat room – ‘You Are Not Alone’
One user thought the chat room was too busy, and should be more reserved. All participants would prefer not to have the publication of answers in full replicated here, but instead suggest publishing a notification in the chat-room time-stamped to each request answered, and more in line with long established IRC protocols for emergency response.

Pirate Pad/ Etherpad
It was suggested that the pirate pad could be used mainly as a space for holding research answers until they could be consolidated and synopsized for final publication in the ‘IWantToHelp’ tool by the task leader.

IWantToHelp
The requests were legible, and easy to scan for relevancy. However, participants felt they needed more decisive guidance as to when and why it was used. What was the distinction between it and the chat tool? What additional benefits or affordances did it have?

Where to put their research answers.
Should they post them to chat along with the requests posted there by the system and expect a ‘leader’ to pick them up and repost to the main tool? Or should they post all their research to pirate pad, and pool answers there, so that they could later be consolidated by task leader and posted to the main ‘IWantToHelp’ tool?

Nature of requests
Participants felt the nature of the requests was sometimes a bit vague and unclear. Despite having the three tools, the participants were unsure about:

- Where to ask questions about clarity of the requests?
- “Where do (participants) have those discussions?”

Group Leader
It was suggested that a more active group or task leader is required who would play a different role to the other members. They didn’t know what to expect from the leader in this exercise.

Scoreboard for requests and answers
This feature was suggested so that it would provide participants with an immediate gauge of which questions had already been ‘taken’ and were being currently researched, and which questions had been answered. This would, it was implied, be more useful that knowing stats about how many had read the question.

Divide & Conquer, or Duplicate & Assist more Visibly with a Ticket system.
It is useful that requests go to everyone; but visibility of which questions are taken (i.e. already being researched by other participants) is requested so that too much effort is not unintentionally spent duplicating answers. A suggestion was made that each question have a flag or ticket, which could be claimed by a participant if he/she agree to work on it, so that there is a distinction made between reading the question
(which is currently shown) and committing to research answers for it. This could also allow the system to limit the effort extended for each question so only a small number of users to work on each question at any one time. Alternatively several tickets for one question, could allow for conscious controlled duplication of effort, and engineer a slightly competitive response, which could also motivate users to respond well quickly. Having tagged with questions a participant has worked on could also be useful for enhancing that individuals profile, reputation and visibility within the system. If a participant can been seen to be working by others, it is considered significant.

**Consolidating Data – task and role allocation more coordinated.**

There appears to be a conflict between roles for collecting relevant data, and synopsizing that data. It could be decided from the beginning how to organize researched data, so that it can be easily consolidated. It was too difficult to do this at the end. Participants suggested assigning task roles into just researcher and synopsiser (and researcher), and using the Etherpad to aggregate information from which a more concise response could then be crafted.

**Length of Exercise**

Participants felt the time was adequate and that they could have sustained their offsite research response for a maximum of 4-6 hours in duration.

**Missing the bigger picture.**

Participants felt they would benefit from having more integrated information about the bigger disaster picture, including news updates as part of the system.

### 3.2.4.1.3. Feedback from second non-project volunteer

The feedback from the second non-project volunteer was collected and has already been summarized by the project member interviewee. It is presented in the following:

*User was overall quite happy with the experience of the Societies trial. He/she regards the application as very sensible – he/she would use it in cases he/she feels he/she can help, given he/she finds the time. His/her neutral rating in ‘if he would use it more often’ just depends on the (hopefully) rare occasion where it is needed. The services worked without any bug, so there is nothing preventing from further usage, the volunteer however does not any alternative either. The usage was quite hectic – due to the high intensity of the trial scenario. The knowledge of being in a simulation was the only reason for not attaching the label ‘helpful’ in the questionnaire.*

*The usage in its simple mode is easy and does not need a lot of introduction. However there are a lot of things going on in parallel, so the volunteer usually used several screens and browsers to have an optimal overview of chat tool, requests and browsers for research. Overall, it was a full time occupation and not working in parallel to other work (at least in the intensity simulated in this trial). Only toward the end there was more free time (which should be used however to review old questions).*

*However, there is much more functionality in the tools than the volunteer made use of – as no one explained their intent. The whole “right side” of the chat tool or different chat rooms, for instance. The option to rate or approve responses was not introduced either – as little as trust ratings - and hence not really taken into account. Understanding all functionality of the different services would need more intense training. User did not use the PiratePad a lot, either.*

*The introduction was overall rather insufficient for user. The only message he/she got was: “We are in Singapore”. The information that all volunteers were in the same train was rather confusing or unrealistic. Much more communication would have been verbal in this case. The introductory sheets were not all consistent in naming of the tools. Overall, the different names were rather confusing. More guidance from the team leader would have helped a lot. This happened only in one situation.*

*Minor comments to usability: If there are no requests, the welcome message is rather confusing and does not welcome users to log in. The ‘back’ button does not always work as expected in the CSDM platform. The demanded order of login and skill change seemed overly complicated.*

*Suggestions to improve usage:*

- There is too much activity, text in the chat tools. E.g. not all the text of new requests should be posted, but perhaps only title, tags and a link.
• The chat tool should have the functionality to highlight messages that have not been read/displayed before.
• Users should get recommendations for grouping or to contact groups of relevant people.
• If there are follow-up questions in requests assigned to you, you should be notified.
• There should be a way to filter requests which you have (or not) already worked on.
• It might be helpful to be able to specify the skill level in addition to the skill.
• Ideally the team leader gets suggestions to distribute tasks according to skills, skill-levels and workload.

3.2.4.4.1.4. Discussion

It is fair looking at the feedback from these two non-project users to conclude that:

1. Project user’s feedback now concerned the concepts being explored in the trial and the provided instructions.
2. Both non-project users clearly understood the general concepts and were eager to share their experiences and feedback.
3. The feedback is very detailed and would be a very good starting point for a full redesign of the services!
4. Clearly the role of the leader should be developed further – even without any technical changes this would alleviate some of the issues, such as the perceived lack of use of the PiratePad.

3.2.4.4.2 Chat Log

The chat log is shown in Appendix A.4.3. The chat was used for both coordination of work and for integrating the volunteers into the general “buzz” of the action, by letting them see new requests and the responses, which included feedback from the DM experts.

3.2.4.4.3 Database Snapshot

The following tags were used in the third trial to finding volunteers with matching expertise for questions:

<table>
<thead>
<tr>
<th></th>
<th>computer</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>infrastructure</td>
</tr>
<tr>
<td>3</td>
<td>communication</td>
</tr>
<tr>
<td>4</td>
<td>internet</td>
</tr>
<tr>
<td>5</td>
<td>hospitals</td>
</tr>
<tr>
<td>6</td>
<td>translation</td>
</tr>
<tr>
<td>7</td>
<td>navigation</td>
</tr>
<tr>
<td>8</td>
<td>chemical</td>
</tr>
<tr>
<td>9</td>
<td>research</td>
</tr>
<tr>
<td>10</td>
<td>management</td>
</tr>
</tbody>
</table>

Figure 18: Skills tagging

All volunteer users claimed different sets of expertise before the start of the “hot” phase. The following chart shows the “coverage” of the possible skills by the group of five users. We can see that none of the users has indicated expertise in the skill chemical.
The chart above is generated from the specified skills of users from the database snapshot. Compared to the two previous trials, we see a much more complete coverage of the set of pre-specified skills, with “chemical” as the only exception. This led to a greater number of alert messages telling users that matching requests were available.

We were also interested in the frequency of occurrence of requested skill in the questions that experts posted. The following graph (Figure 20) shows these frequencies. We observe that the skill infrastructure was most frequently requested. This is not unexpected in an early phase assessment mission. Three skills, namely computer, hospitals and chemical were not requested at all in this trial.

Based on the database snapshot the number of occurrences of tags for specific skills was counted. The scenario played by the experts was again oriented towards assessment of infrastructure, which is reflected in the frequency of this tag. Compared to the two previous trials we now see significant usage of the tagging functionality. Note that requests were mostly flagged with more than one skill tag.

A qualitative analysis of the answers provided by the volunteers shows that the more stringent organization among volunteers was advantageous in terms of delivering informative and consolidated responses to the experts in the field.

Again expert user1 inserted most of the requests during the third trial.
Again we see an increase in the overall number of issued requests from 15 in the previous trial to now 19. We note that the experts could have issued more requests but were asked to somewhat throttle the load on the volunteer group.

During the third trial only the expert user rated responses, as shown in Figure 22.

The chart above is created from the database snapshot and shows the trust assigned by user X upon user Y. The assignment of the trust has been brokered through the platform management of trust. We note that the usage of the trust assignment functionality by the active expert user was significantly more active than in the previous trial, which hints adoption of this feature.

3.2.4.4.4 PiratePad Snapshot

In Appendix 5 we present the Pirate Pad snapshot as collected at the end of the trial. It is quite clear that the amount of interaction is not that great (although in this snapshot view we cannot assess how much temporary
material was deleted during the trial). The leader role might have promoted more use of this tool as a complementary Chat Tool.

### 3.3 Evaluation Results

#### 3.3.1 Chat Logs

In order to evaluate the three user walkthroughs, we analyse the chat logs from two perspectives. We first give a statistical analysis and then investigate qualitatively the chat messages to understand volunteer experience as well as their expectations.

#### 3.3.1.1 Statistical Analysis

The following table shows the message statistic of the three walkthroughs. We have eliminated the system notification messages (e.g., “user xxx logs into the Chat”)

- Expert messages are posted by on-site expert for task clarification and discussion.
- Volunteer messages are posted by volunteers for collaborative working on tasks
- Task notification messages are posted automatically to inform new tasks in chat room
- Answer notification messages are posted automatically to inform the new answers to a task.
- Total messages include all the messages above.

Chat log statistics:

<table>
<thead>
<tr>
<th>Message count</th>
<th>1st walkthrough</th>
<th>2nd walkthrough</th>
<th>3rd walkthrough</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total messages</td>
<td>108</td>
<td>133</td>
<td>198</td>
</tr>
<tr>
<td>Expert messages</td>
<td>35</td>
<td>28</td>
<td>34</td>
</tr>
<tr>
<td>Volunteer messages</td>
<td>73</td>
<td>55</td>
<td>97</td>
</tr>
<tr>
<td>Task notification messages</td>
<td>N/A</td>
<td>11</td>
<td>19</td>
</tr>
<tr>
<td>Answer notification messages</td>
<td>N/A</td>
<td>39</td>
<td>48</td>
</tr>
</tbody>
</table>

Table 2: Chat log statistics

One can clearly see an increase in the traffic over the three trials, indicating a greater degree of human interaction (this holds even when accounting for the notification messages). Especially encouraging is the increase in the volunteer messages. The experts showed relatively constant interaction.

#### 3.3.1.2 Qualitative Analysis

By analysing the messages posted by volunteers, we summarize their experience as follows:

1) anonymous usernames cause inconvenience in discussion;
2) the lack of new task/answer notification may probably cause inefficiency in collaborative working. Therefore, we made the following improvements for the second walkthrough: a) users’ ID and profile information is automatically synchronised with the Societies platform; b) new task and answer notification is posted in the Chat-Tool.
From the chat log of the second walkthrough, we conclude that the nickname of volunteers can help collaboration of volunteers and task/answer notification feature improves the efficiency of task solving process, in particularly when several users work on the same question simultaneously.

From the chat logs of the third walkthrough, we conclude that Chat-Tool is sometimes too busy when answers are posted intensively, which probably bothers volunteers. Summarized notification messages are suggested.

### 3.3.2 Request/Response Database

We have further used the data in the request/response database to perform a qualitative analysis of the potential usefulness of the given answers. Moreover, we have looked into the interaction between the experts and the volunteers as well as among volunteers as they organized their response.

From the recorded tickets we see a clear improvement in overall performance of the volunteers. We note that these improvements are threefold: First, the time until useful answers arrived at the experts was decreased from the first to the third experiment. Second, the quality of these answers increased in terms of information content. Third, the quality of the answers increased in terms of conciseness and decreasing amounts of distracting information.

We attribute these improvements to both technical and human factors. The feedback that was given by volunteers and experts led to slight changes in the involved third party service that made the technical system much more useable and tailored to the task of its users. Furthermore, the lessons learned from the first two experiments led a significantly improved organization among the volunteers. Specifically, volunteers decided to select “leader” who would spawn tasks. This leadership resulted in better coordination of the information gathering process. Furthermore, volunteers consolidated the responses before sending them to the experts.

As an example we show the following summary of IDP Sites that was forwarded to experts, which contains not only raw data but also refined information, such as the computation of how many persons one site can accommodate, based on Red Cross information that volunteers had searched for and found during the process:

- **North West of Bikit Batok Road (Exit 34 off PIE, take TJIE to Upper Setar Reservoir) Is approx 6 sq kilometers, or 6000000sq/m. given 20sq/m per person (Red Cross figures) thats approximately 300,000 souls**
- **Singapore Island Country Club (Access via AYE then CTE and PIE, Exit 20) Beside Lower Pierce Reservoir 1150000sq m or approx 50,000 souls**
- **Poresia Golf and Country Club (West on the E3) 1250000sqm or approx 62500 Souls**

(2013-04-30 12:12:08', 0)

Brilliant! Thanks!
(2013-04-30 12:15:49)

In combination with the steady increase in feature adoption by the expert and volunteer users through the three trials, we consider this kind of evolving interaction to be a strong indicator of the potential usefulness of the overall approach of the Societies platform and the specifically tailored third-party services for leveraging the cognitive surplus of volunteer users for helping experts in disaster related activities.

### 3.4 Conclusions and Recommendations for Second Trial

We have presented the results of three individual trials that were conducted using the DM services and SOCIETIES platform. The main findings are the following:
1. The platform and services operated without any technical problems for the duration of the three trials, hosting up to 8 containers over several hours. This includes all third party services and systems. The structure and users were distributed across several countries.

2. Eight volunteer users in total partook in the trials. Three of these were non-project members.

3. The development process leading up and into the three trials was guided and shaped by the “co-design” principle that involved project members being active as users, as well as shaping an evolving system and well as the evaluation principles.

4. Some of the platform innovations could only be shown conceptually: these related to the community orchestration of the ad-hoc volunteer group. Other innovations (Trust, Context, Privacy) were shown in the trials. Context related in particular to the relevancy of users to requests. The Trust ratings provided by the experts were visible to the users per response.

5. The interaction increased over time, as was evident from the Chat Log data. The users also created more requests while breaking down tasks into sub-tasks.

6. The user feedback became increasingly refined (even though there were new users) by the third trial phase. This can be seen as an indication that the users were able to relate to their experience.

3.4.1 Participatory Value for Researchers

We also want to provide some concluding remarks concerning the perceived participatory value for the researchers involved in the project during the preparation of this trial and its evolution over the three phases. The outset was somewhat clouded by the delays in the available platform and the desire to have everything available in a “big bang” event which had been the assumption made during the preparation of this trial. When it became clear that a smaller than expected set of users could be reliably supported, the group seized the opportunity to conduct what was then seen as a “cognitive walkthrough” that would stand separately from the main trial.

During and after this walkthrough all participants agreed that enormous progress could be made by immersing themselves in the services and workflow and seeing the problems and potential improvements, both in terms of the services as well as better understanding the definition and description of the collateral material such as instructions, roles of a leader for the volunteers, privacy constraints, inter-volunteer interaction, and the important aspect of the conceptual value propositions as reflected in the pre-trial “railway” scenario. This was seen as the starting point to continue the “walkthroughs” until the group felt confident that one could add non-project users. The rapid iterative development was seen to be very effective, especially since suggested changes could be justified or judged more easily by relating them to personal experience.

Finally, it is important to add that the joining of forces between WP8 members and those involved at the integration and development level was much more effective in the context of “everybody being in the same boat” around a real planned cognitive walkthrough, rather than the formal handover of a system from developers to trial group.

3.4.2 Recommendations for Preparation of the Second SOCIETIES Trial

The second trial will involve two kinds of volunteer users: One group will be evaluating images of damaged infrastructure provided in quasi-real-time by a fleet of Unmanned Aerial Vehicles (UAVs) operating under the control of an “off-site” volunteer using suitable virtual reality equipment. This volunteer will be chosen by the system from the second group based on attributes such as trust, context and preferences. In addition, there will be DM expert users in the field. The trial will be conducted at three locations: On-site, off-site volunteers evaluating the images, off-site volunteer controlling the UAVs in a suitably equipped technical environment. This means that the User Aspects and Logistics need to be well understood and planned prior to the trial. In addition, the trial will use a real satellite data link to be as realistic as possible. We will require a stronger degree of true technical expert knowledge on behalf of the volunteer group (for instance they will assess the structural integrity of a building or similar infrastructure).
We recommend that the “Participatory Design” approach remain a driving force for the second trial. As outlined above it has proven to be an effective way of galvanizing efforts to a common goal and for rapidly adapting services as well as expectations and evaluation approach.

In terms of **Deployment** and **Scalability** we expect that the SOCIETIES platform will be hosted along similar configurations as the first trial. The number of active users was limited by resource requirements. Since there will be more users involved in the second trial, we expect that the number of supported containers be at least 12-15. The system has proven to be stable in the first trial, but we need continue level of **Stability** for the second trial.

In terms of **Aligning the Roadmaps** between WP8 and the Integration workpackage (WP7) we expect that the experience from the first trial will help us better understand any deployment limitations. Our “Participatory Design” approach will allow us to react flexibly to changes. Nevertheless, it is crucial that the system be deployed and ready according to the specified requirements.

We expect some degree of **Staged User Involvement** to test various elements of the system and services, which will be more complex that the first trial.

A question that needs to be addressed is that of the required **Depth of Integration with the SOCIETIES Platform**. We expect a richer set of context attributes to be used in orchestrating the volunteer selection. To what extent the **Trust Model** will provide real value is still open and needs to be addressed. It is also unclear how/if the users will interact with the SOCIETIES Application on other devices.

As in the first trial, a careful formulation and specification of **Preconditions** (context attributes, “lead-in-story”, preferences, etc.) needs to occur to ensure a smooth transition from the (artificial) state before the trial to the trial itself.
4 Disaster Management: Mobile Services evaluation

4.1 Description

Complementary to the Disaster Management trial that focused on cooperation with volunteers (see Section 4), an evaluation involving the Norwegian Red Cross was organized in order to get feedback about the SOCIETIES basic community concepts, the mobile team management service iDisaster and the smart jacket interface (that requires using the mobile smart iJacket service). Since the Red Cross had not been participated to the design of the proposed solutions and none of the participants were familiar with the SOCIETIES concepts, the evaluation was conducted as a focus group rather than a “trial” where participants are given tasks and interact with the software themselves. The meeting started with a demonstration of the software prototypes that was followed by a moderated discussion. Following this focus group, SINTEF was invited to make observations during a “planning game”, i.e. a serious game with the aim to train leaders in an action (or mission) to get practice in coordination.

Note that it not the first time where the smart jacket is being evaluated by first responders. An initial prototype was evaluated earlier in cooperation with the MIRROR project with the Italian civil defense. The evaluation this time differs in two ways: the design and functionality of the jacket were revisited based on the feedback on the first evaluation, and the jacket is integrated with the SOCIETIES concepts of CIS and CSS.

The reason for selecting a new user group is essentially practical:

- The other part of the disaster management trial focused on volunteering and did not involve the responders earlier involved in the paper trial organized in SOCIETIES (i.e., the persons who gave feedback to the preliminary design).
- Simpler logistics were achieved by arranging the meeting in Norway where services were also developed. Travel costs were also avoided.

As a side effect, we were also able to disseminate the SOCIETIES concepts to a new relevant target group, the Norwegian Red Cross.

4.1.1 Location

The focus group took place at SINTEF premises in June 2013. The observation took place at the Norwegian Red Cross (Trondheim district) premises one week after the focus group.

4.1.2 Participants

Beyond the moderator and the presenter (see the protocol for the focus group below), four persons participated to the focus groups. All participants were all men and aged 25-40. They all belong to the help corps of Red Cross district of Trondheim. They all have a technical background (product design, civil engineering, computer engineering and cybernetics). According to the participants, a large number of members in the help corps in Trondheim have a technical background. A possible explanation is that the technical university is one of the main organizations in the city.
The following table summarizes the experience of the participants at the help corps and their roles in the corps.

<table>
<thead>
<tr>
<th>Participants</th>
<th>Experience in Red Cross help corps</th>
<th>Role in Red Cross help corps</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participant 1 (P1)</td>
<td>4-5 years.</td>
<td>Team leader in search actions (i.e. responder in the field).</td>
</tr>
<tr>
<td>Participant 2 (P2)</td>
<td>20 years.</td>
<td>Action leader (i.e. coordinator).</td>
</tr>
<tr>
<td>Participant 3 (P3)</td>
<td>2-5 years.</td>
<td>Operation leader. Ambulance driver.</td>
</tr>
<tr>
<td>Participant 4 (P4)</td>
<td>9 years. Experience from large corps (in Trondheim) and small corps (in a small Norwegian city).</td>
<td>Action leader. IT technical leader (i.e. provide technical advice and participate to development projects).</td>
</tr>
</tbody>
</table>

**Table 3: Disaster Management - Focus group participants**

The help corps in Trondheim consists of 105 members. They participate to around 60 actions (or missions) per year, in particular in two main types of actions:

- Rescue actions are actions where one or several injured persons need assistance and transportation. For example, a person may get injured when skiing in the mountain. The location of the assisted persons is quite well defined, but not always accurate. Some search may be needed.
- Search actions are actions where one or several injured persons are reported missing. For example, persons get lost during a storm in the mountain, or a person with dementia does not come back home. A large area has to be scanned requiring more responders and resources. The organization of this kind of action requires a lot of experience.

A large number of search actions are interrupted during the first phases of an action (i.e. during the initial collection of data or the definition of an initial plan) and before the implementation of the action, (i.e. before corps members starting to investigate the field). For example, parents may retrieve a child reported missing.

### 4.1.3 Devices

Three Android devices were used during demonstration: an Android tablet was used to present the coordinator tasks, and two Android smartphones were used to present the tasks of responders on the field. In addition the Arduino-based smart jacket that includes a set of actuators (lamp, loudspeaker, vibrator and display) was used.

### 4.1.4 Services

The following table specifies the services demonstrated during the focus group.

<table>
<thead>
<tr>
<th>Third Party Services</th>
<th>Demonstrated to Trial Participants in 1st Prototype User Trials: Yes or No</th>
<th>Passed Functional and Integration Tests in WP7 by which date.</th>
<th>Comments or issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>iDisaster</td>
<td>Yes</td>
<td>15.03.2013</td>
<td>Fully functional under stable WiFi conditions. Synchronization failures otherwise.</td>
</tr>
<tr>
<td>iJacket</td>
<td>Yes</td>
<td>15.03.2013</td>
<td>Functional under stable WiFi conditions. The</td>
</tr>
</tbody>
</table>
Table 4: Disaster Management - Third Party Services during the Focus Group

<table>
<thead>
<tr>
<th>Third Party Services</th>
<th>Demonstrated to Trial Participants in 1st Prototype User Trials: Yes or No</th>
<th>Passed Functional and Integration Tests in WP7 by which date.</th>
<th>Comments or issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>iJacketClient</td>
<td>Yes</td>
<td>15.03.2013</td>
<td>Bluetooth connection to the smart jacket is instable.</td>
</tr>
</tbody>
</table>

### 4.1.4.1 Permissions, privacy and ethics management.

All participants were presented with the code of behaviour and confidentiality (see focus group protocol below). No information about participants will be made available publicly. Participants have been sent the transcript from the discussion for inspection.

### 4.1.4.2 User evaluation objectives for our Enterprise Community

The purpose of the focus groups was twofold:

- **DM-FG-UO1**: To evaluate the concepts of collaboration spaces (implemented as communities). The functionalities for collaboration are presented through the mobile team management service iDisaster.
- **DM-FG-UO2**: To evaluate the use of tangible interfaces (as exemplified by the smart jacket).

### 4.1.5 Focus group

A focus group is a moderated discussion among a small group people who discuss a topic under the direction of a moderator, whose role is to promote interaction and keep the discussion on the topic of interest (Stewart et al., 2007). The focus group technique stems from social research. It was first introduced in the late 1930s as an alternative approach to traditional individual interview techniques that used predefined questionnaires with closed-ended responses choices, and thus tended to influence the interviewer through oversight and omission (Kraeger and Casey, 2000). A focus group provides an environment where people are allowed to interact, which allows them to both influence and be influenced by others. Still, a focus group allows for individual differences of opinion to be voiced. After a period in which quantitative techniques were given priority, the use of focus groups in the for-profit sector has grown since the 1950s, and adopted in research in the 1980s.

The use of focus groups in design science research is discussed in (Tremblay et al., 2010). Recall that, differently from to behavioural science approaches that study the use and benefits of a system implemented in an organization, design science approaches focus on the development and evaluation of IT artefacts that are intended to solve identified organizational problems (Hevner et al., 2004). Design science is the overall approach in SOCIETIES. In (Tremblay et al., 2010), two types of focus groups are suggested in the frame of design science: (1) exploratory focus groups to achieve incremental improvements in artefact design and (2)

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confirmatory focus groups to demonstrate the utility of the design in a field setting. In our case, the former apply. The purpose of our focus group aims at improving the concepts illustrated by the demonstration.

In order to define the settings for the focus group and to conduct its execution, we have followed the guidelines provided in (Krueger and Casey, 2000). Important concerns are listed below. More details are specified in a protocol (see below)

- “Focus” in the approach name indicates that the discussion is limited to a small number of issues.
- The number of participants should neither too large nor too small: while a large group is difficult to manage and make difficult the participation of all participants, the discussion in a small group may be dominated by one or two participants. Different sizes are recommended in the literature, for instance 8-12 in (Stewart et al., 2007), 6-12 in (Tremblay et al., 2010) and 5-8 in (Krueger and Casey, 2000).
- The identification of participants is based on their characteristics in relation with the topic of discussion rather than on a random selection as used in survey research. For design research the participants should be from a population familiar with the application environment for which the artefact.
- The development of questions is the most important step in the specification of a focus group. The set of questions or “questioning route” is carefully predetermined. Questions should be open-ended allowing the participants to determine the direction of the response. They should relate to key concerns and formulated in a clear and concise way. In (Krueger and Casey, 2000), several guidelines are provided for a good phrasing of questions, e.g. avoiding “why” questions that may make participants to intellectualise an answer. Guidelines for structuring the questioning route are also provided: opening, introductory, transition, key and ending questions.
- The recommended duration of a focus group is two-hour with around twelve questions.
- The choice of the moderator is critical. The moderator should not be the principal investigator, i.e. in design science the contributor to the development of the artefact. The moderator should understand the purpose of the research. He/she should be open, not defensive and show respect for participants. The moderator should encourage the sharing of ideas and pay attention to understanding the feelings, comments, and thought processes of the participants.

A critical issue is to determine the number of focus groups needed in the study. Multiple focus groups allow for understanding the range of opinions of people across several groups. The literature suggests that 3-4 groups with the different type of participants needed for the study should be first be conducted. Then, if saturation is reached, i.e. if no new ideas emerge, the process can stop. Otherwise new groups should be conducted until saturation is reached. In (Tremblay et al., 2010), the authors argue that the notion of “no new ideas” is especially challenging in design science research because there is always room for improvement of an IT artefact. The system owners and developers have at some point to decide whether they should move forward. Of course, there is a need to balance resources and evaluation costs, and it may be difficult to find participants with sufficient knowledge for participation in the study. In our case, we planned to conduct focus groups with different first responder organizations. At the moment, a single focus group, whose results are presented here, has been conducted.

4.1.6 Demonstration

The demonstration was structured in three steps:
- Basic team management: Using iDisaster, the coordinator sets up. Team members can interact with other team members also using iDisaster.
- Service plug-in: Using iDisaster, the coordinator recommends services to the team members. Team members install services recommended by the coordinator also using iDisaster.
- Service sharing: Using iDisaster, a team member shared the iJacket service allowing extension of iDisaster with a tangible interface, here the smart jacket. Using iDisaster, other team members can install a client to interact with the smart jacket.

These three steps are illustrated in the following figures.
Ola coordinator

Create teams
Add members to teams
Interact with the team members

Phone & Tablet

Report to the coordinator
Interact with members within a team

Kari team member

Phone & Tablet

Figure 23: Disaster Management - Basis team management

Ola coordinator

Recommend the Jacket service

Phone & Tablet

Install the recommended service

Kari team member

Phone & Tablet

Figure 24: Disaster Management - Service plug-in

Ola coordinator

Install App to access Kari’s Jacket

Phone & Tablet

Share the Jacket service

Other team members

Phone & Tablet

Figure 25: Disaster Management - Service sharing
4.1.7 Data Collection

The transcript from the discussion is provided in Appendix 6.

4.2 Focus group protocol

This is the protocol for the exploratory focus group presented in this chapter and related to the SOCIETIES iDisaster and iJacket services.

4.2.1 Purpose

The overall aim of the exploratory focus group is to get feedback to the first version of disaster management third party services that illustrate the setting up of communities and service sharing in a community. The focus group approach is chosen as a methodology because we are dependent of a tangible interface (the smart jacket) that we have developed a single interface with. Another reason is that services are implemented for the Android platform, and earlier experience has shown us that using to the Android platform is demanding for trial users not familiar to it.

4.2.2 Main concerns

There are two main concerns we wish to clarify through the focus group:

- Is a collaboration tool as provided by iDisaster a useful tool in disaster response situations?
- Are tangible interfaces as demonstrated through the smart jacket useful tool in disaster response situations?
  - What kind of tangible interfaces would be useful?
  - Is it difficult of users to understand the concept of sharing such interfaces in a community?

4.2.3 Participants

The focus group consists of 4 volunteers from the help corps of the Red Cross (Trondheim district).

4.2.4 Organisation

This section defines the roles of the organisers of the focus group.

4.2.4.1 Moderator

Marius Mikalsen (SINTEF) is chosen as moderator for the focus group. He understands well the topic to be discussed but has neither contributed to the development of the scenario ideas nor of the technology. Thus he has no ownership of the concept and can act neutrally with respect to the ideas proposed. He also has the skills needed for moderation: he is able to communicate clearly, is open and tolerant, and feels comfortable to ensure the flow of conversation.

The moderator is responsible for:

- Welcome the participants
- Provide an introduction to the focus group without referring to notes
- Recall participants that it is the idea that is assessed – not the participants. Every comment is a valuable comment.
- Explain participants the code of behaviour and confidentiality.
The names of the participants will not be made available publicly (e.g. through research publications, press articles or project deliverables)

The dialog is recorded for later detailed analysis if needed. The record will not be made available publicly. The record will not contain any reference to participants’ name, email address or any other directly identifiable personal identification. The dialogue will be destroyed after acceptance of the project deliverables (i.e. within spring 2014)

- Introduce the presenter and the assistant moderator in the focus group
- Ask the questions as specified by the questioning route (see below)
- Complement/clarify these questions if necessary.
- Use follow up questions as needed – in particular if something interesting is brought up. NB! Avoid the use of WHY questions.
- Maintain the flow of conversation.
- Keep the conversation in the focus of the issues of concern.
- Manage the time
- Make sure everyone has a chance to share their meanings
- At the end of a discussion related to a question, summarize the main points from the discussion in order to check that the feedback is properly understood and to help the assistant moderator in recording the discussion.
- Invite participants to provide additions or corrections of the summary
- At the end of a discussion related to a question, ask the assistant moderator to ask questions for clarification.

The moderator should:

- Practice the questions beforehand, know the key questions
- Avoid head nodding
- Avoid verbal comments that signal approval of a meaning
- Avoid giving personal opinions
- Be well rested, alert and fully present during the focus groups
- Create a comfortable, open atmosphere

4.2.4.2 Presenter

Jacqueline Floch (SINTEF) is selected as the presenter because she has, as one of the main contributors to the scenario and technology, the best understanding of the concepts. She is an experienced presenter and feels comfortable to speak in public.

The presenter is responsible for:

- Provide for an objective and balanced presentation of the concepts.
- Demonstrate the services

The presenter should NOT:

- Participate in the discussion
- Try to defend critiques that come up during the discussion

4.2.4.3 Assistant moderator

Jacqueline Floch (SINTEF) will also act as assistant moderator for the meeting.
The assistant moderator is responsible for:

- Collect the list of participants
- Create “Name Tents” for participants
- Make an audio record of the discussion
- Monitor the recording equipment, make sure it works
- Take notes throughout the session. Be attentive to the following:
  - Make a sketch of seating arrangements.
  - Well said quotes: Capture word for word the most enlightening statements (the audio can be used to check the correct recording).
  - Place quotation mark around quotes and indicate the name of the participant.
  - Record non verbal activity – watch for obvious head nods, physical excitement, eye contact between certain participants, or other clues that indicate level of agreement, support or interest.
  - Place personal opinions in parenthesis to keep them separate from the participants’ comments.

The assistant moderator should NOT

- Participate in the discussion
- Ask questions, except when invited by the moderator

### 4.2.5 Introduction to participants

Our overall goal is to provide collaborative and pervasive tools that increase the efficiency and effectiveness of rescue relief teams. The project has first involved participants at the Assessment Mission Courses (AMC)\(^6\) of the European Civil Protection Mechanism in participatory design to identify problems and potential solutions. We also have collaborated in another European project MIRROR that is also experimented with tangible interfaces with the Civil Protection in Italy.

iDisaster and iJacket are proposed as potential solutions. We wish the participants to help us to evaluate the proposed prototypes. We wish to find out how the concepts and prototypes can be improved and eventually identify alternative concepts and solutions.

### 4.2.6 Questioning route

#### 4.2.6.1 Opening questions

1) How long have you contributed to the Help Corps at Red Cross, and what are your activities within the team?

#### 4.2.6.2 Transition questions

2) Can you tell about the last operation or training you were involved in?
3) What communication and collaboration tools did you use then?
4) How do know what the other members in an operation are doing? Is it important to know it?
5) How is debriefing after an operation organised? Can you easily retrieved information about events that occurred?

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\(^6\) The AMC simulates a disaster scenario consisting of an earthquake with resulting damages to the local infrastructure and casualties in the population. During the course, the participants from several countries learn how to assess the situation after a disaster in a foreign country, and how to use the technology they have available for this.
4.2.6.3 Key questions

Collaboration: Focus on the functionality to create teams, add members and interact with other members.

6) The tools support the creation of teams and the assignment of people into teams. What do you think about that function?

Reminder for the moderator: We do not know whether or not they are organized in several teams or in a single group...

7) Would you prefer the system to automatically suggest teams (for example based on previous operations) or reuse previous team compositions? For example, if someone is lost in Bymarka, the system could suggest people with local knowledge.

8) What do you think about using text messages for communication during operations?

Reminder for the moderator: comparing to voice.

9) What do you think about being able to go through the messages and status updates exchanged during an operation?

Reminder for the moderator: reading can be used during operation or after during debriefing.

Tangible interface: Focus on the smart jacket as an extension of the interface

10) What do you think about wearing a smart jacket that supports interaction with other rescuers?

11) In what we have shown to you the jacket only display information to the user. What if the jacket was also collecting information about you? For example, location, pulse and stress level.

12) In what we have shown to you, the software is downloaded and installed within a click, and the jacket is connected using a QR code. What do you think about this way of connecting the jacket to your phone?

13) In what we have shown the jacket is shared in a team. Would you prefer to be able to select specific rescuers it is shared with, e.g. a coordinator, a person with a particular role such as a doctor?

4.2.6.4 Ending questions

14) You have now the chance to give advice to the persons that wish to create the tools? What is your advice?

a) Give one reason why we should NOT pursue this work

b) Give one reason why we should pursue this work

15) We want you to help us to evaluate the concept. Is there anything we have missed in this session? Is there anything you wanted to say and that you had not the opportunity to say?

4.3 Focus Group Results

The focus group discussion took place in a slightly different way than we had expected: the participants were so eager to tell about their work processes and their experience that they answered many of the questions before we asked them. The participants also addressed several other issues that did not relate closely with our initial intention when organizing the focus group, i.e. the concept of community and tangible interfaces as illustrated by the demonstrated solutions. We did not however prevent them from telling about other issues because they relate in a more general way to the acceptance of digital technologies by the Red Cross. The following summarizes some of the main problems and needs that were discussed. When relevant, we relate them to solutions proposed by SOCIETIES.
4.3.1  Service availability in areas with poor or no 3G network coverage

A major problem in Norway today is the lack of 3G network coverage in many isolated regions, but also as pointed by one participant in the hills surrounding Trondheim used for outdoor recreation.

What can we do to make it work even with very poor bandwidth? If we had wireless network everywhere in Norway today, then we would have had all these Apps, I think. 80-90% of the operations in time unit (i.e. involved people times duration) occur outside good coverage.

And lack of service availability is also one of the main reasons given for not using the solution proposed by SOCIETIES:

Technology choices. You should try to make the technology as accessible as possible. We are looking at what form of communication we choose to use. I think that we have to go over for Peer to Peer. No server-client. If there is a central node, then it is the death for rescue services.

This is an issue that SOCIETIES has not addressed.

4.3.2  Effective information flows and effective resource management

The actions the help corps at the Norwegian Red Cross is involved are time critical. The tasks should be assigned to the teams in the field in an effective way. In addition, some actions require a large number of participants. Today work coordination and team management involve paper work and oral communication.

One can have an optimal strategy, but one should also implement it optimally in order to succeed. You have to use resources appropriately. And this solved well without digital aids, but there is plenty double work and certainly there are many things for which you can use digital aids.

Members in the help corps have different qualifications that are registered in their system. The SOCIETIES support for community orchestration would permit to compose teams more rapidly. This was also proposed by one of the participant (before we got the chance to ask them):

If you need to select people from a list in an App, it goes too much time. But having a system that suggest based on the UMS list a group composition.

The SOCIETIES mechanism of activity feeds is a means to enhance information flows. However as we will see below activity feeds should be extended to support the needs of the Red Cross.

Having an application that you can enter information and distribute anyone instantly wherever you are in the race....

More effective information flows was given as one of the main reasons to pursue our work in SOCIETIES:

Anything that makes information flow more easily to a reasonable level. Information is in your channel, it is accurate and comes immediately.

4.3.3  Role-based organisation

The help corps in Trondheim is a role-based organisation. The action leader team defines three leader roles: action leader, next leader and communication leader. Each team in the field has a team leader. Each role has a well-defined set of responsibilities and communication flows between roles are also well-defined. For example, the action leader defines an overall strategy and communicates with the police and other external bodies, the next leader defines tasks and assigns them to the teams in the field, the communication leader interacts with the team leader in the field and follows-up the status.

What is special in Trondheim is that we have a dedicated role. It is a role-based organization. One can have multiple roles depending on experience.

... And then it's important that you get the information you need depending on your role.
The SOCIETIES concept of community defines a flat structure that is thus not adequate to support the organization of the help corps. The introduction of roles in CIS is needed, as well as the ability to discriminate between activity feeds (if used to realize tasks) so they can be dispatched properly according to roles.

4.3.4 Keeping track of progress in the coordination centre

The action leader team is currently using a matrix allowing them to keep track of the planning and progress of the tasks. This form of presentation has proved to work well.

This is a resource allocation map. It is a matrix that helps to organize. It is "worth gold" for the Red Cross.

... You can use the visual to recognize a pattern and you get an overview quickly. ...

There is a communication log and a task log. The communication leader logs who has done what, position etc. The content is mainly a status. To optimize this out, you need almost no text.

Supporting such with SOCIETIES technology requires of course a new presentation form, but also the ability to keep track of the status. For instance, activity feeds could be extended to implement tasks and keep track of assignment and status.

The ability to gather information that can be used at all stages during the action, i.e. notification, planning and follow-up, would also allow to increase the effectiveness of the action.

[Today situation] The same system for following-up. [UMS] Voice message first, and text message afterwards. [Today situation] But it is not optimal. If all information can be gathered in one place, one can avoid to use multiple clients, an SMS client and then another client. This brings tremendous efficiency.

Also this information could be used after the action has taken place (during the technical review).

Technical review can be a lot easier if there is a way to point out the important points. You can rewind in real time with positions. Typical step-to-step or chapter-to-chapter “this happened here”. It is the ultimate of what we want.

4.3.5 Keeping focus on tasks in the field

An important concern regarding rescuers in the field is that they should be able to keep focus on their activities (essentially search of missing persons). The persons trained for search actions are 3-4 times more effective in search actions than arbitrary citizen. They are learnt to concentrate on the field and to look at the right indices.

We want the crew out there to be concentrated and not disturbed.

Essentially the team leader is the only person who needs to communicate with the leaders in the coordination center. Also the team leader should not be disturbed by information overload.

We have an order form with five points. Quality of assignment is dependent on the amount of information.

The ability to keep focus is particularly important in the case tangible interfaces, such as the smart jacket, are used to draw the attention of rescuers. Rescuers should not be disturbed when not needed. Important information such as new finding impacting the search strategy should be communicated to all.

The signals must be given priority. And discriminated. Not everyone get the same sound.

The system must have an understanding of the context of the participants.
This requires enhancements of SOCIETIES support to activity feed. On one hand, we need to consider the dispatching of activities to the right people. The dispatching should be context-aware: it depends on people role and type of information. On the other hand, the presentation of activities should support the filtering of high priority tasks.

Another related issue is the ability to not disturb people who have answered they would not join the action.

> It's a classic example that we have a desire to not bother those who said that they could not come, but we harass them because the interface is poor.

### 4.3.6 Privacy concerns

Although not demonstrated, the participants were asked if they were willing to wear sensors for reporting position, measuring stress or similar. This led to a discussion related to privacy. The participants were willing to share general information such as location in the field, but they were more reluctant about sharing personal information. For that kind of information, rescuers should be able to control what they share and with who. The Red Cross is a volunteer organisation where keeping rescuers motivated is essential to maintain a well-functioning organization. Imposing equipment that collects private information about rescuers cannot therefore be done without their consent.

> So I am not a free man anymore. Some will refuse to be monitored by a jacket. I would have received back the jacket back with all the gadgets torn out of it. I think that there is nothing to do with generation...

Another issue is that there exist large individual differences that the system should be able to understand.

> One at work, with 120 heart beat in a resting state... How will the system know that it is normal?

In general, the coordination team would like to handle a team as a whole, not individuals in a team. The team leader has the responsibility of managing individuals.

> In general we are not interested to look at the individual. We want to see our team.

> ... Data lies with the team leader. It is him who should know about the members. The action leader knows about the team, not about the individuals in the team.

> ... Also the team leader can see who is tired... Technology should be used for things we humans are bad at.

One of the participants however suggests a scheme with colours to indicate the status of a team allowing them to prepare the replacement

> Not least, if you can provide feedback red, yellow, green. Something about the crew as a whole. After 5-6 hours so you know you might want to replace 80% of people. At some point, I know that I may need 50 new people for the crew.

The participant that had long experience at Red Cross reported that he only experienced a minor health incident with rescue teams once in 20 years (dehydration). It has also sometimes happened, but rarely, in training settings where stress conditions are increased with the aim to select people best suited for actions.
4.3.7 Usability, robustness and usefulness

The participants also clearly indicate that the system should be easy to use and tailored to their needs. Few functions focused on their tasks if what they want.

> When you have to prioritize, if you need to choose between 2000 functions in an App ... or to install 200 services before you start the action... But the five points order is important... what basic things you need before you start searching.

... We cannot have two thousand functions. Absolutely 2-3 features that make you 10-15% better. If things get to complex, then rescuers do not concentrate on search,

> And then it is not the missing person or the equipment that is in focus, it is the App that gets focus.

The participants were satisfied with the approach to install the service needed to use the smart jacket, and connect to the jacket.

> In Trondheim all will manage it.

The participants were also worried that the system would not work when they need to use it.

> Then in reality: systems do not work, or they do not work when you take them in use, the interfaces are difficult to use. Maybe the worst is lack of access to map data.

Another concern is that the system should be available during several hours, without the need to carry heavy batteries.

> … but what happens if you are in the woods … if the phone runs out of power. You must be fully charged phone when you get the action, how many?

... If one thinks of the Home Guard, outfitting the soldier with all sorts of thing, and half part of weight for what the soldier carries comes from battery...

4.3.8 Tailored support on generic mobile technology

Using smartphones and applications in the rescue service was mentioned as the main reason to pursue our work in SOCIETIES.

> Bring your own device. Use the one you have in your pocket. No special equipment. 90% have it available.

> We must use the tools that people use in everyday life. We are 10 years after. We have to play around with the old technology.

At the same time, using a generic is not the preferred approach.

> General applications are very unsuitable for rescue services. Tailoring and context are essential for success.

> The app is only for us, it should not be general ... Maybe there is a need for such a special App for us that cannot be sold to other [to other rescue services].

4.4 Observation during a planning game

Following the focus group, SINTEF was invited to make observations during a “planning game” in order to get a better understanding of the work process during an action. The purpose of the planning game is to train help corps members to acquire experience through training in order to be able to play a leader role in the action team. The game only involves the members to be trained to action leader roles, experienced leaders that supervise the progress and rate the trainees, and a small support team that simulates events in the field. There is no deployment of members in the field during the planning game. The Norwegian Red Cross always
separates training at different levels in order to avoid that flaws occurring at one level impact on other levels. For instance, if the trainees to action leader roles do not specify and assign tasks in an efficient way, the members in the field have to wait a long time, and this may affect negatively the motivation of members to later participate in actions. Instead of deployment in the field, the support team involved in the game acts as field team leaders, i.e. they answer to the coordinator tasks and generate events. A script is developed beforehand specifying main lines of actions to the support team.

4.4.1 Events flow

The description of events during the planning game is provided in Appendix 7.

4.4.2 Analysis

Although the members of the action team were not experienced in the coordination of actions, the planning game gave us a good understanding of the main tasks occurring in a CO trailer and concretized different problems presented by the participants of the focus group. In addition we were able to identify some others flaws in the work process. There is no doubt that the coordination and implementation of actions could be optimized if digital solutions were used. Network coverage is the main challenge and makes the introduction of smartphones difficult today\(^7\). However also without coverage, some of the coordinating tasks, now performed as paper work, could be greatly enhanced. In particular this yields the coordinating tasks between action leaders in a CO trailer (commando trailer) and the transfer of tasks from the action leader to the filed team leaders.

The following presents some potential enhancements. We relate them to solutions proposed by SOCIETIES or propose extensions to SOCIETIES solutions.

- **Avoiding administrative paper work.** The communication leader fills up many forms of different types (list of available members, team description with leader members). Information in different forms is redundant. Digital support for collecting the names of action participants could be provided. Suggestions to compose teams made by the system, before the final composition of a team could be handled digitally to a field team leader (even when 3G is not available). Also changing the composition of teams later during the operations could be made easier through drop and drop. This is support that might be provided through community orchestration in SOCIETIES.

- **Avoiding communication bottlenecks.** Currently all assignment are done via radio. This does not scale when there is a single communication leader, and the number of teams grows or the number of events related to a few teams grows. Currently all tasks are written down manually by the next leader. If they could be written and sent digitally, this would reduce the need for oral communication greatly. 3G is not needed for the initial assignment if the team leaders meet at the CO trailer as done today. This is support that might be provided through activity feeds. The concept provided by SOCIETIES should however be enhanced so that it is possible to set priority on activities, to set status and to filter them according to priority and status.

- **Providing a status overview to all team leaders.** Currently the action leader has to ask the other leaders about the status, interrupting them in their tasks. A digital overview over the number teams, the tasks assigned to teams and the task in progress would reduce the need for oral communication between the different action leaders (in the case the roles are played by different members). The matrix (board) in the trailer was not used in an optimal way, as paper work and communication with teams in the filed inferred delays in the workflow. Again as in the previous point, this requires an enhanced concept of activity feed. In addition, a new presentation form is needed (a matrix instead of a list).

- **Providing digital map support.** Currently paper maps are used. First, in that particular game, printing problems occurred. We also observed that the use of paper maps lead to unnecessary confusion about places. This yields both when the leader team wished to indicate a location to a team (e.g. limit for

\(^7\) One of the more experienced leaders also explained that it was not normal for them to use satellite communication. This is far too expensive to use for this kind of action.
search at the stadium), or conversely when a team had to indicate a position (e.g. the body). This is a special feature that would require a new 3P service.

- **Following up team status.** Although we were told during the focus group that this matrix was worth “gold”, we observe it was not always properly used. The next leader forgot to set up some post-it notes on the board. Although the next leader was inexperienced, such mistake may also occur in a stress situation when the number of teams and tasks occur. The next leader dram areas on a digital. As most tasks related to searching an area, it should be easy to provide digital description of tasks. The next leader should also get support to write other tasks in a digital form instead of paper. Then it is quite straightforward to assign them digitally. On the other side, the team leader may get support to report completion digitally, and when 3G is not available the communication could register the status. In that way many status errors can be avoided. In addition to the task status, the position of teams could also be reported digitally, or at least recorded after update through radio. A solution to this relates to the point “Providing a status overview to all team leaders”. The team position as part of context can be collected in the SOCIETIES platform.

- **Avoiding unnecessary travel time.** All members have to meet at the CO trailer. Time could be saved if members could meet at the first plot assigned for search. The game did not illustrate what happens when all areas drawn on the map were transferred to the field team leader have been investigated. We were told that the team leader has to come back to the CO trailer to get new assignments. If the case this should be avoided.

### 4.5 Conclusions

The focus group and observation meeting with the help corps members from the Norwegian Red Cross was an enriching experience. We learnt about their work process and their needs. Not surprisingly, since the Red Cross has not been involved in SOCIETIES earlier, and thus did not provide us with requirements, the solutions we demonstrate them do not match their needs well. The participants were however open for new technologies and further cooperation, and provided several suggestions. Currently the lack of 3G coverage in 80% of the areas where actions are organized prevent them from using the help corps from using modern digital technologies. However as we have seen, there is also a potential for improvement of the implementation activities that take place in the CO trailer already today.

The members we met told us clearly that they would prefer to use a system tailored to their process and needs rather than a general platform that is adapted afterwards. We have seen that digital solutions that fit their process can be provided based on existing and extended SOCIETIES concepts: extended support for specifying roles in a community, community orchestration for the suggestion for teams, extension of the activity feed concept for task assignment and follow-up, 3P services for status overview and sharing of maps. An open issue is whether or not users would be able to able to differentiate between a system built “from scratch” to match their needs from a system built on the services of a general platform such as SOCIETIES. The latter requires the platform to be flexible allowing developers to select the services needs to fit the needs of the Red Cross users.
5 Enterprise Trial: First Prototype Evaluation

The SOCIETIES Enterprise first prototype user evaluation trial took place over one day in April 2013. A workshop presenting some key innovations and technologies from the projects research was organised to attract the interest of potential candidates from Intel employees. Six people, representative of the projects Enterprise Group, volunteered to take part in a series of participatory exercises along with seven SOCIETIES researchers. This was followed by participatory demonstrations of SOCIETIES first prototypes for Enterprise, playful context discovery games, role-playing scenarios, and open discussion sessions.

5.1.1 Location

The Enterprise trial took place during the SOCIETIES project meeting, which was held in Intel’s Innovation Open Lab at Intel’s Leixlip Campus during April 2013. A collaborative discussion space with a large whiteboard wall, comfortable seating arranged in a semi-circle was used as the main room for the participative demo and role-playing scenario exercise. In addition to this room, other rooms were available and used during the trial where all areas had an indoor location detection infrastructure installed to provide automatic location awareness during the trial tasks.

This trial was based in the participants’ work environment, which is also shared by a small number of SOCIETIES researchers. Many other SOCIETIES’ researchers and developers present were invited into the domain of the Intel employees for the duration of the SOCIETIES’ meeting and the trial, and a small subset of these could also be considered as researcher participants in the trial as they provided supporting roles in the exercises. However, for the purposes of clarity, these SOCIETIES’ researcher participants are always referred to as researchers or developers in this document. –Thus the trial participants crossed over the boundary into the domain of SOCIETIES for the trial, whereas most of the SOCIETIES researchers crossed into a different work domain. Those individuals, who had a presence in both the Intel work community and the SOCIETIES project community, were mostly responsible for creating and facilitating the third hybrid spaces, both physical and conceptual, in which the trial could take place.

5.1.2 Trial Participants

In total, six Intel employees self elected to take part in the participative demo part of Enterprise trial. Of these six, four stayed to participate in the role-playing scenario.

All of the trial participants were technology literate males aged between their twenties and forties. These were colleagues who know each other in a limited capacity beforehand, but amongst whom might have been some who worked closely together. As conference organisers, or attendees, they were all familiar with the conference scenario, and each one brought his own knowledge, expectations, experience and preferences about such events to the trial.

In addition, as people who work in technology research and development, they had realistic expectations about the maturity and finish of trial prototypes. They were familiar with encountering bugs and were not put off by any minor roughness. Most were familiar with the distinguishing project concepts. They were particularly interested in the innovative and novel aspects of the SOCIETIES experience.

The participants were all engaged, participative, and responsive to trial activities.

5.1.3 Devices

The devices used in the trial were all Android (version 4.0.4) based using a selection of Samsung Galaxy S3, Motorola Razr-I and Orange San Diego smart phones.

5.1.4 Technical Report

As discussed the user trial took place in Intel’s Innovation Open Lab. The deployment of infrastructure to the lab was designed to support the scenario of a conference workshop, splitting the physical area into virtual
zones which were to be used by the indoor location system. The created zones included a presentation zone, breakout zone and showcase zone, which were mapped to physical areas and rooms in the lab. The indoor location system, developed by IBM, is based on detecting or ‘sniffing’ Wifi signals from registered mobile devices such as the smart phones used by the users in the trial. A network of sniffer devices were positioned and configured within the zone areas to enable the detection of a user’s device as they moved between the different zones. The accuracy of this detection depended on the number of sniffer devices that were deployed and how close a user was positioned to the shared boundary of 2 or more zones. The detection location was communicated from the sniffer devices to IBM presence zone server and then to the SOCIETIES context management system which allowed other platform components and 3rd party applications to receive updates on the user’s location. During deployment testing the latency of the location updates when fully operational varied between 5 seconds and 30 seconds.

The software deployment for the trial involved the installation and configuration of the cloud nodes and applications on the mobile user end devices. The software deployment and testing plan involved setting out clear cut off deadlines for software to be ready for deployment testing and a controlled upgrade procedure of the deployed software with bug fixes and refinements. The cloud node software, which included a full deployment of the SOCIETIES platform and the 3rd party services backend, was installed on multiple VMs (virtual machine) to Amazon’s AWS EC2 (Amazon Web Services Elastic Compute Cloud) hosted in Ireland. The first VM was the primary server and a second VM was configured as a backup server for redundancy purposes. The mobile devices connected for a Wifi network to the publicly addressable VMs to enable user login and all other communication. The devices were Android based and were pre-configured with the SOCIETIES platform application, the Networking Zone 3rd party application and the Context Aware Wall 3rd party application.

Deployment testing began 6 weeks in advance of the trial although initial delays were incurred due to problems acquiring the correct infrastructure hardware and configuring the cloud VMs. The testing of the deployed software required more time than expected due to the immaturity of some modules within the SOCIETIES platform and due to networking issues during testing. These delays had a knock on effect to the preparation time for the evaluation as previously discussed. Testing continued through the pre evaluation phase and until the start of the trial. Technical support was provided during the trial and the system was actively monitored to ensure technical issues would not constraint the users’ activities. Usability feedback was provided by the evaluation team during the pre evaluation phase and as many improvements as possible were made to the applications before the trial. The technical deployment, testing and end user evaluation served as a very valuable learning opportunity into the software stability, deployment requirements and readiness for end users. All details were captured and communicated back to the project’s technical teams who are now actively addressing the issues that were discovered.

5.1.5 Services

The specific third party services:

<table>
<thead>
<tr>
<th>Third Party Services</th>
<th>Used by Trial Participants in 1st Prototype User Trials: Yes or No</th>
<th>Passed Functional and Integration Tests in WP7 by which date.</th>
<th>Comments or issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>AdHocMeetings/CollaborationTools</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NetworkingZones</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SharedCalendar / PersonalizedAgenda</td>
<td>No</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Context Aware Wall</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Conference Registration</td>
<td>No</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 5: Enterprise Third Party Services
5.1.5.1 Permissions, privacy and ethics management.

The trial was setup to use dummy user personas and system accounts were created to reflect the information. Therefore no personal identifiable information was gathered from the users or used during the trial thus no explicit data privacy permissions were sought from the users.

5.1.5.2 User evaluation objectives for our Enterprise Community

- **E-UO1**: To investigate what levels of usability and what user interaction metaphors should be supported.
- **E-UO2**: To evaluate an easy-to-use privacy layering interface.

5.1.6 Usability Methods employed

- Participative Demo. Group Talk Aloud through task sheets, with comments collected.
- Role-playing scenario
- Focus group discussion
- SUS

![Figure 26: Enterprise trial in action](image)

5.1.7 Data Collection & Analysis

The raw data:

<table>
<thead>
<tr>
<th>Enterprise Third Party Services</th>
<th>Usage Logs</th>
<th>SUS score</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Effectiveness:</strong></td>
<td><strong>Productivity:</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Task completion</td>
<td>Time Taken (sec)</td>
<td>Satisfaction Users subjective self-report.</td>
<td></td>
</tr>
<tr>
<td>1. AdHocMeetings/CollaborationTools</td>
<td></td>
<td></td>
<td>There will be just one generic SUS</td>
</tr>
</tbody>
</table>

© SOCIETIES consortium 2013
2. Networking Zones
3. Shared Calendar / Personalized Agenda
4. Context Aware Wall
5. Conference Registration

| Table 6: Enterprise Third Party Services Usability Table |

5.2 Evaluation Methodology

5.2.1 Deciding an approach for trials - Pre Trial Preparations and Constraints

While a suite of five Enterprise services were devised by the project to fit the project scenarios, as refined by user research and evaluations, by March 2013 the working prototypes of these five applications were not readily available, beyond the workspace of each service developer. Developers were busy integrating amendments to core SOCIETIES platform technologies, early in 2013, in addition to their ongoing development of applications. User flow documentation was not consistently available for the five services. It was therefore quite difficult to plan what types of trial activities might be feasible. It was unclear until the end of March which of the enterprise services would be included in the trial, and when they might be available for inspection. A pilot trial was planned for mid March.

After reviewing the services as remote demos, at the start of March, it was decided by the trial manager to include just two of the SOCIETIES enterprise services, along with the platform application, for the purposes of the trial. These services were the “Networking Zones” service, and the “Context-Aware Wall” service. The other services were not in a stable state both in terms of UI functionality or platform integration to enable the successful deployment in time for the targeted trial date. It was decided that these services would be deferred to the next user evaluation event.

Pilot trials were facilitated onsite in Intel to gauge usability, deployment and performance. Local installation and usage of services was not feasible for remote WP8 researchers due technical constraints such location detection infrastructure at the trial site, so detailed inspection and interaction with the user interfaces to explore potential user stories for trial activities was only possible on site in Intel. IBM researchers travelled to the Intel site in Ireland to install the indoor location detection infrastructure based on Wifi sniffers, a few weeks in advance of the trial. Following this, WP8 researchers met onsite with the trial management team on two different occasions, March 28 and April 10 for day long meetings in the run up to the event. They also prepared onsite for two days prior to the trial exercise. The trial system initially presented some stability and usability issues during those early onsite meetings. Development and bug-fixing on the applications was ongoing and there was no formal interaction design documentation of user flow, tasks and functions, due to time and resource constraints, which meant WP8 had a limited scope to investigate in detail the potential dynamics of multiple users’ interactions for the two enterprise applications along with the SOCIETIES application, in the proposed conference scenario for the trial.

The Prezi storyboards for SOCIETIES conference scenario which were previously presented to this group of Enterprise users, had been based over a longer timeline, presumed a wide group of active system users who were willing to share a lot of information, and employed a wide range of integrated services, such as pre-conference planning, personalised agendas, post-conference planning, and shared activity based services such as organising a taxi share. However only a small subset of these activities could be supported and evaluated by the services selected for the SOCIETIES prototype in this trial. Also the trial would be staged over a couple of hours rather than over several days, which limited the likelihood of naturally occurring behaviours such as meeting colleagues and sharing services, motivating use of the SOCIETIES system. This meant that new alternative scenarios were required for the purpose of both illustrating the reduced system presented to trial participants, and allowing for evaluation of the more innovative concepts in the project.
The objectives of the pre-trial meetings were to enable WP8 and Trial Management researchers to share experience and visibility of the system and discuss its presentation to the trial participants in order to plan the trials. This involved participatory methods of collaborative co-design and planning activities. Some challenges involved were: how to expose the participants sufficiently to SOCIETIES innovations so that they could be explicitly aware of the potential of all features when evaluating the system; what were the full list of tasks feasible with each application, how would users manage moving across applications, how could the recently integrated activity feed be used - both as a data source by capturing user interactions with the system during the trial, and also as a tool to give users intelligible visibility about the system’s activities.

5.2.1.1 Researcher Script Walkthrough

During the SOCIETIES plenary project meeting, a small group of SOCIETIES researchers were invited to collaborate by reading through the role-play scripts together with the WP8 researchers. They were given a short description of the conference scenario, their personas, and individual tasks and goals.

During this run through it became clear that some unresolved usability factors of the system, could cause frustration and confusion, and also that the individual scripts could easily slip out of synch if the timing of key interactions was not more closely managed. For example one persona in the script needed to discover a key message, to be displayed in a service in order to have a meaningful connection, which could cause a sticking point. They requested more detailed instructions, to avoid overloading participants with usability problems, and key markers in the script to control timing, which could not be left to serendipity. One researcher noted the Networking Zone’s map was not intuitive. Another noted that he had ‘no idea what privacy notifications are about, what do they relate to, can I revoke them?’.

As a result of this session the trial scripts were revised to include ‘cheat sheets’ of detailed instructions on how to do each task, it was decided to involved SOCIETIES researchers to play the roles of “guardian angels” to assist participants as required during the exercise, and the necessity of first introducing the participants to the SOCIETIES system via a more controlled participative demo became evident.

It was expected to have ten participants at the trial, but the exact duration of time for which volunteers would be available to engage with the trial was not clear in advance. Technical issues emerged during the pre-trial walkthrough, which meant that there was a late decision to include only six participants in the trial.

5.2.2 SOCIETIES Workshop at Intel Campus in Leixlip, Ireland.

The Workshop started with an architectural overview of the SOCIETIES platform from the project’s Technical Co-ordinator, David McKitterick from Intel, and was followed by Dr. Ioanna Roussaki from the National Technical University of Athens who provided attendees with an insight into the project’s Context Management & Inference engine. Prof. Nick Taylor from Heriot-Watt University in Edinburgh explained how the platform uses the Personalisation & Learning enablers to tailor the SOCIETIES experience for the project’s targeted user communities. Bruno Jean-Bart & Olivier Maridat from TRIALOG presented the Privacy by Design techniques. Tailoring this user pervasive experience relies heavily on the platform’s ability to have a fine-grained understanding of the user’s context, which could be regarded suspiciously by our end users. These suspicions were taken on board in the final presentation by Bruno Jean-Bart & Olivier Maridat from TRIALOG based in Paris, who jointly presented the project’s ‘Privacy by Design’ techniques.

The primary motive for organizing the Workshop was to attract the attention of potential trial participants, and to offer them a valuable insight into the innovative technologies proposed by the SOCIETIES project. Following the workshop six people from Intel elected to participate in the SOCIETIES Enterprise Community user evaluation exercises, based around the ‘Networking at a Conference’ scenario.

5.2.3 Participative Demo

It was decided that a participative demonstration would be required in the trial to introduce participants to SOCIETIES mobile applications, as the system was still very much in a formative stage of development and integration; the user interfaces and interactions were not intuitive, some key innovations were not
immediately apparent. There were many known usability issues in advance of the trial but due to deployment delays and constraints on UI design expertise there was not sufficient time to address all issues beforehand.

Six users who had volunteered to take part in the SOCIETIES Enterprise trial joined seven SOCIETIES researchers in a small room with large whiteboards, and comfortable seating. Participants sat in a semi-circle on sofas facing the screen. The trial manager welcomed and thanked them for their time. To enable the participative demonstration, the presenter’s mobile device was connected to a large monitor via a HDMI cable thus allowing the full device screen to be seen by all users. A SOCIETIES researcher facilitated a quick icebreaker game to establish a friendly informal democratic atmosphere. Each person present introduced himself/herself using the initial of his/her name, to create a descriptive adjective. Another SOCIETIES researcher sat at a desk in the corner, which was referred to as the “support desk”. Researchers who has developed the selected applications were also present to learn first hand about the users’ experiences and to be available to provide backup assistance if required. Three researchers actively observed and recorded the exercise, taking notes, capturing photographs and video footage. Two researchers also took on the role of Guardian Angels or assistants, whose goal was to be able to help participants navigate through the demo, without getting uncomfortably stuck. While providing users with so much guidance would not be standard for traditional usability tests, and would indeed be most unorthodox, in this case we felt it was justified. The devices were unfamiliar to the participants and the services were by definition unpolished. WP8 was more interested in facilitating these new users, or participants, in gaining a broad overall experience of the SOCIETIES prototype enterprise system, than become blocked on known usability errors. Also the direct experience of helping the new users navigate through the system applications, gave those developers and researchers involved a fresh appreciation of applications features from the perspective of the uninitiated.

Each user was provided with an Android smart phone and instructions for logging in to access the SOCIETIES services. A sheet of paper listing the trial tasks that would be undertaken in the demo with space for comments was also provided. Post-its were available on the coffee table before the participants. A space for each of the applications was drawn on the white board. Participants were asked to follow the tasks along with the trial manager and to make comments on the sheets provided or use post-its which could be placed on the board.
The trial manager then guided the participants via a thorough demonstration, through the main features and functions of the SOCIETIES platform application and the Context Aware Wall. These tasks included: discovering a friend, making a friend request, accepting a friend request, discovering and joining communities and applications. The full list of tasks presented at this session is available in Appendix A.8.

### 5.2.4 Enterprise Participatory Demonstration Tasks

**What we learned:**

While the participants were encouraged to wait, several began tapping on the screens, exploring the applications immediately. However, the applications were not really ready for unmediated interaction, and the participants quickly returned to the more controlled set of demonstration tasks. Having the set list of tasks gave the participants and researchers a clear focus.

The activities undertaken in this demonstration were basic functions, such as send a friend request, review privacy policy, or review list of available cloud services and applications but even these functions were presented with support. When demonstrations are underway there is a conflict between presenting a system in a clear easy to learn and follow manner and traditional usability evaluation objectives of discovering usability errors in simple actions. While it had been decided that the objective of the trial was to learn more about the high end objectives of the SOCIETIES project and it would have been beyond the scope of this enterprise trial to do a thorough usability analysis of each service’s tasks, participants nevertheless, pointed out a considerable number of usability flaws on their activity sheets during this exercise. What was interesting was that they also noted social implications of using the software – such as “Nobody joined my group!” which indicates how closely related this social software is to emotional status. Some of those comments are listed below:

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Answers/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discovering Friends</strong></td>
<td>• Friend persists in “suggested friends” list after being accepted.</td>
</tr>
<tr>
<td>1. How many suggested friends are indicated</td>
<td>• “Confirmed friends entered but don’t recall getting a prompt when user accepted request.”</td>
</tr>
<tr>
<td>to have existing social network connections with you?</td>
<td>• “like it” (in response to receiving friend request)</td>
</tr>
<tr>
<td>2. Send a friend request to someone you have an existing social</td>
<td>• “Deferred then later I accepted friend but (he) is still in (suggested) friends list.”</td>
</tr>
<tr>
<td>network connection with</td>
<td>• “New friend still in suggested friends list.”</td>
</tr>
<tr>
<td>3. Accept a friend request if you receive one</td>
<td>• “New friend added.”</td>
</tr>
<tr>
<td>4. Review Suggested Friends list. Note changes</td>
<td>• “Sometimes accepted friends reappeared in suggested friends list.”</td>
</tr>
<tr>
<td>5. Review friends list. Note changes</td>
<td>• “Most relevant (people) on top (of suggested friends)? Not emphasised!”</td>
</tr>
<tr>
<td>6. Note any observations.</td>
<td>• “Can’t see (friends). I already requested friends but not responses.”</td>
</tr>
<tr>
<td></td>
<td>• “See more info. About (existing social network connection)” Request for more info.</td>
</tr>
<tr>
<td></td>
<td>• “Acceptance of friend request doesn’t work”</td>
</tr>
<tr>
<td><strong>Discovering Communities</strong></td>
<td>• “Conferencing community – failed to join 3</td>
</tr>
</tbody>
</table>
8. Review and accept its privacy policy
9. After joining the community – review the members list
10. Read messages in activity feed
11. Post a message to its activity feed

<table>
<thead>
<tr>
<th>Creating Communities</th>
</tr>
</thead>
<tbody>
<tr>
<td>12. Attempt to create a new Community, adding a name, category, description and a privacy level</td>
</tr>
<tr>
<td>13. Review your created community and its members</td>
</tr>
<tr>
<td>14. Share an App/Service with your community</td>
</tr>
<tr>
<td>15. Review the activity feed of your community and post a message</td>
</tr>
<tr>
<td>16. Review your community’s privacy policy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Using Apps</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Review the list of available Cloud services and Apps</td>
</tr>
<tr>
<td>18. Select the ‘Context Aware Wall’ app and launch it</td>
</tr>
<tr>
<td>19. When launched, click on the Go button and review the list of available communities</td>
</tr>
<tr>
<td>20. Select a community and click ‘Set’</td>
</tr>
<tr>
<td>21. Note your zone location at the top of the</td>
</tr>
</tbody>
</table>
22. Post a message
23. Take a photo and post it
24. Note other messages or photos posted by other users

<table>
<thead>
<tr>
<th>General Feedback</th>
<th>“Don’t need to confirm launch (?)”</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>“Very Good.”</td>
</tr>
<tr>
<td></td>
<td>“When I have typed (message) it is then hard to find!”</td>
</tr>
<tr>
<td></td>
<td>“Give someone a scenario to think about when creating a community – e.g. conference.”</td>
</tr>
</tbody>
</table>

Table 7: Enterprise trial user comments

5.2.5 Treasure Hunt Game

A short mildly competitive treasure-hunt type of game, had evolved during one of pre-trial onsite meetings to evaluate the internal location context aspects of the presented enterprise services. The simple but familiar game provided some amusement while inadvertently the functioning of the networking zones and context aware wall became apparent. This ‘treasure hunt’ game, it was decided, would conclude the pre-lunch participative demonstration. An outline of this Treasure Trail game is available in Appendix A.8.1.

The Treasure Trail game left location and community based clues for participants in the Context Aware Wall, which they followed to arrive at a new zone, where another clue was accessible for each community. As they moved from one zone to another, the possibilities for location based, community focused discovery and communication using the SOCIETIES application and the Context Aware Wall became apparent to the participants. At the last destination they were awarded the prize for completing the treasure hunt - an invitation to lunch.

Results – What was learned:

Some participants requested assistance in using the applications for the Treasure Hunt, which indicates that the application UI was not clear. However most navigated the trail with relative ease. Using a very well know game genre, meant that the users’ confusion were not due to the rules of the game, but to usability issues in system interactions. The concept of a context aware messaging board, where in this case the context in common was location and shared group, was not immediately apparent, and only began to make sense through the experience of following the location based clues.

The experience of planning, and designing the Treasure Hunt game, and having to formally plot the information flow necessary for users to navigate the system, was most valuable to the researchers involved, as it helped to breakdown complex possibilities of activities into a set of specific user actions required and system responses required for a particular goal, in this case literally following messages to reach a particular location.

5.2.6 SUS

The System Usability Scale questionnaire was generated using an online survey tool, but printed versions were used in the trial, as participants were not expected to have laptops or devices with them. The results are as follows.

The scoring system applied is based on Lewis and Sauro’s description [1]:

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“To use the SUS, present the items to participants as 5-point scales numbered from 1 (anchored with “Strongly disagree”) to 5 (anchored with “Strongly agree”). If a participant fails to respond to an item, assign it a 3 (the center of the rating scale).

After completion, determine each item’s score contribution, which will range from 0 to 4. For positively-worded items (1, 3, 5, 7 and 9), the score contribution is the scale position minus 1. For negatively-worded items (2, 4, 6, 8 and 10), it is 5 minus the scale position. To get the overall SUS score, multiply the sum of the item score contributions by 2.5. Thus, SUS scores range from 0 to 100 in 2.5-point increments.”

<table>
<thead>
<tr>
<th>How satisfied are you with the following:</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>I think that I would like to use this system frequently.</td>
<td>0.00%</td>
<td>0.00%</td>
<td>0.00%</td>
<td>100.00%</td>
<td>0.00%</td>
</tr>
<tr>
<td>Total</td>
<td>6</td>
<td>18</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Mean | 4.00 |
| Standard Dev. | 0.00 |
| Variance | 0.00 |

<table>
<thead>
<tr>
<th>I found the system unnecessarily complex.</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>6</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Mean | 2.67 |
| Standard Dev. | 0.82 |
| Variance | 0.67 |

<table>
<thead>
<tr>
<th>I thought the system was easy to use.</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>6</td>
<td>14</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Mean | 3.33 |
| Standard Dev. | 0.82 |
| Variance | 0.67 |
I think that I would need the support of a technical person to be able to use this system.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>33.33%</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td></td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td><strong>18</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean: 2.00
Standard Dev.: 0.89
Variance: 0.80

I found the various functions in this system were well integrated.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.00%</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>33.33%</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td><strong>11</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean: 2.83
Standard Dev.: 0.75
Variance: 0.57

I thought there was too much inconsistency in this system.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.00%</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>50.00%</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td><strong>15</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean: 2.50
Standard Dev.: 0.55
Variance: 0.30

I would imagine that most people would learn to use this system very quickly.

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0.00%</td>
<td></td>
<td></td>
<td></td>
<td>0</td>
</tr>
<tr>
<td>1</td>
<td>16.67%</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>83.33%</td>
<td>3</td>
<td>15</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6</strong></td>
<td><strong>16</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Mean: 2.83
Standard Dev.: 0.75
Variance: 0.57
<table>
<thead>
<tr>
<th>Statement</th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Neutral</th>
<th>Agree</th>
<th>Strongly Agree</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>I found the system very cumbersome to use.</td>
<td>0</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Mean</td>
<td>3.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>0.67</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I felt very confident using the system.</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>Mean</td>
<td>2.50</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>0.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>0.70</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I need to learn a lot of things before I could get going with this system.</td>
<td>1</td>
<td>4</td>
<td></td>
<td></td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>Mean</td>
<td>2.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard Dev.</td>
<td>0.63</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Variance</td>
<td>0.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Overall SUS score: 64.58333333

Learnability dimension - q4 and q10: 3
Table 8: Enterprise SUS scorings

The SUS score was 64.6, which when compared with other studies, cited by Sauro (http://www.measuringusability.com/sus.php) is slightly below that of average which is 68. One participant also noted the following comment on the SUS sheets: “The UI stability issues had an impact.”

5.2.7 Role-playing scenario

Role-play was adopted as a technique for the evaluation trial which was realized through the use of scripts for characters. This allowed for complex socio technical experiences to be modelled during the trial, in such as way that facilitated access to particularly interesting aspects of SOCIETIES innovations, whilst protecting participants from having to defend possible personal information. Role play simultaneously allows participants entry into a playful safe experience of pervasive and social conference communications services and provides a self reflexive distance from the experience where there is room for the question: “What would I do in a real world situation?”.

This approach as described by Mueller and Thoring [4] has roots in theatrical studies, and is influenced by the Stanislavski method. It advocates that role play facilitates reflective action based on real experiences. It is through firstly having the tacit knowledge afforded by the technology enabled experience and then externalizing the thoughts, feelings, and reactions, related to that experience that conflicts and understandings are negotiated.

A role-playing approach was selected as a flexible and useful approach for the Enterprise trial for the following reasons. Role play straddled the requirements SOCIETIES has for the Enterprise trial to manage a dialogue between teaching the participants enough about the system and applications that they were understood and useable, while simultaneously requesting feedback on the system. Participants would only be available to engage with the system for short time segments, normal social behaviour and the circumstances of the trial, would not make it likely for any participants to experience the extent of the system without some artificial signposting and motivations.

The users were not requested to input or associate their real personal data and social network accounts for numerous reasons. Firstly, to facilitate a sufficient experience within the time and technical constraints, such as existing social network connections on LinkedIn (which may not have been the case with the small set of users that participated) then it was necessary to simulate existing social network connections through perceived personas and pre configured social network accounts. Another reason is due to the technical constraints of the system, where user accounts needed to be created and configured in advance of the trial and it was not possible to do this on demand. In any case, such a short trial would not allow for the collection of enough real data (even if they were willing to share this information) about user preferences and behaviour over time, to fuel meaningful realisations of the user intent, and learning aspects of the SOCIETIES system. However personas could be created in advance and preloaded with social media identities and social capital. Inviting participants to role-play with such personas could then illustrate meaningful motivations, allowing for trial participants to get a condensed complex view inside a situated staging of the system in a conference setting, at no personal risk.

Another objective that the role-playing fulfilled was to direct trial activities to interesting and innovative aspects of the projects’ enterprise applications. The expectation was that the fun aspect of the role-play would also encourage trial participants to have more thoughtful and considered interactions - involving emotion and decision making - with other participants and the system than a demo. It was hoped it could cause participants to reflect on their own internal negotiations in making interaction decisions for example “Should my persona share more identity information with the community in an effort to be pushed up the relevancy charts of others, or should I be more cautious?” Having some insight into measured interactions was considered significant to the SOCIETIES system, where both social and information needs are intermeshed. In some respects doing this exercise at the point where the SOCIETIES system is not fully
formed is more revealing because the jolts caused by the uneven user experience, act as reminders to participants to be self-reflexive and aware of the social technical aspects of their constructed role as evaluators of a proposed system during the trial, and to share their thoughts, and feelings about the experience, rather than be lost in play.

Persons could also provide for some protection against the risk of groupthink, as the trial participants were all from the one company, where it might reasonably be proposed real roles and relationships, could influence trial behaviour. It was an accepted caveat then, that while the mechanics of Privacy would be included in the Enterprise trial, and the distinction between the various privacy templates and customisable privacy options could be shown, the circumstances of the trial would preclude any real opportunity to observe how SOCIETIES privacy policies succeeded or not in meeting real people’s expectations for privacy with regard to real sharing behaviour on the trial SOCIETIES’ system.

Light personas were created on the fly and potential scenarios improvised during pre-trial onsite meetings to tease out how meaningful stories of discovery, connection and organisation might evolve with the SOCIETIES enterprise system. These facilitated collaborative group walk-throughs, with SOCIETIES researchers, developers, and trial managers with the pre-trial system, set up on site at the Intel Leixlip campus. These personas were then developed further offsite, and the improvised ideas developed into outline scripts. The scripts, it was envisioned would motivate participants to engage with the trial system, thus allowing them to experience creating groups, making friends, and organising meetings, and understand the unique innovations of the societies’ system with regard to: personalisation (implicit and explicit, social network integration, context awareness, and discovering relevant friends and communities).

It was expected to have ten participants at the trial, but the exact duration of time for which volunteers would be available to engage with the trial was not clear in advance.

The script ideas for the enterprise trial diverged from the initial scenarios in the project’s enterprise storyboards in response to both the reduction of services available and the necessity to direct trial activity toward more innovative areas. The personas diverged too, as it was expected to have only male participants attending the trial, who we assumed would be more comfortable taking on the roles of male characters. We devised some script outlines that would encourage and motivate interaction of the trial personas. We generated a list of all the possible functions afforded by the current iteration of the prototype to be trialled. We spent the days, before the trial, planning how to create meaningful scenarios around these available tasks which could be played out by participants in a reasonable span of time. Our scripts needed to condense the temporal duration of a daylong conference into an hour or two of trial activity. The role playing exercise was always going to be staged and artificial as we would be requesting that users focus on the SOCIETIES suite of applications for the duration of the trial, and would therefore not be also immersed in the myriad distractions and interruptions which one could expect in a ‘real’ ‘in the wild’ situation. Their attention would not compete with either other applications, or wider situations.

Data capture was not ideal during the trial. The SOCIETIES’ activity feed which we had hoped would provide detailed time-stamped notes of interactions, was only designed to record some limited events and could not provide a detailed map of journeys taken during the trial. The trials were videoed. Several options
were provided for participants to offer comments and feedback via post-its, discussion and sheets about their experiences.

However as all the participants were very focussed on engaging with the tools or supporting that engagement, there was little capacity for ‘pulling back’ from the activities to reflect on experiences or capture ideas. The social nature of the trial, meant that each participant and his assigned ‘guardian angel’ were engaged in a unique journey through SOCIETIES, that was not directly comparable with their neighbours. There was a sense of social commitment to the trial exercises, which encouraged all of the trial participants and researchers to press on with the trajectory of the script.

5.2.7.1 The Secret Millionaire Angel Investor and the Apprentice Head-hunter conference scripts.

The premise of one script idea was that there were two companies who had three employees each, and four other individuals attending a conference. -One of the attendees was an angel investor, who did not want to be identifiable, was seeking to discover potential companies in which to invest. This theme was referred to as the ‘Secret Millionaire’ script, in reference to a popular reality television programme in UK and Ireland. -A secondary theme was that a head hunter from one company attempting to entice potential future employees to contact him without the knowledge of their colleagues. This became known as ‘The Apprentice’ script, in reference to another reality television programme. A third subplot suggested was that some characters were aiming to discover and organise proposal partnerships. Pre-existing relationships and links from private and professional social networks, assigned to each persona and set up in actual social media accounts, would then predispose some characters to having an advantage in achieving a stated goal, whether that be seeking investment for their company, or discovering new career opportunities. However, the choices made by trial participants during the exercise, with regard to sharing and connecting with relevant others, networking through the SOCIETIES networking zones application, and communicating with the context aware wall, would decide the ultimate outcome.

![Figure 29: The investor presents his million euros investment](image.jpg)

Working through script ideas with working prototypes, was slow due to many usability, technical and deployment constraints, and in the end one theme only was selected for inclusion in the final trial – that was the ‘secret millionaire’ script as it illustrated innovations around relevancy and learning.
We were negotiating the feasibility of a non-intrusive user trial in the days coming up to the trial itself and we discussed various options along the continuum from a completely guided participatory demonstration and hands-off user testing with users given devices and set some basic tasks, or given some high level goals.

There was a tension evident between the dual functions required of the scripts. On the one hand the role play was expected to act as a group participative demo to provide signposts to the interesting aspects of the platform, whereas on the other the scripts had initially been suggested to facilitate more open and less directive opportunities for the trial participants to interact with the system. The day before the trial some SOCIETIES researchers took part in a ‘dry-run’ script walkthrough, and they reported experiencing some difficulties and misunderstandings in the exercise, which it was felt might be off-putting to the trial participants. It was suggested that tighter more controlled and constrained scripts with key-point timing would be required to support the participants in experiencing as much of the system as possible. It was also decided to have SOCIETIES researchers act the role of Guardian Angels, who would be available to step in and assist should the users become confused at any point.

The scripts were adapted overnight to include detailed line by line cheat sheets or instructions on how to perform required activities, such as selecting a particular community to post to on the Context Aware Wall, or selecting sharing preferences for personal information. Another script outline was developed that of “The Apprentice”, (full text available in Appendix A.8.2). This could have provided a useful exercise for a group SOCIETIES researchers to try to role play with services, to map out which user interactions would be required to allow the characters achieve their goals, but there was not sufficient time to achieve this additional task.

5.2.8 Focus group discussion

Following the scripted exercises, where users all followed different paths, and make different choices with regard to sharing and joining, a focus group discussion took place.

This open discussion gave participants and researchers an opportunity to revise the feedback and observations collected throughout the day on post-its on the large whiteboards in the meeting room. Comments from the morning session had been organised into areas titled: “the SOCIETIES platform app” and “Context Aware Wall”, with any addition comments set outside these areas. Additional sections were
drawn for the afternoon session to include: “Networking Zones Application”, “Comments on the script”; “Technical Issues”, “Questions for Discussion” and “Known bugs”.

The SOCIETIES value proposition: “Discover, Connect, Organise” was written on the board along with some other words to encourage feedback such as: “What about….?””, “Why….?”, “Nice to have….”, “What I don’t like is…..” and “Thank you!”

The atmosphere was relaxed and friendly. Participants included both the Trial participants and SOCIETIES researchers. People were engaged with the subject matter, eager to share their experiences and a lively discussion ensued. When asked if they would be enticed to engage with the SOCIETIES services if they were available in a real world setting, and if the value proposition of discover connect and organise was attractive, a participant said that his experience was that “it was hard to see the value without putting in work to share”. Most participants could envision future use of the system in a conference scenario, but felt that the current applications were not intuitive, and that a large number of users would be required to experience potential.

Giving the user controls to filter the suggestions based the user’s goals and generic categories were a suggestion to enhance the services usability. Some participants were not sure of the value of SOCIETIES Community Interaction Spaces without a range of other SOCIETIES apps.

With regard to the Context Aware Wall service one participant “liked the fact that two things were changing – location and notice board – but it was not obvious.” They could understand that having location and community provided a matrix of possibilities to a group of users but felt that these possibilities were not fully promoted within the services or the scenarios presented. A discussion regarding the potential to discover relevant or sought out others at a conference arose. “I just want to know where (relevant) people are. Where are the people I already know?” Some participants suggested that they would prefer to have a map overview in the UI where the location of people or communities relevant to them could be indicated, through use of photos, and how this might be realised was discussed with SOCIETIES developers present, even though it was accepted that availability of screen space might quickly require some clever display tricks if several faces, needed to be shown. This showed how design ideas for enhancements to the applications arose through exchange of ideas in a participatory exercise.

Usability bugs present in the applications, and user flow were factors observed to affect their experience. One participant commented that he knew he had just created communities, shared information, and communicated with relevant others using location aware services but that he would have had no clue how to do so without the detailed guidelines in the script. The trial participants had a “whistle-stop” tour of the applications, and played out discovering, connecting and organising but they had not had the opportunity to experience the services with full free will.

Participants imagined a scenario where someone was scanning a room in a conference scenario to discover relevant people, and discovered the most relevant person to them was sitting in the seat beside him. What would one do? Would it be socially awkward – like approaching a well known personality? And how would they feel if someone else approached them? The new social interactions that the services could facilitate might cause some awkwardness or social unease, as well as social facilitation.

Several feedback comments were related to bugs, with the interface or system. It is clear that bugs interrupt the user experience of the system and caused confusion. For example one user noted that friends who had already been accepted, still appeared in the list of suggested friends, or that swiping notifications did not dismiss those notifications in the app. These indicate that there are several user actions that do not result in expected system responses. This caused confusion and lack of faith in the system to perform.

The privacy aspect of the system was particularly unusable, as it generated no fewer than three comments:

- The language used for the symbolic level location was perceived as vague and needing clarification.
- The privacy list did not seem to function as it appeared. “(It) is not a multi selection. If you select something that wasn’t requested you can still join”
- The Disclaimer Privacy Terms of Use is not functional – too small to click.

A participant also remarked that he was not sure if he would have shared if it were his own data. As he was role-playing he went along with the game but that it was hard to see value of the system without putting in work to share.
5.2.9 Post-its and Focus group – raw data.

The following section lists some of the feedback (see Appendix 9 for detail) as captured on the white boards during the participatory exercises. Some comments were gathered in the demo part of the trial, whereas more were generated during the games, role play exercises or discussion. The feedback was sorted as it was generated into the titles used below: The SOCIETIES platform application; Context Aware Wall Application, Networking Zones Application, Comments on the script, Questions for Discussion, Technical Issues, Known Bugs. In some cases the post-it notes are clearly only capturing the partial tone or hint of the discussions. They serve as a useful aide-memoir and record of the event to support researcher recollections and the video-recorded activities.

5.2.9.1 The Societies Platform Application:

“There is a click under Activity Feed for users which have joined that doesn’t work.”
“Privacy” – “Symbolic level” location is vague and could have any level of resolution. Perhaps app should explain what this means for this app.”
“Can a malicious user share an application that can potentially damage the systems of his community? If yes, how we can avoid this?”
“Suggested community shows a community that I created, then failed when I tried to join it.”
“No push on community number increase until I click on my communities again.”
“Security warning on about Redmine.”
“Privacy list is not a multi selection. If you select something that wasn’t requested you can still join.”
“Friends already accepted reappear in Suggested list”
Are Suggested friends most relevant first? Not stated anywhere
Swiping notifications from notifier does not dismiss notification in app
Listing of permissions for community is unintuitive: shows drop down list of radio buttons
Filter results doesn’t show the filter you have previously selected
The Disclaimer Privacy Terms of use is not functional – too small to click
Friends request showed -2
What happens if you “Decide Later”?

5.2.9.2 Context Aware Wall app:

- Breakdown zone – typing not intuitive, not sure how to submit text
- It could be useful to have Send button on right of text box. It is difficult to find it the first time
- Crashed when I was running app and scrolled message into view
- Continuous time-lapsed photo might be desirable. Ideal for sounds recorded
- On logon, preferences would be desirable. Maybe context help
- Nice to have: instant join button for community
- Input of message is not obvious
- No facility to join/search a CIS
- “Its not consistent” – camera bug. “I’d like to have it blackscreened”
- Refresh CISs list after joining new CIS
- I would prefer not to have the real image in the background, it wastes battery
- Can it not use augmented reality
- App such as British Red Cross (try to mimic). Allow you to learn and be tested on the app as you use it
5.2.9.3 Networking Zone app:

- “Apache Tomcat error 404 error web. Closes app when error occurs.”
- “Attendee list at Conference versus people currently in the room”. Which is visible?
- “When I find John using this app how do I then send him a message?”
- “Business card of user: not obvious why I can’t see details of user” (because they hadn’t shared)
- “People in same room a relevance indicator.” (requested feature)
- “I can see that there is a John in the same room but how do I know who he is?”
- “I’m bored in this room, who is in the other room?” Room-by-room relevance requested.
- “No indicator that I shared extra info with another user.”
- “I don’t know could I have the same interactions on this Intro screen as in the secondary zone specific screen.”
- “When you click on map why can you not see the message wall (Context Aware Wall) and attendees at the same time?”
- “I would like to see room by room relevance.”
- (A user) commented on sharing: “it isn’t obvious that relevance richness is as a result of sharing more… but this isn’t obvious.”
- “How do I know that I have really shared info with John, there are no cues in the interface when I go back to the main Breakout zone interface?”
- “I saw a profile and then later it has been updated but it is not obvious to me from list.”
- “Do I have to be in the same zone in order to view their profile?”
- “Why do I see different options when viewing Tim & John’s profile?”
- “It would be better to see sharing info greyed out than for it not to be at all visible. I didn’t know if there was something wrong.”
- “When I came back out I had no idea I shared anything with any user.”
- “I don’t know if this relevancy in the same room”.
- “Integrate the two apps so that I can see who is in the CAW app.”
- “Can you look up data from the day before?”
- “It is painful but I understand”
- “Oh it is share your interests, I didn’t get that!”
- “Messaging: not integrating; who/who not joined with”
- “Joining groups?”
- “In the 2nd game: why not have everything in the same app? Going back and forth is cumbersome.”

5.2.9.4 Comments on the script:

- (A user): “The script seems out of sequence with what was on the Context Aware Wall app”

5.2.9.5 Questions for Discussion:

- “Did you know what you were sharing at all times?”
- “You can join a community if a user invites you or you can create a new one and invite already friends. How about search and join a community where you do not have friends?”

5.2.9.6 Technical issues:

- “What are the challenges to integrate the SOCIETIES app in an already deployed middleware (e.g. a home energy management system)”?
- “I was using the wrong Back button.”
- “Sniffer problem: location changed randomly.”
- “Ping on User6.”

5.2.9.7 Known bugs:

- “The Back button doesn’t work in the app.”

5.3 Conclusions

The First Prototype Enterprise trials for SOCIETIES have been both difficult and rewarding. The exercise of presenting the services to people outside of the project and accepting their experience and feedback has caused much discussion within the project. Observing the participants attempting to achieve their objectives, using the first prototype services, demonstrated the delta between thinking about and developing services in the abstract and understanding how users may expect to task those same services in a conference situation.

The Enterprise trial was a participatory effort, both in the preparation and planning, all the way through to the trial exercises on the day of the trial – the participatory demo, the games and the scripted role play. The true purpose of the first prototype evaluations – to inform the project about how the proposed SOCIETIES platform and services might be valued by real users – we feel, was achieved through engendering situations which required the potential end users, or trial participants, to engage and interact with project researchers and developers on the subject of the proposed technologies.

Having the trials organised in an informal and small, yet professional environment, and including both SOCIETIES researchers, and trial participants in a set of participatory exercises has been more effective at this stage of the first prototype evaluations than separating users from researchers and developers. Whilst, there are possible drawbacks to this inclusive approach: the participants could be reluctant to criticize the proposed technologies for fear of offending developers; or they might vocalise their own presumptions of confusion or frustration even before attempting to perform a task, so perceived flaws may gain greater significance than they otherwise would; generally we feel that SOCIETIES’ researchers and developers learned more about significant use of their services and the platform from planning preparations, providing support for the trials and direct observation and participation, than they could have otherwise gained from reading a report. The emotional responses and instincts of participants are understood in a more meaningful way by direct observation and engagement. Also as everyone in the participatory discussions understands that these are prototype trials and there is scope for improvement, it allows for a more honest discussion. The participatory nature of the trial has therefore been both insightful and informative for those SOCIETIES developers who were involved.

To enable planning and preparation of materials for future SOCIETIES trials access to services should not be delayed by technical issues in so far as possible. We learned from this first prototype trial that limiting access to services solely to on-site deployments increases the risk for the trials, as it is so close to the trials there is little scope to improve usability of services, and testing deployment issues means there are continuous interruptions in access to the services which prevents free flow run-throughs of trial scenarios.

Lack of clearly bounded use cases tightly coupled with the application functions meant that it too much of our feedback is non-specific. While we think we know some of the usability issues, we could perhaps use the participants’ time more effectively if we create lists of bounded tasks, such as “how do you set up a new community”, and test different sets of tasks with different users. It would also be interesting, if resources were available, to focus on one service and to push the boundaries of testing and development, with have more continuous rapid iterative testing design and evaluation stages over a longer period of time, which could be sustained in one location with different sets of users accessing the test at different times.

The greatest constraint was the limitation resultant in the use of generic names and identities for the users. This meant that we were unable to test privacy, trust or automation. There were no really anonymous users in this case, as they were colleagues of some researchers, and yet we have no real users’ data. The feedback was mostly reliant on stated opinions, subject to all the normal social influences such as group-think, and inhibitors of performing the test in the workplace with others with whom one may have an on-going relationship. If privacy and trust are to be evaluated it can only really be done with real users deciding if they are willing to share their own identities and data with the SOCIETIES system. On the other hand this
constraint was one that led to creative approaches for the evaluation, which resulted in role play and participative approaches that offered alternative polyvocal understandings of the socio technical issues conjured up by the SOCIETIES system, as envisioned for the conference scenario.

Mobility, and interruptions were also factors which were not realistically represented in the staging of the trial. While participants used mobile devices and the space available was set up to enable device aware location sensing, this did not scale to the constant movement in and out of spaces in a real life conference setting. During the trial, people were engaging with the apps for the most part while sitting and concentrating on specific tasks, supported by physical paper guides in the environment, not while they were moving about having a simultaneous conversation, half reading a paper conference guide and looking for their next meeting, as might be expected (based on SOCIETIES D2.1 ethnographic vignettes) in a real world conference scenario. Future trials could try to allow for more realistic mobility and interruptions.

The individual services were presented to the users not as silos but rather as an intermeshed experience through the use of scripted role play games. While the scripts had been intentionally devised to challenge the feasibility of using SOCIETIES to meet high level users’ objectives in a conference situation, i.e. could an angel investor arrange to meet relevant and interested parties using SOCIETIES, rather than simply illustrate the pre-designed functions of the individual applications (such as “could one leave a message for a given community in a particular place”); this meant that participants were somewhat confused and found it difficult to distinguish between which service they were referring to when giving feedback.

As the SOCIETIES platform and applications were immature in terms of stability and user interface design, the participants are jolted out of a smooth and passive user experience, and could be supposed to be more aware about their engagement with the system and self-reflective about their role in the trial. While the post-it comments were often focussed on the bugs which is usual as this is what stands out to people; both the open discussion and the SUS results indicated that despite the interruptions of bugs, participants in general, could envision a positive use cases for these technologies.

The User Interfaces, user flows and front end designs of the applications utilised, caused considerable difficulty for all of the participants. They were not intuitive, or easily navigated. The services offered were not essential to the conference scenario, and the benefits were not immediately obvious, so some users questioned whether accessing the system would be worth the effort. Improvements to the front-end designs of the Networking Zones and Context Aware Wall, along with the SOCIETIES application would be likely to have considerable enhancement to the overall user experience.

Despite the issues with software stability and the controlled environment of the trial scenario, participants were clearly willing and inspired to imagine the potential for the types of services made feasible by a system such as SOCIETIES which linked social networks, relevant contacts and communities with pervasive services. They were intelligent about the possible risks and the assurances they would require with regard to the management of their data but enthusiastic about the reach of services which might be made feasible by SOCIETIES.

The process of having user trials, and in particular participatory approaches, challenges the socio technical form of the project itself. Developers do feel challenged to present technologies and services for evaluation, when they are not complete. There is a negotiation of power, deciding what services and features should provide the face of the project, and how they should be presented. In preparation for trials, the deconstruction of goals, actions, and responses for numerous concurrent users in order to prepare scripts illustrated the rapidly scaling complexity of a SOCIETIES system in situ.

Participants offered several ideas for design enhancements or alternative services. Someone interested in conference organisation, imagined organising the physical location of meetings based on the numbers of delegates interested in a topic using SOCIETIES, or organising feedback during an event using the context aware wall. The potential to discover relevant connections, while still protecting ones identity or detail of organisation from others was considered very useful. Several suggestions for extended services and features using the SOCIETIES technologies were also given. One participant was requesting both pre and post conference organisation services (similar to those which featured in the original D8.3 storyboards).

Participatory methods are promoted within the HCI community as a means to democratise the design process. Unpacking and understanding the negotiation of power in sharing technologies is of particular significance at this juncture in the digitisation of everyday life, and in SOCIETIES is most demonstrably evident in the management of privacy, trust and automation of services. This was confirmed from the
projects initial user requirements, sourced from ethnographic vignettes, surveys and participatory sessions, where users clearly identified privacy, trust and clear controls over automation of services as critical for acceptance of pervasive and social services. However, beyond attitudinal discussions arising during and after these participatory demos and role-play, we have not been able to evaluate these important factors in terms of real user behaviour, satisfactorily. We can assume that increasing user intelligibility of the services through their interfaces, and the SOCIETIES platform interface, along with fine-tuned privacy controls for each sharing interaction might through design provide affordances for perceived privacy and trust, but the SOCIETIES technologies were not mature enough to evaluate this, for this prototype. If the future SOCIETIES platform and services are to be developed to the stage where they would be acceptable to end users, we expect that a great deal of effort would have to be focussed on realising these objectives for privacy, trust, and user intelligibility.
6 Student Trial: First Prototype Evaluation

6.1 Trial Description

A vital stakeholder for SOCIETIES is the 3rd party service developer. This stakeholder is also as an essential part of the user community for the platform and thus has relevance for evaluation by WP8. Without this user community the product of SOCIETIES would remain a ‘black box’ platform, so it is important that this stakeholder tries to exploit and brings life to this ‘black box’, in order that the end-user community can benefit from the innovations contained inside. As such, WP8 considered an evaluation from the point of view of this user community would be valid and necessary.

In the original DoW for WP8 the student community from Heriot Watt University had always been considered as having a dual user role, in that they could be end-users and at the same time 3rd party service developers. However, due to the delays in platform implementation and integration WP8 was forced to reconsider any evaluation with the students as end-users for the first trial, and so it was decided to concentrate on the evaluation of this user community purely from the point of view of a 3rd party service developer.

WP8 designed the trial such that the objective was to evaluate the technical maturity of the technologies presented by the platform APIs, the usability presented by the platform APIs, and the platform innovations as presented by those APIs.

6.1.1 Trial Users

The trial involved six 5th year students from the MEng Software Engineering course at the Heriot-Watt campus in Edinburgh, Scotland. One of the student course modules involved a group project, where the students were tasked to design 3rd party services that would exploit the innovations of the SOCIETIES platform.

![Figure 31: 3rd party student developers](image)

The module duration was over ten weeks and started at the beginning of January 2013. The students were invited to attend a module induction co-ordinated by the head of the course, but which also involved researchers from HWU, Intel and TSSG presenting and discussing the following topics:

- An overview of the SOCIETIES value proposition and the so-called ‘innovation tree’
- A technical introduction to the SOCIETIES platform for 3rd party service developers
- The SOCIETIES infrastructure deployed at HWU
- Testing and integration of deployed services
- Examples of 3rd party services from WP6

The timetable for the course module involved the following phases:
1. The induction session as described above, which was followed up with a meeting with the six students and head of the course to decide on the groups and next steps

2. In the first two weeks the groups were asked to familiarise themselves with the platform innovations, as described by the API documentation, at the end of which they would present and discuss their ideas for services

3. This was followed by the groups defining the designs for their services and setting up their implementation environments

4. The final phase was the implementation and deployment of their services, which culminated in a presentation of their service to members of the SOCIETIES consortium

6.1.2 Devices, equipment and infrastructure

As HWU students, the trial users have access to the HWU’s computer labs where they were able to run the SOCIETIES platform, develop and test their services.

The HWU PUMA lab provided access to the SOCIETIES Openfire server running at HWU premises allowing the students to connect to the same Identity Management server to test their services.

The students were also given access to the several hardware deployed in the Learning Zone of the MACS department at HWU such as RFID location tracking and public screens. RFID locations and displaying information on the public screens are utilized using the SOCIETIES platform, however neither of these features were leveraged in the services developed by the users.

6.1.3 Permissions, privacy and ethics, and data management

This trial was aimed at evaluating the platform from the point of view of 3rd party developers as opposed to end-users. Hence, the trial did not involve collection of personal information. However, the students were bound to the rules and regulations concerning the use of computing facilities at Heriot-Watt University (https://support.hw.ac.uk/index.php?/Knowledgebase/Article/View/74/0/policy-it-rules-and-regulations).

6.1.4 Feedback, Data Collection, Analysis and Interpretation

To obtain feedback from the students on the trial a number of acquisition techniques were deployed.

Weekly meetings were held between the students on the trial and SOCIETIES researches, proxied through HWU. In addition a total of three rounds of questionnaires were conducted, one at the beginning of the trial, one half way through the trial, and one after the final service demonstrations.

As was mentioned previously, the students were encouraged to input any issues that they found during the trial (bugs etc) into the online Redmine tracking tool. They were also encouraged to discuss any observations through the online Discussion Forum.

6.2 Evaluation Methodology

As mentioned previously, the objective of this trial was to evaluate, from the point of view of a 3rd party service developer, the technical maturity of the technologies presented by the platform APIs, the usability presented by the platform APIs, and the platform innovations as presented by those APIs.
WP8 were cognitive that the task being undertaken by the students had some risk, especially as they were unfamiliar with the concepts and the technologies there was a perceived risk of the platform being overly complex. These risks were discussed with the head of the course and generated questions for ourselves, such as: “Are the platform APIs sufficiently mature enough for this exercise?”, “Are the innovations as presented by the APIs clear enough to generate novel services?”, “Is the platform stable enough for the exercise?”. But these questions were also part of the evaluation exercise, and so were valid. The conclusion from this risk analysis was that there would be a fine line between over protecting and under protecting the trial users, which would need to be proactively managed.

Because the exercise was also part of the students’ course and was of critical importance to this user community, the first decision taken here was that HWU would act as a proxy between the consortium and the students. It was also decided that a formal meeting would take place every Tuesday afternoon between HWU researchers and the student groups. The minutes of these meetings would be forwarded to WP8 and the details would be discussed as part of the weekly WP8 Student Trial Management audio conferences, which would take place throughout the duration of the trial.

SOCIETIES uses a web-based project management and bug-tracking tool called Redmine and each of the students had been set up with a Redmine account. The use of this tool had been demonstrated at the induction session and the students were actively encouraged to input any issues they encountered directly into the tool, they were also given assurance that all input would be actively managed by the project’s Technical Co-ordinator. In addition, a User Trial Discussion Forum was setup and the students were also encouraged to use this tool for any additional discussions. All student input to the Redmine tool was discussed at the weekly meetings with the students, also at the weekly WP8 Student Trial Management audio conferences, and at the weekly SOCIETIES Developer audio conferences. This was to monitor that all issues were being dealt with in a consistent and timely manner, and to ensure that the students felt they were part of the trial and didn’t feel isolated.

6.3 Evaluation Results

Over the ten weeks of the trial several devices were used to generate evaluation feedback from the trial developers. Three questionnaires were conducted, one at the beginning of the trial, one towards the middle of the trial, and one after the final trial demonstrations. Minutes of the weekly meetings between the students and the HWU team were circulated back into the trial evaluators, for analysis and discussion. The students produced individual logs and diaries during their ten weeks, and final reports were written by each of the groups. In addition, quantifiable data was acquired through issue logs and bug reports from the Redmine tool. This section provides an overall picture of these results and is followed up by an analysis in the conclusions section.

6.3.1 Feedback from Questionnaires

The following provides conclusions drawn from three questionnaire surveys that were given to this user community:

6.3.1.1 First Questionnaire Survey

The full survey responses can be found in Appendix 10.

This short survey was presented to the students at the beginning of this exercise, just after the induction meeting. The survey was designed to the students capture initial impressions of the SOCIETIES platform, as presented at the induction meeting, and their thoughts on the support set up defined.

From the responses it can be seen that the students felt that they did understand the platform innovation and novelty, as presented to them. They also felt that the platform was presented to them with sufficient enough detail. However they did acknowledge that they were being presented with quite a complex system.
After the meeting they had engaged with each other in numerous collaborate sessions to brainstorm ideas for services that would exploit the platform innovations, and overall they enjoyed the experiences gained form these brainstorming exercises.

They did express mixed views on the level of detail provided by the service developer documentation, and these views were relayed back to the SOCIETIES developers.

Finally, they did feel they would be comfortable expressing their thoughts using the Redmine Discussion Board that we had set up.

### 6.3.1.2 Second Questionnaire Survey

The full survey responses can be found in Appendix 11.

The second survey with the students was conducted at the middle of the ten week course. It was designed to capture the interim views of the students in terms of the functioning of the support mechanisms that had been put in place.

When using the Redmine ticketing system to issue tickets for any problems encountered, the students felt that the consortium were very quick to respond to these problems and were very successful in resolving these issues.

It had been five weeks now since the initial induction and the students were more familiar at this point with the platform and in particular the 3rd party APIs. Their views on the innovative nature of the platform APIs was somewhat ambivalent, but they did feel that the APIs did expose the concepts presented by the platform.

They were also ambivalent regarding the novelty of the 3rd party services that they had designed, which was slightly surprising, but they did feel that their service’s innovation had been stimulated by the innovation presented by the platform.

However, the students did feel that they would be able to build their service using tools other than those provided by the platform.

### 6.3.1.3 Final Questionnaire Survey

The full survey responses can be found in Appendix 12.

Our final survey was conducted at the end of the course, after the students had presented their service demonstrators to their course tutors. The previous surveys were kept intentionally brief, but it was concluded that we had more scope in this final survey.

In general the students agreed that they were well informed about the objectives of the SOCIETIES project in relation to their 3rd party developer project. They now had mixed views about the innovative potential of the platform, as presented through the 3rd party developer environment. They also had very mixed views in agreeing whether the 3rd party developer environment lived up to their expectations. Some students said they did not really enjoy the group project experience, and the rest were somewhat ambivalent. They also questioned the benefits and relevancy of the exercise.

However, they generally agreed that the developer documentation worked well for them in terms of support. They also strongly agreed that the support tools provided through Redmine worked well for them. They were somewhat mixed in terms of how well the 3rd party APIs worked for them, and to how well the status of these APIs was communicated to them throughout the exercise.

There were mixed views as to how well the 3rd party developer environment stimulated and supported the creation of innovative social features in their services, but stronger support for the same environment to create pervasive features. Also, the lack of availability of some of the proposed platform APIs somewhat stifled the development of the social and pervasive innovative features that they had designed into their services. However, the students generally agreed that the exercise did augment their knowledge of social and pervasive technologies.
When asked about the rewards and benefits of working as a group, their response was generally ambivalent. Similarly to the previous responses they did find that the responsiveness to any problems that they encountered was more than adequate to meet their project needs. They also felt that the duration of the exercise was adequate.

The students had mixed views as to whether they had achieved their own objectives through the exercise, with the majority feeling they had and a minority feeling that they hadn’t. They were however very satisfied with the level of support that they received throughout the exercise.

They were ambivalent as to the degree to which they could feel that this was an innovative experience for them, and tended to feel that this was down to a lack of innovative features, as provided by the platform (see results to question 21 and 22). Finally they concluded that in general they would not be interested in using the platform again in the future.

6.3.2 Weekly minutes

This section lists out a summary from the weekly minutes between the students and the HWU team. The complete transcript of minutes can be found in Appendix 13. These minutes would be discussed at the weekly WP8 audio conferences and any appropriate actions required would be identified and acted upon to rectify any issues. In addition, the Technical Co-ordinator would identify any key issues that needed to be fed back to the core developers, and these would be discussed at the weekly developers’ audio conferences and appropriate Redmine tickets would be issued.

6.3.2.1 1st Report

- The students have been brainstorming about the types of services they want to use and wondering if they can use mobile phones for deployment. It was explained that the android release was not stable and recommended not to use it.

- There was an idea of using GPS from the phone so a suggestion was to write a service that acts as a context source. So one of the services could be to retrieve GPS coordinates off the phone and insert them into the Context Broker using the Context Source Management component.

- They enquired about whether the platform exposes functionality to identify and create CISs from the 3P service POV. One of the ideas was to write a service such as Shazam (http://www.shazam.com/) that recognises the music the user listens to and tries to create CISs based on users listening to the same genre.

On the technical side, they had problems with the documentation and the guidelines:

- There is not one guideline that says how to install everything and run it. The guidelines are split into many files that tell you what to do. This makes it difficult as the order in which things have to be done is not clear. For example, they mentioned that they followed the guidelines to install everything but there was no guideline to tell them how to run SOCIETIES and see what it looks like.

6.3.2.2 2nd Report

From the previous brainstorming sessions the following services have been proposed:

1.  Group Collaboration Tool

The service will allow students to organise meetings, create CISs for a specific purpose and use the Activity Feed to post notifications to the CIS members for upcoming meetings and other important information. The service will also make use of git/svn and Dropbox API to enhance the collaborative nature of the service.

2.  Adaptive Music Playlists
The service will be able to recognise genres of the music that the user listens to and will feed this information to the profile of the user.

The service will share this information with friends, CISs or publicly if the user wishes to do so. Additionally, it will also make use of the UserActionMonitor to allow the platform to learn context-aware music preferences as well as community music preferences.

3. Location-Aware Content Delivery

The service will be available on Android connected to a backend service running on the CSS. It will consume profile information from the platform and leverage the GoogleMaps API to display relevant information to the user on the map.

6.3.2.3 3rd Report

Discussion on the use of SOCIETIES innovations:

- **Pro-activity**: discussed how services can be proactively started. As the platform does not support pro-activity in service management and services are automatically started in Virgo, the discussion focused on proactively starting specific activities in the 3rd party service.

- **Context**: discussed how some context data can be used to change the behaviour of the 3rd party services as well as how these can be used in the personalisation and learning of preferences for the services.

- **CIS**: follow-up from last week’s questions about services creating CISs and using the CIS Activity Feed.

6.3.2.4 4th Report

**Group 1: Collaborative Tool service**

**Service description:** The Collaborative tool service allows users that work in collaborative projects to organise their work, such as their shared tasks, schedules, files etc. The service offers integration with DropBox, github and Google Drive. A group of users joins the same CIS and leverages the CIS Activity Feed functionality to notify other members of the progress of the work and to post notifications about events, tasks, github commits, Dropbox uploads.

The service has three parts:

- A web-app that runs separately from the SOCIETIES platform and provides integration with external services such as Dropbox, Github and Google Drive.

- A SOCIETIES 3rd party server service. This is hosted on the CSS that acts as the CIS administrator. It is responsible for hosting the shared information and administering and the group session.

- A SOCIETIES 3rd party client service. The CIS member CSSs download the service from the CIS. The client part of the service uses information from the platform such as context (user location, status), preferences and the CIS activity feed to share information with other CIS members.

**Group 2: Content Analysis service**

This service provides three different functionalities:

- RSS Feeds content analysis and filtering based on interests and context.

- Music analysis and inference of music interests for CSSs. Demonstrates learning of music preferences in different contexts.

- Social Events service that runs on Android and leverages context information such as location and interests and preferences to recommend interesting events the user might want to attend.
6.3.2.5 5th Report

**Group 1: Collaboration tool**
- Issues with installing 3rd party service on CSS node – privacy policy location
- Working on integrating their service with Dropbox, SVN and Google Drive
- They were asked to produce logs but the Wiki page that explains how to create Virgo logs for DEBUG level was not linked from the main Wiki page.

Some preliminary reports on their experience so far:
- Pre-setup Virgo useful
- Getting their service to build is frustrating
- Getting their service to run is frustrating
- If they didn’t need to use SOCIETIES for their course, they wouldn’t have bothered to fix all the problems

**Group 2: Content Analysis service**
- Currently working on the music identification algorithm and music recommendations
- Didn’t try to install the platform yet but they were planning to do so

Group 2 were going to talk about the deployment of their service on the SOCIETIES platform but they still hadn’t installed the platform so they spent the time in the labs installing it and getting it to run. They used Redmine to create tickets and ask questions when they ran into problems while trying to run the platform.

6.3.2.6 6th Report

Management of Redmine tickets from the student trial:
- Group 1 are planning to finish on week 11
- Group 2 are a bit delayed and will probably be issuing tickets during these two weeks
- Group 2 are currently having a problem running the platform

6.3.2.7 7th Report

Management of Redmine tickets from the student trial:
- Tickets are being answered promptly.
- Some are still unresolved. Specifically tickets about running the platform.

**Group1: Collab tool**
- Specific questions about sharing services.

**Group2: Social Explorer - content filtering service based on RSS feeds**
- Questions about the SOCIETIES architecture. For example, why does a user have his own container? Mentioned the privacy aspects and the ability of users to run their own SOCIETIES environment without relying on big corporations to host SOCIETIES.

- The basic discussion was about deployment of their service and how this is influenced by the current SOCIETIES architecture.

6.3.2.8 8th Report

Management of Redmine tickets from the student trial:

- Question about OSGi – a dependency JAR is not being copied to the Virgo directory. Need to discuss whether it’s better to package the JARs inside the deployable JAR, or have them separately.

- Problem with service init-method not returning/exiting – the service still starts correctly but the web interface hangs.

6.3.2.9 Reports Summary

It is clear from the reports that the students made good progress over the ten or so weeks of their 3rd party service developer course, albeit faced with the challenges on offer. It was not clear why some worked as individuals while others formed into groups, as you would have thought that working in a group would have helped to lighten some of these challenges, but maybe this was down to the individuals involved.

However, because the project had set up the student support protocol through the Redmine tool, we were able to get a micro insight into platform problem areas as these became exposed to the students, and also an overall macro sense about the performance of platform from an outsider’s perspective.

6.3.3 Final Group Report

The final group report from the students has summarised their experiences from this exercise very succinctly, and they present their views on the platform’s robustness and innovation qualities. Here can be found the main points as extracted from the final report and the unedited version can be found in Appendix 14:

- In general the students felt that it took them a long time to understand what the platform was and this meant that it took a long time to get started. Also, once they did get started there always seemed to be problems. They put this down to their lack of experience with the platform and shortfalls in the explanations provided by the documentation.

- A lot of the technologies were new to them and this hindered their progress while they learned how to use these technologies. They had been told that a new software release was due to fix critical bugs and offer new features, but this was due for release inside the 12 week duration of their course, which was not ideal.

- The platform proved to be very temperamental and caused numerous problems, some days working and other days crashing for no particular reason. Some of these problems seemed to relate to the choice of target operating system. However, once the platform was up and running it seemed to run smoothly enough. Overall though this did leave these third party developers with a negative impression on platform robustness, and the students did express that they would be surprised if many open source developers would be prepared to put up with this.

- They understood the issue of user’s privacy and particularly with social media, but they remained sceptical at the solution provided by the platform, in terms of how the platform allows users to set their own privacy. They felt that FreedomBox provided by Debian seemed to be a better solution.

- They felt that the platform was difficult to understand and for a third party developer to appreciate the innovative capabilities then the platform needs to be ‘presented in as clear, concise and understandable a manner as possible’.
- Some of the platform features did come across as innovative and useful, such as learning the context if users’ actions or grouping users based on common interests. However, more attention needs to be taken in addressing usability, with the system being so difficult to use that it was stifling the innovative parts of the project.

- They felt plagued by the lack of debug functionality and using logging in the system was very time consuming and frustrating.

- Using the platform did become easier over time but ‘the learning curve of the system was shockingly steep for a project that has ambitions of being adopted by the Open Source community’. Suggestions for improvement included:
  - An overhaul and standardisation of the available Wiki documentation
  - A single package to ease the complicated installation process
  - Pre-configured options for various models of development, to both ease start-up and system redesign

- They were very appreciative of the support provided and had a good experience with the Redmine tool.

6.3.4 Observations taken from individual student reports

Presented here is a summary of the collective observations from the individual student reports. The full transcripts from these reports can be found in Appendix 15. The student names have been anonymised, so as to protect the students’ privacy.

The students universally expressed concerns around platform stability and maturity, with a ‘constantly altering work environment and incomplete documentation’. The documentation and developer guides were conflicting at times, which led to overall frustration. There were also issues around setting up the development environment but overall the responsiveness and support from the technical team to these problems was faultless.

Delays in implementing the deployment of the designed services were experienced as a result of using the wrong release version. However, Redmine was seen as an important issue management tool and the students found the ticketing system very useful, with problems being ‘answered in a timely fashion’. Some found the Wiki knowledge sharing repository to be ‘unclear and confusing’, and when using this to install the platform they were unsuccessful. The user guides ‘contained errors’ and pointed to a lot of references in other guides/tutorials. A “How to…” user guide is required. One student said that they couldn’t see ‘the platform in its current state being able to be used by an outside developer… Most of the time was devoted towards getting the platform set-up, rather than developing our third party service’.

A lot of the technologies were very new to the students and although they did enjoy learning these new and relevant technologies, they did feel that this created an additional learning curve above and beyond the already steep learning curve, as presented by the platform itself.

In general, the innovative nature of the platform did not appear to be obvious to this group. They did mention privacy issues surrounding social and pervasive deployments but it was unclear whether the SOCIETIES platform really resolved these privacy issues. They did try and design their services around the platform innovations, such as the use of personalisation and the activity feed inside a group CIS in the project management service. One student did use the platform’s grouping features to extend an existing service.

6.3.5 Remote Technical Support during Student Developer Trial

The student developer trial at HWU was supported remotely by the project development teams in addition to the on-site technical support provided by HWU. The remote support comprised of software releases to be used during the developer trial, online user and developer documentation, and responses to submitted support requests or bug reports. The main mechanism for interaction between the SOCIETIES development teams
and the student trial developers was via an online open source issue tracking tool called Redmine [http://www.redmine.org/].

Redmine is an open source customisable project management web application built with the Ruby on Rails framework. It provides features for software project management such as task planning, project roadmaps, wiki & document management, notifications & activity logs, and SCM integration. It also provides flexible issue tracking features for feature requests, support requests and bug reports. Redmine was chosen as a project management tool for SOCIETIES and was setup on the project’s testbed [https://redmine.ict-societies.eu/].

To support the student developer trial, a customised sub project in Redmine which was created to support any 3rd party developer was used by the student developers to communicate with the SOCIETIES project. This Redmine project provided access to wiki documentation, issue tracking features and discussion forums. Figure shows the project home page which would be presented to the user when they logged in. Each student user was provided with a unique account with access to this Redmine project.

![Redmine Project for 3rd Party Developers](image_url)

**Figure 32: Redmine Project for 3rd Party Developers**

The wiki documentation provided detail user and developer documentation for installing and configuring the SOCIETIES platform, and for developing and integrating 3rd party services with the SOCIETIES software. Figure provides a list of the available wiki guides targeted at 3rd party developers and thus the student developers.

![Wiki Documentation for 3rd Party Developers](image_url)

**Figure 33: Wiki Documentation for 3rd Party Developers**
As the developer trial proceeded the students used the issue tracking features in Redmine to log support requests on problems they were experiencing e.g. problems understanding the documentation and platform APIs, issues installing and configuring the platform distribution to their local environment and OS specific startup problems. The students also discovered some defects in the platform software and these logged as bug reports.

Figure provides some examples of the support and bug reports that were logged by the students. Each issue ticket was reviewed after submission and then assigned to the appropriate project developer to address the issue. Sometimes to address the issue, further communication was required with the student author of the ticket and this was done via the update feature on each ticket. When a ticket was addressed it was then set as resolved or fixed, where the student author was then requested to verify or close the ticket.

![Figure 34: Examples of Redmine Issues logged by the Student Developers](image)

### 6.4 Conclusions drawn from the student trial

Looking back at the evaluation objectives that were set at the beginning of the trial; evaluation of the technical maturity of the technologies presented; the usability of the platform APIs; and the platform innovations, we can say that significant work is still required.

It was evident from the feedback in general that the students felt that the user documentation required improvement, and this was relayed back to the work-package responsible for the 3rd party service developer environment. However, the students did communicate that they felt that they understood the platform innovation and novelty on offer, albeit they did not feel they needed the platform as such to do so.

They expressed considerable frustration regarding the technical maturity and usability of the platform APIs, and indeed the technical maturity of platform deployment in general. They were quite mixed in their overall sense of platform innovation, but did caveat this by saying that not all of the platform innovative features were available, and that this had somewhat stifled the innovative experience for them.

As stated previously, the student evaluation offered the project team insights into the platform from both a micro and macro perspective. At a micro level the students felt plagued by missing functionality, such as debug, whilst at a macro level they felt it would be difficult for a third party developer to appreciate the overall innovative capabilities of the platform. They felt that more attention needed to be given to usability, with the system being so difficult to use that it was stifling the innovative capabilities.

Platform stability and maturity was a problem, with a ‘constantly altering work environment and incomplete documentation’. The technologies required to implement a service were alien to these MEng students, which
presented an additional learning curve, above and beyond that presented by the platform challenges. This point highlights a potential issue for who the project would be targeting to design and implement exploitable services in the future.

In general, the innovative nature of the platform did not appear to be obvious to this group. They did mention privacy issues surrounding social and pervasive deployments but it was unclear whether the SOCIETIES platform really resolved these privacy issues.
7 Conclusions and preparations for the 2\textsuperscript{nd} trial

This document D8.6 presents the evaluation results from across all three SOCIETIES user domains, and the document presents an overall evaluation of considerable scope. Although at the time of these evaluations certain platform functionality had not been developed to a point where it could effectively be integrated into the platform as a whole, the evaluation process was able to get around these constraints by taking differing approaches, all of which were complimentary to the process. This evaluation took place much later than was envisaged in the original Description of Work, which obviously has impacted on the timing and effectiveness of any evaluation feedback. Putting the constraints imposed by the technical maturity of the platform to one side, we can conclude that as a first attempt at an evaluation of a complex system, the exercise has also been about learning and experimenting with various methodologies on how to evaluate these complex systems, which should provide constructive mutual understanding for the next round of trials.

However, WP8 has concluded that we have somewhat helped to contribute to the design process by offering a touchstone evaluation of the platform. WP8 has also been able to evaluate the platform to varying degrees from the holistic high-level view of Discover, Connect and Organise, as well as evaluating some of the more novel and innovative solutions that were presented by the creation of social and pervasive communities, for example concerns around privacy, to take but one.

As we conclude this first round of user trials and reflect on lessons learned, we can highlight some of the thinking that will be carried forward to our second round of trials:

1) In terms of \textbf{Aligning the Roadmaps} between WP8 and the Integration work-package (WP7) we expect that the experience from the first trial will help us better understand deployment complexities.

2) To enable \textbf{Planning and Preparation} of materials for future SOCIETIES trials, access to services should not be delayed by technical issues, as far as is possible. We learned from this first prototype trial that limiting access to services solely to on-site deployments increases the risk for the trials, as it is so close to the trials there is little scope to improve usability of services, and testing deployment issues means there are continuous interruptions in access to the services which prevents free flow run-throughs of trial scenarios.

3) In terms of \textbf{Deployment} and \textbf{Scalability} the number of active users was limited by resource constraints in the first trial. Since we anticipate that there will be more users involved in the second trial, we expect that the number of supported containers needs significant improvement. The system has proven to be reasonably stable in the first trial, but we need to continue this level of \textbf{Stability} for the second trial.

4) Increasing \textbf{User Intelligibility} of the services through their interfaces, and the SOCIETIES platform interface, along with fine-tuned privacy controls for each sharing interaction, should provide affordances for perceived privacy and trust.

5) We should expect some degree of \textbf{Staged User Involvement} to test various elements of the system and services, which will be more complex than the first trial. More attention needs to be given to \textbf{Usability}, with the system in the first trial being so difficult to use that it was stifling the innovative capabilities.

6) To what extent the \textbf{Trust Model} provides real value is still open and needs to be addressed.

7) Another question is that of the required \textbf{Depth of Integration with the SOCIETIES Platform}. We expect a richer set of context attributes to be used in orchestrating the user relevance.

As in the first trial, a careful formulation and specification of \textbf{Preconditions} (context attributes, “lead-in-story”, preferences, etc.) needs to occur to ensure a smooth transition from the (artificial) state before the trial to the trial itself. However, we note that the limited user scale probably negates the effectiveness of achieving the context richness required.

8) In the Disaster Management trials we recommend that the “\textbf{Participatory Design}” approach remain a driving force for the second trial. It has proven to be an effective way of galvanizing efforts to a common goal and for rapidly adapting services as well as
expectations and the evaluation approach. Our “Participatory Design” approach will allow us to react flexibly to changes. Nevertheless, it is crucial that the system be deployed and ready according to the specified requirements.

9) The User Interfaces, user flows and front end designs of the applications utilised, caused considerable difficulty. They were not intuitive, or easily navigated. Improvements to the service front-end designs, along with the SOCIETIES application would be likely to have considerable enhancement to the overall user experience.

10) SOCIETIES concepts could provide digital solutions that map onto existing user domain processes, for example in Disaster Management: extended support for specifying roles in a community, community orchestration for the suggestion for teams, extension of the activity feed concept for task assignment and follow-up, 3P services for status overview and sharing of maps.

We were not as close to hearing the ‘voice of the user’ as we would like to have been, but we have learned a lot of lessons about the difficulties and complexities of trying to evaluate innovation from both a micro and macro point of view. These lessons learned will be carried over to the final evaluations and have indeed helped prepare and pave the way ahead.

One critical aspect of this is to understand and accept that planning needs to be realistic and achievable, which sounds obvious but is not necessarily fully understood. This is a collaborative project, with objectives varying between individual partners, and this variety, although quite natural and normal, adds additional complexity to the mix. So a key lesson learned from the first evaluation is to try and keep it simple, realistic and achievable, whilst at the same time relevant.

Weiser’s prediction [5] that profound technologies disappear, throws up additional complexity in the evaluation of ubiquitous and pervasive technologies. As the interface between the user and the technology becomes less visible and tangible, how do you evaluate these disappearing technologies? Trust, privacy, learning, context, etc are just some of the meta-enablers of this project that provide platform innovation, but you cannot give these enablers to a user because they are invisible in nature.

As such, the pervasive technology evaluator needs to be novel and innovative in their thinking about the techniques and methodologies used to evaluate these intangible enablers. This presents exciting and interesting opportunities for experimentation in this field, as we discovered when we strategised the techniques most appropriate for each of our user trials.

We feel that this deliverable documents a wide spectrum of pervasive computing evaluation techniques, and given the constraints imposed, each of these has provided their own applicable mapping for future evaluation.
8 References


A.1 DM “Train Scenario”

This scenario pertains to the development of the DM use case, especially with respect to the value propositions that would be evaluated and motivated outside of the actual trial:

“Jack is on a train journey from Berlin to Munich. Using his smartphone he is uploading some photographs that he just taken in Berlin to his Facebook and a message appears from CrisisCommons to ask him if he wants to lend some help with the relief effort for an earthquake that has just occurred in Japan. He wants to help and he clicks on the link to launch his CrisisCommons app. He has been a volunteer with CrisisCommons for a while now and has helped before with other disaster relief efforts. He finds the task solving exercises stimulating and is happy in the knowledge that he is helping to alleviate the suffering of others.

He logs into the app and is presented with a number of tasks (~10). Since he has used the app before the task lists have been carefully selected with Jack in mind, and the app is aware that sometimes Jack likes to work on tasks on his own, and other times he prefers to collaborate with other CrisisCommons volunteers. This collaboration can be with other volunteers in the virtual world, or alternatively Jack can see that the app has located two other volunteers that are on the train so that he can contact them to see if they would like to meet up with him for task collaboration. These are all options that the app can make available to him.

The train journey will be another couple of hours and Jack decides to see if the other two volunteers would like to meet up with him. He uses the app to message them. He cannot see who they are and they cannot see who he is. The three volunteers start to message each other and share some information about themselves. The app is now aware of this collaboration and reshuffles the task list based on their previous tasks and their own personal areas of expertise. They arrange to meet in Jack’s carriage.

Very soon they are in Jack’s carriage and having gone through their introductions start to discuss the task list, so that they can agree a task to work on. There is one task that they are all keen to work on but they feel that they need some help with it. They start working on the task and also post the detail of the sub-task that they need help with. After a minute or so they receive a message from two other volunteers offering assistance with the sub-task, which they accept.

In no time at all they arrive at the solution to the task and upload this to the app. They talk for a while and then decide to try and assist with another task. Their journey is nearly complete and they have been quite busy helping with tasks. They can visually see response level indicators from other volunteers and also visual feedback from the relief workers at the disaster zone. They arrive in Munich and before going their separate ways agree that they should go to dinner together. All three are satisfied that they have made a significant contribution to the disaster relief effort, they have also become friends from their shared experiences and will try to keep in contact with each other in the future.”
A.2 DM Code of Behaviour and Confidentially

All trial volunteers and researchers are obliged to carefully read and agree to adhere to the code of behaviour and confidentially required by this trial, as outlined below, before any further participation in the trial.

Specifically:

1. Infrastructure requirements are minimal. You need nothing but a Notebook or Desktop with Internet access and a Web-browser. We do not recommend that you use smart-phones or similar, due their small screens.

2. One of the core ideas for you to solve the tasks will be to employ any available source of information. This may include online resources or your books. **But by no means should you post questions to online fora, Twitter, Facebook or similar.**

3. There is one important constraint: **Only talk to, or discuss simulated trial tasks with people who are participating in this trial simulation and are fully aware of this fact!** Misunderstandings happen, especially with multiple languages involved. Imagine what could happen if you talk to a Mom in Singapore and ask her how many children are in the school that her daughter attends, because it has been reported to have structurally collapsed, and she did not understand the nature of the simulation exercise. You might inadvertently start a serious and real disaster this way.

4. If you are placed in a group of volunteers, it is likely to consist of around 5 persons.

5. Since there will be consecutive trials with different groups, please refrain from discussing what you experienced until the last group has finished. This may take a couple of weeks.

6. Your time is valuable, so we try to limit your involvement to approximately 3 hours in total over a period of no more than three days.

7. Your task will be to answer questions that will be injected into the system by simulated disaster management personal. The answers to some of these questions may be complex and require to “divide-and-conquer” the problem. We are very interested in group dynamics and how you will interact to provide the desired information.

8. We will ask you to take some notes on how you obtained information or reached conclusions.

9. We will log your interactions with the system for later analysis. This data will not contain any reference to your real name or email address or any other directly identifiable personal identification. However, persons directly involved in the trial might be able to make the link between you and your interactions with the system in the trial, from the nature and content of your interactions.
A.3 DM 1st Cognitive Walkthrough

The volunteers were provided with the following written instructions (immediately before the trial they were briefly introduced to the trial objectives by telephone):

Guidelines for Use of SOCIETIES Offsite Volunteer Community Trial Participants ‘IWantToHelp’.

This is the scenario for your trial.

- There has been a disaster.
- You have responded to the “IWantToHelp” call on social media (Facebook or Twitter).
- We are assuming that SOCIETIES – a platform for social computing which you use - has learned your preference for working in teams.
- SOCIETIES has also learned that you have a free slot in your calendar for 2 hours on today, and it infers you are likely to spend browsing the web.
- SOCIETIES has identified that this time is potentially a contribution towards “cognitive surplus” that could be put to good use.
- You, along with others, have been invited to participate in a focused remote volunteering exercise to assist fieldworkers in the recent disaster.
- You have shared data about your personal skills and experience with SOCIETIES, as you trust it will manage this information safely and privately. This data will be used to help match fieldworkers’ requests with volunteers’ skills and experience, where possible.
- SOCIETIES has learned that you work well in teams and have a preference to collaborate, so you have been automatically(!) selected to be a participant of an offsite team for this exercise.
- SOCIETIES has orchestrated the offsite volunteer communities according to the following factors: availability, skills, experience, preference to work in teams, and languages.
- You are tasked to try to answer the tasks posted by the disaster fieldworkers in the “IWantToHelp” tool as quickly, accurately and thoroughly as possible.

Three Tools

You will have two main tools to collaborate with your team to manage the tasks assigned to your group:

- “IWantToHelp” – a request and answer interface,
- “YouAreNotAlone” – a chat tool to allow you to easily collaborate,
- A Pirate Pad which will provide a shared space for taking notes etc.

We recommend that you open at least two or three browser windows to access all three tools at the same time for the duration of the trial.

Please note that the order you login is important!

You need to first login to the “IWantToHelp” web application: http://213.133.100.232/societies/index.php
You must then login to this tool. To do this you must use the username and password provided to you by the trial organiser at the beginning of the trial. This same username and password must be used for all the tools.

Note that this password will only be viable for the duration of the trial.

Next go to User Settings and select your skills/tags from those available from the drop-down list. It is important to select all the skills that might be relevant as these will be used by SOCIETIES to match tasks to your profile.

The list of skills are:

1. computer
2. infrastructure
3. communication
4. internet
5. hospitals
6. translation
7. navigation
8. chemical
9. research
10. management

Please try and assign yourselves to at least (1, 'computer'), (2, 'infrastructure'), (7, 'navigation'), (9, 'research'), and at least two more. You need not be an in-depth expert in these fields.

You can then go to User Settings and assign an alias / nickname in the FirstName field. This name can be used in the “YouAreNotAlone” chat tool which you should log into next.

Please note that your lastname or organisation does not need to be listed for this trial.

So next login to the “YouAreNotAlone” chat tool:

http://157.159.160.188:8888/chat/ using your same SOCIETIES username and password as above.

You may then change your name using the link on the right - and it is recommended that you use the same alias (nickname) as you have used in the "IWantToHelp" tool.

There will be one main public chatroom.

You will also have access to those chatrooms associated with each of the skills that you have selected, which will in turn be linked to tags embedded with each of the requests.

Then go to the Pirate Pad web application:

https://etherpad.mozilla.org/tWpCRBZMoH and sign in using the same alias (nickname) as you have used in the "IWantToHelp" tool.

Divide and Conquer

It is recommended that you and your co-volunteers take the ‘divide and conquer’ approach, where two or three people agree to work on each task. You will be introduced to this process by the task leader, who will introduce themselves to you:

In this trial, we have pre-defined a task leader to your group. This person will take responsibility to coordinate the responses. In addition, they will help assign tags for subtask-questions. Use the
"IWantToHelp" chat tool, and pirate pad to discuss any other aspects of the collaboration. All chat transcripts and pirate pad notes will be saved for post-exercise analysis.

The task leader is also usually an experienced user who will be expected to give the other volunteers guidance and feedback on their responses. The fieldworkers who create the tasks will be active in the disaster management situation and will not be available to give feedback.

**Subtasks**

Tasks may need to be broken down into subtasks. We ask that you post these subtasks back into the “IWantToHelp” tool, using the agreed tags to allow it to be linked to the original request. Please try to close these subtask questions once they are answered.

**Synopsis**

It may be decided that a synopsis of all the research answers gathered in the subtasks, is required to facilitate the retrieval of the most relevant answer for the attention of the original request owner. The task leader will be responsible for seeing that this is done.

**Timing**

Time to start:
9:30 Irish summer time; 10:30 CEST.
30 Minutes for reviewing instructions and login.
90 minutes for the trial.
45 minutes to capture feedback after the trial.
A.4 DM Chat Logs

A.4.1 First Walkthrough

The chat messages from the first walkthrough are demonstrated as follows. The format of message is “(TIME) (USERNAME): MESSAGES”. Note that the messages from “ChatBot” are system notification. The numeric usernames are the anonymous users.

(2013.03.05 - 12:26:45) ChatBot: (390337) logs into the Chat.
(2013.03.05 - 12:26:47) ChatBot: (285002) has been logged out (Timeout).
(2013.03.05 - 13:44:05) ChatBot: user logs into the Chat.
(2013.03.05 - 13:44:07) ChatBot: (390337) has been logged out (Timeout).
(2013.03.05 - 13:45:09) user: hello everyone
(2013.03.05 - 13:49:00) user: hi i'm dingqi
(2013.03.05 - 13:49:04) ChatBot: (553627) logs into the Chat.
(2013.03.05 - 13:49:15) (911942): Hi this is Yiorgos
(2013.03.05 - 13:49:54) ChatBot: (330160) logs into the Chat.
(2013.03.05 - 13:49:58) ChatBot: (903999) logs into the Chat.
(2013.03.05 - 13:50:17) (903999): Hi this is Edel
(2013.03.05 - 13:50:56) (330160): Hi I am me
(2013.03.05 - 13:51:12) ChatBot: (180252) logs into the Chat.
(2013.03.05 - 13:51:19) (180252): This is patrick
(2013.03.05 - 13:51:21) (903999): hi you
(2013.03.05 - 13:51:26) (330160): so Mark = 330160
(2013.03.05 - 13:51:38) (903999): hello 330160 who are you?
(2013.03.05 - 13:51:41) (903999): oh mark
(2013.03.05 - 13:51:42) user: dingqi = user
(2013.03.05 - 13:51:45) (903999): ok
(2013.03.05 - 13:51:55) ChatBot: (911942) leaves the channel.
(2013.03.05 - 13:51:58) (330160): read above
(2013.03.05 - 13:52:01) ChatBot: (911942) enters the channel.
(2013.03.05 - 13:52:01) (180252): Patrick = 180252
(2013.03.05 - 13:52:38) ChatBot: user leaves the channel.
(2013.03.05 - 13:52:39) ChatBot: user enters the channel.
(2013.03.05 - 13:52:46) ChatBot: user leaves the channel.
(2013.03.05 - 13:52:47) ChatBot: user enters the channel.
(2013.03.05 - 13:52:55) (903999): hi
(2013.03.05 - 13:53:53) ChatBot: (553627) has been logged out (Timeout).
(2013.03.05 - 13:59:09) ChatBot: user leaves the channel.
(2013.03.05 - 13:59:11) ChatBot: user enters the channel.
(2013.03.05 - 14:05:44) (903999): Hi Jacqueline
(2013.03.05 - 14:05:50) (903999): Who are you here?
(2013.03.05 - 14:06:54) (903999): Muted
(2013.03.05 - 14:07:08) (180252): This is patrick. I have put in the request
(2013.03.05 - 14:07:23) (180252): So I will let the other four of you read the request!
(2013.03.05 - 14:07:46) (180252): Do you want me (patrick) to join as a volunteer?
(2013.03.05 - 14:08:03) (911942): Why was I able to see the request even though I was not logged in? (Yiorgos)
(2013.03.05 - 14:08:06) (180252): Which is unfair, since I posed the question ;-)
(2013.03.05 - 14:08:17) (180252): Requests are open to all to see
(2013.03.05 - 14:08:37) (903999): Anonymous users can see and respond to requests but not set them. AFAIK
(2013.03.05 - 14:08:45) (180252): yes
(2013.03.05 - 14:08:57) (911942): ok, thanks
(2013.03.05 - 14:10:01) (903999): Do we need to list subtasks somewhere first? Or just post them directly into tool?
(2013.03.05 - 14:10:30) (180252): Be creative !
(2013.03.05 - 14:12:36) (911942): So, should we start putting answers with no "central management" ?
(2013.03.05 - 14:14:23) (330160): 45 minutes gone and not a 'baby in the house washed yet'
(2013.03.05 - 14:18:33) (903999): Are there any more questions from the question provider? There will be more than one task in the trial. No?
(2013.03.05 - 14:18:44) (180252): We started at 14:07, that is 11 minutes ago, not 45!!
Yes, there will be more.

It is very hard to identify with numbers. I really would prefer names as handles.

Y: we can put our first name initial in front of what we are writing.

P: I have put in a new request.

I got the pop up!!!!

P: Just going to the toilet. Back in a moment.

Do we need someone to check the map directions?

How did you get the driving directions? What tool did you use?

(NB I would like to direct this at user 5)

user5 Y: googlemaps

D: I think we may need an ID to quickly distinguish tasks from each other.

How many people are in public hospitals in Singapore, include numbers of staff, patient estimated per hospital please?

Need someone to volunteer to work on this for next 10 minutes?

ANyone?

We need your contributions to the Cobalt task. If this is a CBRN situation, we might need to evacuate the whole Island.

are we still there?

user: please note that in the navigation request, some road is impassible.

How did you get the driving directions? What tool did you use?

user: D: I think we may need an ID to quickly distinguish tasks from each other.

How many people are in public hospitals in Singapore, include numbers of staff, patient estimated per hospital please?

Need someone to volunteer to work on this for next 10 minutes?

We need your contributions to the Cobalt task. If this is a CBRN situation, we might need to evacuate the whole Island.

are we still there?

user: please note that in the navigation request, some road is impassible.

How did you get the driving directions? What tool did you use?

Need someone to volunteer to work on this for next 10 minutes?
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A.4.2 Second Walkthrough

The chat messages from the second walkthrough are demonstrated as follows. The format of message is “(TIME) (USERNAME): MESSAGES”. Note that the messages from “ChatBot” are system notification.

Due to the large volume of the chat messages in the second walkthrough, we only demonstrate a snapshot of chat messages as follows:

(2013.03.05 - 13:21:07) ChatBot: (dingqi) enters the channel.
(2013.03.05 - 13:26:32) (Marko): where is the task?
(2013.03.05 - 13:26:44) ChatBot: (Eddie1) leaves the channel.
(2013.03.05 - 13:26:44) ChatBot: (Eddie1) enters the channel.
(2013.03.05 - 13:26:57) user3: It was deleted. See new one: http://213.133.100.232/societies/index.php?site=tickets_process&id=3
(2013.03.05 - 13:27:13) (Eddie1): So we need to focus on the question?
(2013.03.05 - 13:28:03) ChatBot: (Marko) has been logged out (Timeout).
(2013.03.05 - 13:28:04) ChatBot: user5 logs into the Chat.
(2013.03.05 - 13:28:23) user5: testing
(2013.03.05 - 13:28:37) (Marko): testing
(2013.03.05 - 13:31:07) (Eddie1): Should I copy the question here or is that a pain?
We need to know the location and approximate size of supermarkets in Singapore, and possibly other information that might be relevant (e.g. specialisation, building type, etc).

To organize your work, you might break your task down hierarchically into regions and create a request with each identified supermarket which you then process and annotate, perhaps, with images, names / phone number of contact persons, GPS coordinates, height asl.


Cold Storage is the second-largest supermarket chain in Singapore (source: https://en.wikipedia.org/wiki/Cold_Storage_(supermarket?)

Giant Hypermarket is a major supermarket and retailer chain in Singapore. Source wiki: https://en.wikipedia.org/wiki/Giant_Hypermarket

Marcket Place by Jasons is a chain supermarket in Singapore. Source wiki: https://en.wikipedia.org/wiki/Market_Place_by_Jasons


Sheng Siong. Source wiki: https://en.wikipedia.org/wiki/Sheng_Siong

Update: Create a new request to localize all giants.
A.4.3 Third Trial Phase

Due to the large volume of the chat messages in the third walkthrough, we only demonstrate a snapshot of chat messages as follows:

(request title: We need to know the location and approximate size of supermarkets in Singapore, and possibly other information that might be relevant (e.g. specialisation, building type, etc))
(2013.03.15 - 13:40:17) ChatBot: user4.societies.local@ict-societies.eu inserted answer: What chat room is associated with this task?
(request title: We need to know the location and approximate size of supermarkets in Singapore, and possibly other information that might be relevant (e.g. specialisation, building type, etc))
(2013.03.15 - 13:40:25) ChatBot: (Eddie1) leaves the channel.
(2013.03.15 - 13:40:25) ChatBot: (Eddie1) enters the channel.
(2013.03.15 - 13:40:48) ChatBot: user1.societies.local@ict-societies.eu requested help: Elevation of Singapore Changi Airport and handling bays
(2013.03.15 - 13:42:18) ChatBot: user3.societies.local@ict-societies.eu inserted answer: Other findings from the wiki list:
Isetan a Japanese department store:&nbsp;http://en.wikipedia.org/wiki/Isetan
Prime supermarket - no link found yet.
Shop N Save -&nbsp;no link found yet.
(request title: We need to know the location and approximate size of supermarkets in Singapore, and possibly other information that might be relevant (e.g. specialisation, building type, etc))
(2013.03.15 - 13:42:25) (Eddie1): It would be really handy to have a guide for how to divide up google maps into quadrants or smaller sections....

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Prime supermarket - no link found yet.
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(request title: We need to know the location and approximate size of supermarkets in Singapore, and possibly other information that might be relevant (e.g. specialisation, building type, etc))
(2013.03.15 - 13:42:25) (Eddie1): It would be really handy to have a guide for how to divide up google maps into quadrants or smaller sections....
The Maintenance of Religious Harmony Act ("MRHA") is a Singapore statute which, according to its long title, provides for the maintenance of religious harmony, for the establishment of a Presidential Council for Religious Harmony ("PCRH").

(request title: Caveats wrt ethnicity/religion etc.(2))

ChatBot: user1.societies.local@ict-societies.eu requested help: Teleports (2)

ChatBot: user2.societies.local@ict-societies.eu inserted answer: Singapore is a multi-racial country and the general language used for communication among the various races is English. Hence most of the time, people just say hello (yeah, in English).

(request title: Meeting formalities)

ChatBot: user1.societies.local@ict-societies.eu requested help: Teleports (2)

ChatBot: user3.societies.local@ict-societies.eu inserted answer: National Stadium...in Kallang,...but it's under construction...

Indoor stadium also in Kallang...capacity of 12000

ChatBot: user6.societies.local@ict-societies.eu inserted answer: 4 national languages: Mandarin, Malay, Tamil and English. For business and politics, English is the language of choice.

(request title: Meeting formalities)

ChatBot: user5.societies.local@ict-societies.eu requested help: Teleports (2)

ChatBot: user4.societies.local@ict-societies.eu inserted answer: Better cultural information:

Greetings will follow a strict protocol often based on both the ethnic origin and age of the person;

- Younger people or those who work in multi-national companies may have adopted the western concept of shaking hands with everyone, but this is not the case with older or more reserved Singaporeans;
- Ethnic Chinese shake hands. Their grasp is rather light although the handshake itself can be rather prolonged;
- Men and women may shake hands, although the woman must extend her hand first. Introductions are always done in order of age or status.

Between men, ethnic Malays shake hands;

Men and women do not traditionally shake hands, since Muslim men do not touch women in public;

Younger Malays may shake hands with foreign women, but it is more appropriate to use the "salaam" (bowing the head) greeting;

This is also the greeting to be used when two women meet;

Ethnic Indians shake hands with members of the same sex;

When being introduced to someone of the opposite sex, nodding the head and smiling is usually sufficient;

As with the other groups, the elderly or the person with the most status is introduced first.

Singaporeans are group dependent and rely on facial expression, tone of voice and posture to tell them what someone feels.

Singaporeans are very sensitive to retaining face in all aspects of their lives.

The elderly are always treated with the utmost respect and courtesy;

Even if you do not personally know the individual, you will be expected to give special consideration.

(request title: Meeting formalities)

ChatBot: user3.societies.local@ict-societies.eu requested help: Teleports (2)

ChatBot: user1.societies.local@ict-societies.eu inserted answer: The closest ones are:

- 20 Loyang Crescent, Singapore - close to the water, could be problematic http://www.encompass-m.com
- 5 Tampines Central, Singapore - would be my preference http://www.singtel.com
(request title: Teleports (2))
(2013.04.30 - 11:30:11) (expert1): Great list! Thanks user4!
A.5 DM Third Trial Phase Pirate Pad Snapshot

SOCIETIES DM Cognitive Walkthrough #3 - 30th April 2013

Do the users need to be given the train scenario as background context?

Just to let you know that experts will have access to here, but will interact mainly through the IwanttoHelp interface

Religious information:
Buddhism (33.3%)  
taboo of buddhism: killing any living being, most of them are vegetarian or Vegan
Islam (14.7%)

Taoism (10.9%)
Hinduism (5.1%)
Other religions (0.7%)  
Non-religious (17.0%)

Language:
Most Singaporeans are bilingual, mostly speaking English and another language. All inhabitants should be able to speak either English or Mandarin Chinese.

Ok Please input answers in to I WANT TO HELP tool. Thanks.

Also note that some users were waiting for permission/instructions to begin....

Feedback from the ground

Thanks all of you! We are getting into a good start!
The nature of the disaster is an earthquake.

We are experiencing issues with our satellite network here. very bad connectivity. So we appreciate concise responses.

We are having our first briefing with officials in about 45 minutes. Please can you try and consolidate the responses. Thanks. We would prefer to consolidate what we have at the moment and try and see what we can rely on.

IDP locations (draft before putting into tool)

National Stadium...in Kallang....but its under construction...
Indoor stadium also in kallang...capacity of 12000
ok. some users requesting direction in the chat tool :)  
Ok We need to finish up soon to collect feedback....  
Discover connect organise...

Summary of IDP Sites in Tool:  
I see multiple golf courses and camping sites situated around the central park.  
Considering the potential availability of drinking water and electricity, I would examine them as potential IDP camps.  
Given the ring road is intact, it could provide good access to all of these camps. (I'm not entirely sure where that assumption came from)

North West of Bikit Batok Road (Exit 34 off PIE, take TJE to Upper Setar Reservoir)  
Is approx 6 sq kilometers, or 6000000sq/m. given 20sq/m per person (red cross figures) that's approximately 300,000 souls

Singapore Island Country Club (Access via AYE then CTE and PIE, Exit 20) Beside Lower Pierce Reservoir  
1150000sq m or approx 50,000 souls

Poresia Golf and Country Club (West on the E3) 1250000sqm or approx 62500 Souls

Finding it hard to keep going. I'm flagging.
A.6 Disaster management: Focus group transcript

This appendix includes the transcript of the discussion in the focus group with Red Cross. The transcript is translated from Norwegian. With respect to the code of confidentiality, the participants are mentioned as P1, P2, P3 and P4.

1) How long have you contributed to the Help Corps at Red Cross, and what are your activities within the team?

P1: 4-5 years in the Norwegian Red Cross. Soon action leader. Have gone the ranks up. Currently team leader for search actions in Trondheim. Contributes to the technical part and to searching. Also steer boats. Takes part in everything except first aid and ambulance, mostly because of interests.

P2: In the Norwegian Red Cross since 1994. Have most experience in Corps connected to cities (or close to cities). Has worked long at the central level of the Norwegian Red Cross. Worked with how the rescue system to be adapted from small to large search actions. Is action leader in Trondheim today. There are several action leaders in Trondheim. A shift scheme for assigning first efforts: the responsible leader team must be sober for 7 days in 24 hours; they can be called on short notice. Rescue actions are the most critical: one should be out of the house in 20 minutes. Search actions require more resources and people, and take more time. Mostly people are out in action within one hour. A rescue action is an action where the location is quite well defined but not accurate; it may require some search before finding the exact location. A search action requires scanning a large area. The organization of this kind of action requires a lot of experience.

P3: The action is initiated through the emergency medical communications centre (in Norwegian AMK). Police is the “customer”.

P2: We are the 4th "Rescue agency." We are no agency, but in practice we are. We do things fire, ambulance and police are not enough to do.

P3: 2.5 years in the Norwegian Red Cross. I am operation manager. This has a slightly different meaning in Trondheim than elsewhere in the country: I am responsible in actions in a greater extent. I work with the daily operation of the corps. I contribute the emergency team (according to the shift scheme). I drive ambulance and steer boat.

P4: 9 years in the Norwegian Red Cross. Have gone the ranks up and participate in the shift scheme in Trondheim. In addition, I am ICT advisor for a corps in [a small city]. Tis means advice for network issues, map solutions and other technical solutions. I also work on development projects whose results will hopefully be used in the Red Cross. For example, tracking people with mobile. Initially I contributed in [small city], so I have experience from small and big corps (15 vs. 105). I am action leader in the emergency team and in ICT leader in [small city].

2) Can you tell about the last operation or training you were involved in?

P2: A typical action has two dimensions: 1) solves the action, 2) means/resources you need to solve it. There are many variations between different corps, but there is a basis methodology that goes again: 1) collect information, 2) evaluate information, 3) select a scenario in a category (search actions require most support; rescue actions not as much), 3) implement. There are operational, coordination and tactical questions. And finally logistical questions. One can have an optimal strategy, but one should also implement it optimally in order to succeed. You have to use resources appropriately. And this solved well without digital aids, but there is plenty double work and certainly there are many things for which you can use digital aids. Then in reality: systems do not work, or they do not work when you take them in use, the interfaces are difficult to use. Maybe the worst is lack of access to map data. The system can be perfect but without data, it stops.

P3: We can talk about how we roll out the campaign.

P2: I will give you documentation that describes this here. A summary of best practice.

P3: In short, the police decide that they need a search action and that they should contact the Red Cross. We get a call through our district. The district contacts the action leader. The action leader sends an UMS.
P2: **UMS** stands for Unified Messaging System – a product from Voice Broadcast. You can enter text and convert to a voice message, or read a voice message. There is a distribution centre that can send the message to up to 50000 within an hour.

P3: The message is sent as a call to all who are on an approved list. It saves 2-3 hours work. The message comes immediately. Then you meet as fast as you can. The action leader is in the forefront and the other rescuers meet him.

P2. **What is special in Trondheim is that we have a dedicated role. It is a role-based organization. One can have multiple roles depending on experience.** It creates a quite unique coordination.

P3: You have an action leader who has mobilized and the action team that is right behind him with fixed roles. They are ahead and move to the field. Along the way they plan. Ideally, the plan is ready when the other rescuers come to the site. And they disappear in the search field.

P2: There is always a need for a meeting place. Describing a meeting place is something that you should have great control over. I travel out in advance. There are only one or two persons who wait for the remaining people, gather them and tell them where to go. So, all have to go through the deposit? (office) to obtain information before driving to the site. **Having an application that you can enter information and distribute anyone instantly wherever you are in the race.** For example, if you drive a car and have already the necessary equipment in the car, you could consider to drive directly to the site. **Parallelization.** All bottlenecks should be removed. The more information, the right and condensed information you have, the more you are able to handle in an appropriate way.

P3: And it is integrated with maps...

P2: ...navigation equipment, Facebook feeds and whatever. The main thing is that this information comes up on time so you avoid driving to a place for being sent forward to a site.

P1: Today if someone is already in the car and wants to meet directly, the information should either be provided in the initial voice message (UMS) or <... P2: there may be 50 people ...>. Sometimes we also send a text message with the meeting point after the initial voice message.

*Is it the same system?*

P2: **The same system for following-up.** Voice message first, and text message afterwards. But it is not optimal. **If all information can be gathered in one place, one can avoid to use multiple clients, an SMS client and then another client. This brings tremendous efficiency.**

P3: Especially when sitting in a car ... <latter> ... it is not be legal ... There's something about information overload. And when you're stressed. When the pulse rises immediately. It is best that you use the same application, and that you do not need to push several buttons.

P2: **And then it's important that you get the information you need depending on your role.** If you have access to a full activity log and see the whole history, then you begin to look for info that is relevant to you. And then you follow all the time: is there something new? is there something for me? **And then it is not the missing person or the equipment that is in focus, it is the App that gets focus.** It is very dangerous, and it is a basic motivation for not using equipment. If we can gather focus, then, we do not use equipment.

*When you send message, do you send to a specific person?*

P2: Yes, to a list a of lot of people. This is a flat notification.

*The first notification, but afterwards?*

P2: Then it goes to the same people. We have no selection process. It is possible in the interface to send to all those who have said that they will participate, but it is so cumbersome. It is not done and it's a classic example that we have a desire to not bother those who said that they could not come, but we harass them because the interface is poor.

...

P2: General applications are very unsuitable for rescue services. **Tailoring and context are essential for success.**

P1: In addition they [general applications] are very locked. Internet explorer ... <laugh>
P2: and it must be the correct version ... This is a classic example. Intention is good and much work really well, but then we come to the part where all struggle. Then come all tailoring that reduces power. Just an example, with UMS we went from 45 minutes for alerting all to 3 minutes (before the leader called 5 people who themselves called 20-25 people...). It's the kind of killer App we are looking for: we can cut down the time consumption. Do not let the leader be a bottleneck.

Now we come to the point you start looking, what happens then?

P3: I have made a plan, it is the responsibility of the action leader. Then it is physical, 4 people go over the place shown on the map and start searching. You share the work between as many men as you have. Then they disappear in the field and they have the knowledge to solve the task.

Do you communicate?

P2: Through radio. What we need to share between management and crew, it is the task. What is to be done and who does it and what's next task. And it is available on the phone, when we have phone. Bandwidth is the challenge. What can we do to make it work even with very poor bandwidth? If we had wireless network everywhere in Norway today, then we would have had all these Apps, I think. 80-90% of the operations in time unit (i.e. involved people times duration) occur outside good coverage. We must take into account both low populated areas and high mountains where coverage is poor. It is clear that there are several actions in dense populated areas and we have pretty good coverage in many cases. If we have GPRS, then it is ok to send the text.

P3: By the way, what information should be shared: what are you looking for, what is their state, what you can expect, what's our plan [plan set by leaders], what equipment you have with you, do you have a car, is a snow scooter available, how long can you expect to be in the field...

P2: We have an order form with five points. Quality of assignment is dependent on the amount of information. As soon as you get over five orders, then it becomes overload again ... It may well be that it's okay to keep communication analogue. When you have to prioritize, if you need to choose between 2000 functions in an App ... or to install 200 services before you start the action ... also there is no network ... then I keep away from these things that I cannot use without network... Just because I know what happens...<laugh> But the five points order is important, and there are elements here, intelligence would call it: what basic things you need before you start searching.

P3: A concrete example, we are sitting on a course and UMS is used to send the message to 20 participants. It came out in packages of 4 and 4 via the mobile web. It was just a call. There was no room for more out of the mast. When you cannot send very much on that mast, it is one at a time.

P2: But we can continue with the process. An important aspect related to the action is the state. A planned task, assigned tasks and completed tasks. This is information the management needs to know ... How many tasks are in play, how many more do we need to produce, and so relationships: who does what. If all tasks are available, then you can rely that the team in the field will select the next task. If you put tasks in priority order.

What do you do today?

P2: Today it is a centralized allocation process that is controlled by the action management.

Then you use pen and paper?

P2: Yes. I can draw. [lag = team; nest: next; tildelt = assigned; i søk = under search; ferdig = done]
Figure A.2: Disaster management - Red Cross matrix for task allocation

P2: We take post-it notes, so we write team 1, 2, 3, 4 on the post-it notes and we post notes on the blackboard. If you type team number on the board, it is impractical if the action last 4-5 days, also 8-9 hours, and a team drops out and we replace by a new one. Also I who is planning needs to know who does what. I can add new tasks here (1st column) ... <draw notes: 1st team searches and has tasks waiting: there is a team that has no tasks and they are surely waiting>. You can use the visual to recognize a pattern and you get an overview quickly. It is what a coordinator need.

This is used for a search action?

A2: Yes, but this can be used in all cases. It could be the effort to allocate a large area with police. This is quite general. This is a resource allocation map. It is a matrix that helps to organize. It is "worth gold" for the Red Cross.

P1: We can tell you more. We sit in the CO trailer [commando trailer]. 3 pesons: leader (= action leader), the next leader and the communication leader. The action leader cooperates with the police, they define the big lines, where we start and what direction we are taking. The next leader works on detailed planning (handing out post-it notes, which team does what). The communication leader delivers the tasks. The next leader and he communication manager have the overview and track what is happening...

P3: ... and they move the post-it notes.

P2: This [drawing below] can be called a feature based model for action in the command area. Requirements, tasks, status, reports ... AL (action leader) looking over the NL (next leader) and SL (communication leader) jobs, the information flow is going as it should. If the flow is stops between NL and SL, there is a problem with the assignments. For example, an assignment is completed, some team does not report status, priority is set on action... The flow must go all the time.

You talked about the log, does it play any role here?

P2: There is a communication log and a tasklog. SL logs ... who has done what, position etc. The content is mainly a status. To optimize this out, you need almost no text.

You just need status: done / not done. You need to follow your matrix.

P2: Yes.

P1: We need a colour coding with 4 colours.

P2: If you have a system that supports the matrix, log can be generated automatically. And then you eventually add information/justification.
Figure A.2: Disaster management - Red Cross information flow

Can a team have several actions to do simultaneously? Then it is not enough with status done / not done.

P2: Today, they get a list of assignments we have planned so far. They are numbered 1 to N. We need to describe the assignment over radio. Radio is a shared resource. There would not be anything else than chatting if all assignments were described on the radio channel. You need to have in situ understanding of operation and it can be updated after you have gone to the field ("situation awareness"). It is best to download this through GPS. We draw a lot of polygons and number them, and then we give them to a GPS. Many more than a team can take alone. Then we tell the team to take polygon number 4.

P3: Then we must admit that tasks are assigned through oral communication today. “Go from there to there.”

P2: Yes, right. It is the most elementary, but time consuming and it works if you have 4-5 teams. If you have 30, so it will fall down. It is impossible to control 30 teams unless you make large polygons and number them. If I have 30 layers and a large crew, the worst is to create tasks that only take 15 minutes to complete. Because then you not do anything else than to assign and to receive status.

Is the AL or NL that define the tasks?

P2: In a small action, one person takes all roles. Then it is a mental task to coordinate. When there are 4-5 persons who coordinate, then there is interpretation ... The most effective action is that you are coordinating yourself. But it does not scale.

P2: <problem with pot-it notes that blow away ... laugh> In our case leaders are sitting in a trailer. Everything is in the head of SL that monitors where everybody is in the field.

What kind of task?

P3: You have personal equipment and a map. So I (AL) can say using coordinates on the map: go there, there is a trail, your mission is to scan it. It assumes that the person out there has the knowledge to solve the task.

If you find an injured person?

P2: Then the whole operation changes. First, it changes the pace. You started from an unknown situation to a clear situation. You get two things: save the person or evacuate him/her. When there is a resource, the red button, so everyone knows that the person is found. All can be prepared to help. If you are 7-8 miles away, you don’t. But if you are only 200 meters, you can prepare your mind to go there. If I'm not far away, I go there, I will not wait. <in short: ... It does not need to go through the leader, you do not have to wait for the leader to select who should go there>
If there are several people who are missing?

P3: In any case, people want to know that a discovery was done. An operation when you find out afterwards that it has gone one hour before you were informed, then...

P2: … one becomes less motivated the next time you are asked to join... It does not change anything at once, but it affects the capacity of the next operation...

If an action lasts long, several days?

P2: Then switch teams along the way. Thinking shift is important. Those who coordinate must replace people. It is important that a team can complete and that little reporting is needed. Change of action leadership does not necessarily coincide with the shift in the field. Certainly not. Operations in the field are continuous.

3) What communication and collaboration tools did you use then?

[Already answered]

4) How do you know the other members in an operation are doing? Is it important to know it?

[Already answered]

5) How is debriefing after an operation organised? Can you easily retrieved information about events that occurred?

P2: The log is used for it. We do not call it "debriefing" but a technical review. Debriefing is more related to the psychological, so it is more related to the experience, not the fact. To round off, one takes a tour for everyone to know what happened. AL tells why he has chosen this strategy. It is not a forum for feedback. Feedback can be provided in another setting.

You have no evaluation?

P2: Yes we do, but we do not do it in plenum, in a large group at 04:00 at night. A normal operation have what we call "defusing" or discussion afterwards.

P3: And it takes place at the lowest possible level [team level]

P2: And the leader has the responsibility to point out some people for further follow up. If there is a finding of a dead or strong injured person, this requires more work afterwards.

P2: Technical review can be a lot easier if there is a way to point out the important points. You can rewind in real time with positions. Typical step-to-step or chapter-to-chapter “this happened here”. It is the ultimate of what we want. Technical review is only to read. But when we evaluate, extract experience, evaluate equipment, improve, then correlation and network analysis are very important. So a system that has time stamps of activities can be extended to several things.

Collaboration: Focus on the functionality to create teams, add members and interact with other members.

6) The tools support the creation of teams and the assignment of people into teams. What do you think about that function?

We understand that the matrix is much worth.

P2: Yes the concept, but we may replace it with something else [the paper implementation]. A smart board would be ideal. Format, that you use the visual. Matrix is not a pure list, it is irreplaceable. The problem is that you cannot fit more than 20 teams per screen. But with today's phones it is very easy, it's just browsing. Or if you're on a big screen, you do this by scrolling so the display shows team 1-3, then you scroll...

[About allocation to teams]

P3: You get an UMS list of people who can join at once. Within my own corps I can point to each person, can say that he/she fits this position. If you need to select people from a list in an App, it goes too much time. I think that I would accept at the team level: team 1 does this, team 2 that...

P2: If you think parallelization. The Red Cross has a list of qualifications: what person can what. Of course there will always be a human evaluation. But having a system that suggest based on the UMS list a group composition. It may even take account who was been there the last time and if he/she was not the team
leader suggests it. It is entirely unproblematic. The fact that one can compose the teams within one hour. It would have been an advantage to have. But at least to know the status of who is coming and to "drag and drop" it out inside a group as a centralized process. We need that a leader can trust that the right people are in the teams.

That's interesting. There were questions 7! But you said you were different teams in Trondheim?

P3: Yes, you have 4 emergency teams. Each team is responsible for one week. It applies only to the leadership. To participate in the rescue, one has to go through a basic education. Afterwards, you can take an additional education, then you can get join this system. Then you have those who say they are willing to do extra. They can join the emergency group.

P2: It is a special force. There are those who are specifically interested and motivation is the most important, and so is the training. As they rise through the ranks and eventually fill all the roles. Emergency in an action are the leaders, but we just cover all roles from driver to first help... We are multi-artists.

P3: You register the various members in different groups with different qualifications. You may be eligible to be the communication manager for example. It is registered in the system. He/she has the expertise.

7) Would you prefer the system to automatically suggest teams (for example based on previous operations) or reuse previous team compositions? For example, if someone is lost in Bymarka, the system could suggest people with local knowledge.

[Already answered]

8) What do you think about using text messages for communication during operations?

Messages must be targeted. Avoid information overload.

P2: Yes, the only thing is the start until you know what kind of role you get, then it is flat. There is operational leadership at the top, and all the others who are on the way. In this phase, they need to select. Maybe someone can directly do to the area and start to search based on the little information we have. We have to have much more information than what we have today for selecting people based on capacity. But when we have gone over to the team structure is the action leadership and team leader who need to communicate. If they [team members] are going out to use their eyes and hear beep, beep, then they take the phone and touch it ... We want the crew out there to be concentrated and not disturbed. If they see everything that happens, it is not appropriate at crew level. We want them to focus on the missing person.

There is a need for more information in the leadership than are out in the field.

P2: It may be that the person in the field can see other things than the leadership. For the leader is a detail, but out in the field, this is a central information. <admiral paradox>

9) What do you think about being able to go through the messages and status updates exchanged during an operation?

During operation - not after

P2: For me, it's interesting if I must control myself. If something is not right, to find what's happened here. I have not seen that many have done it during operation. If you manage to organize the log down at the basis, so you can also add decision support. The important effect in a long term is improvement and learning. The main opposition is that you may lock the work processes. If the work process is wrong, then you can destroy the rescue service.

Is there anything procurement contracts on time?

P2: The police are going to get something out ... but not before 2018 ... <laugh> I think the rescue service will come first with the good systems.

Tangible interface: Focus on the smart jacket as an extension of the interface

10) What do you think about wearing a smart jacket that supports interaction with other rescuers?

To have other forms of interaction, is it a point?

P2: It's a point.

P1: It may be that you get a physical message that now you have to stop searching and listen to the message.
P2: The signals must be given priority. And discriminated. Not everyone get the same sound. People do not bother to change…. Context is critical. The system must have an understanding of context. If the team has a new action it must warn the teal leader. Otherwise, if the police have received new information that changes the whole thing ... The system must have an understanding of the context of the participants.

11) In what we have shown to you the jacket only display information to the user. What if the jacket was also collecting information about you? For example, location, pulse and stress level.

P2: We have it for location today. We use APRS: convert location data to analog, and the other side we have a modem ... View aprs.no. And then we have tracking. See http://tracking1.nrkh.net or http://tracking2.nrkh.net . Then you see the Red Cross activities.

P2: Live tracking of position, it is implemented and it will be standard. There is only matter of time.

Another type of information is stress

P2: Stress, I would say yes. But it depends if members want. Privacy Policy. If it is so that members can themselves to choose whether they want to give them and who they want to share them. And we have an implementation that ensures that the data is real. It is clear that fatigue affects vision ability. Not least, if you can provide feedback red, yellow, green. Something about the crew as a whole. After 5-6 hours so you know you might want to replace 80% of people. At one point, I know that I may need 50 new people for the crew.

P1: When a team leader says that now we have a cup of coffee, you know it's time to change ... <laugh>

P2: Yes it is interesting from an operational point of view, but for to be implement fairly, then you have to ensure privacy. It is possible to be progress-oriented and show that you can balance privacy and operational needs.

P3: In general we are not interested to look at the individual. We want to see our team.

P2: It should be difficult to identify individuals afterwards.

P3: Data lies with the team leader. It is him who should know about the members. The action leader knows about the team, not about the individuals in the team.

P2: But I think that if the team leader shall know that I am tired, it is an infringement of privacy. I am deprived of all opportunity to manage my own appearance. So I am not a free man anymore. Some will refuse to be monitored by a jacket. I would have received back the jacket back with all the gadgets torn out of it. I think that there is nothing to do with generation...

P2. Another example: One at work, with 120 hear tbeat in a resting state... How will the system know that it is normal... Also the team leader can see who is tired... Technology should be used for things we humans are bad at.

But the problem is that one can overestimate their own ability ... Have you had the misfortune of personnel?

P2: Yes, but rarely in operation, it is more in the training setting. This is where you are selecting. You are observing behaviour. I have experienced only once in operation, not in Trondheim. Once in 20 years.

12) In what we have shown to you, the software is downloaded and installed within a click, and the jacket is connected overusing a QR code. What do you think about this way of connecting the jacket to you phone?

P1: Rather. In Trondheim all will manage it.

P2: Technology freak increases upward (leadership), the ground level reflects the society’s use of technology.

13) In what we have shown the jacket is shared in a team. Would you prefer to be comfortable two select specific rescuers it is shared with, e.g. a coordinator, a person with a particular role such as a doctor.

Are there situations where you draw other people into - not just those who are trained?

P3: Yes, rescue dogs.

P2: Yes, and all other voluntary organizations. For ex. Norwegian People's Aid.
Yes, all these are trained. What about the population in general?

P2: Spontaneously volunteering, some call it disorganized volunteering, I call them independent volunteering... So they meet spontaneously and dissolved afterwards. It is a phenomenon that we have seen some resurgence but there has been little since the Sigrid case. There are dependent on resourceful people around the missing person.

P2: To bring in people who have no training in the system is very relevant. When we have thousand persons at our door, what can we do to make them better to solve the action. It may correspond some help to search method: now you use this method, click. You can read more and get a quick review of what it means.

Explain the trial with volunteer in SOCIETIES.

P2: It is very relevant and it would be wrong of the rescue service to not have such initiative. There is a value in it, but the challenge is quality...

P2: <in short- Good experience in the Sigrid case where spatial data came in and people used an App to report.>

14) You have now the chance to give advices to the persons that wish to create the tools? What are your advices?

   a) Give one reason why we should NOT pursue this work

P4: Do not lose focus

P3: The app is only for us, it should not be general ... Maybe there is a need for such a special App for us that cannot be sold to other [rescue services].

P2: Technology choices. You should try to make the technology as accessible as possible. We are looking at what form of communication we choose to use. I think that we have to go over for Peer to Peer. No server-client. If there is a central node, then it is the death for rescue services. Qualcomm has made an example of something ... AllJoyn is open source. see https://www.alljoyn.org

P1: Agree with P2P. It happens also in Skistua[hill close to the city of Trondheim] that we lose coverage. If you collect 100 persons then and you lose coverage, it does not work. It is possible to set up a wireless router, but what happens if you are in the woods if you lose your network or if the phone runs out of power. You must be fully charged phone when you get the action, how many?

   b) Give one reason why we should pursue this work

P4: efficiency. Exploiting information sharing

P3: Anything that makes information flow more easily to a reasonable level. Information is in your channel, it is accurate and comes immediately.

P2: Get parallelized tasks. We must use the tools that people use in everyday life. We are 10 years after. We have to play around with the old technology.

P1: Bring your own device. Use the one you have in your pocket. No special equipment. 90% have it available.

15) We want you to help us to evaluate the concept. Is there anything we have missed in this session? Is there anything you wanted to say and that you had not the opportunity to say?

P3: What do you do when you lose approximately 25% of the system? What does the system do? If you run two systems?

P2: Much solved with P2P. But it creates a lot of problems with deployment. API contract should be stable. Also have application able to handle different versions. But for the user it's just a flat. What lies behind it is absolutely completely irrelevant.

P2: We cannot have two thousand functions. Absolutely 2-3 features that make you 10-15% better. At another point we have to go over and trust the new technology. We might there one day, but we are a long way yet. The phone here, if I use the active stand 7-8 hours use. This is where the jacket can enter. That one has several places one can receive data.
P3: If one thinks of the Home Guard, outfitting the soldier with all sorts of thing, and half part of weight for what the soldier carries comes from battery...

P2: Drone technology is also a point that could be included in an App like this. Police have been given a mandate and started something there. With drone technology, you can get an overview picture right on your phone. When you're on the field you can get information streamed to your phone. It can be very important. We are developing an App called RescueMe which you can click a link that sends geo-location and report the position back to us. It is an example of a process which will simplify a lot for us in search actions.
A.7 Disaster management: Planning game observations

This appendix presents the events that occurred during the planning game at the Norwegian Red Cross in Trondheim. The events are presented in a chronological order. The planning games lasted around 2.5 hours.

- Preparation of the planning game: The CO trailer (commando trailer) is set up. The trailer contains all equipment needed by the action leader team as well as the equipment that will be distributed to the field team leaders. Radio antennas are set up. Note that in the case of the game, the trailer is not moved to the location of the incident. The set up is done before notification of a new action is received.

- The action leader team is notified about an incident and meet at the CO trailer. In this case the roles action leader, next leader and communication leader were played by three different members.

- The action leader selects a map (paper), opens it on the operation desk and pastes a plastic foil on the region of investigation. In the mean time, using a PC, the next leader types a text message using the UMS system “A 75 years old person is reported missing from his domicile <address>”. He selects a list among predefined member lists and send the message to the list.

- The members in that list receive a voice message on their mobile phones. They can select between four options: Repeat message, I am coming immediately, I will come later, I cannot participate.

- The action leader starts planning the action. He suggests to search in an area within 300 meters from the man’s house. This choice is based on statistics (persons in that age range are often found close to their domicile). As long as they do not know more about the behavior of the missing person, statistics determine the strategy.

- The action leader draws a circle on the map (plastic foil) and asks the next leader to draw plots on the digital map. For each plot, the next leader writes a post-it note. The notes represent the search tasks to be assigned to the teams.

- In the meanwhile, the answers from the members are collected by the communication leader who writes down the names of the participants on an action member list. 14 names are collected rapidly.

- The next leader and communication leader decide to form four teams. The communication leader has a good knowledge of members, and selects members to the four teams. For each team, he fills a form with name of leader and members.

- A police representative visits the CO trailer. The action leader presents the status and the strategy. The police have found that the man was wearing a blue shirt, but there is no information about outdoor clothes. The man also used to go around by bike. Although the latter information tends to indicate that the man can have left the area around the house, the action leader does not change strategy. There is no precise indication about where the man could have gone, so statistics still prevail.

- The first field team leader arrives. He writes down on a post-it the name of the members.

- The next leader selects a plot for investigation for the team and sets a post-it on the organization matrix (see Annex A.7). He also lasts down the geo-positions of all plots on a GPS terminal that is given to the field team leader. Then he prints the map for him. There is no paper in the printer and its takes some minutes fixing this. Then the print job fails due to wrong format, the action leader explains the next leader how to proceed. The field team leader gets the map of all plots, so that the next task (searching another plot) can be easily communicated.

- The field team leader exits the CO trailer and waits for the arrival of the members of his team.

- Two other team leaders arrive afterwards. Similarly they get a paper map and a GPS terminal and are assigned to a first plot.

- The number of members joining is increasing. The communication leader who writes down the names of the participants on an action member list.

- The police representative is again visiting. He has new information: the bicycle of the man was found near the river. The action leader asks the communication leader about the number of people on the
member lists. How many people? Are there people who can steer a boat? There are now enough people, so that the initial teams can pursue search around the house. Remaining teams that have not yet been assigned a task are reorganized. A team is assigned to search by boat. Two persons are assigned to observation from two different bridges. Two teams are assigned for search along the banks of the river.

- The communication leader informs the other team leaders. The communication leader registers all communication events in a communication log.
- The action leader asks the communication leader to ask for boat support in Malvik, a commune in the neighborhood. The communication leader does so.
- The field team leaders arrive afterwards and are assigned to the tasks. The next leader sets up post-it to the organization matrix.
- The communication leader receives a confirmation from the Malvik team. They are on their way by boat.
- The police representative is again visiting. He explains the action leader that they have asked the dog rescue organization (a Norwegian volunteer organization that train and provide dogs for search actions) to send two teams on the banks of the river. The vegetation is dense along the river and the terrain is steep in some areas. Dogs will facilitate the search. The Red Cross teams should interrupt their tasks and wait for the dogs. The action leader asks the communication leader to warn the team. He does so contacting teams leaders through radio.
- The Malvik team contacts the CO trailer (the communication leader): they have run out of fuel. The communication leader informs the action team. The action leader asks for their position: they are close to the city. A new team leader arrives in the CO trailer. He has a car so the action leader decides to send him to the boat. The communication leader asks the Malvik team to row to land. They cannot, they have forgotten the oars… The action leader calls the rescue boat. He asks again for position. The communication leader does so, but he gets feedback that a passing boat has helped them and is towing them to a fuel point.
- [The situation is a bit chaotic] Some team leaders are still waiting for a task outside the CO trailer…
- The other boat team has now put the boat on flow. They inform they are starting the action upstream as decided. They are however uncertain how far they should search. The action leader and next leader suggest the stadium. The boat team leader cannot find a stadium on his map. After some confusion, they manage to provide the location.
- The Malvik team is now operative. The action leader tells the communication leader to ask them to search from the bridge near the Ila church upstream.
- A team leader who was waiting for a task entered the CO trailer… His question is interrupted by a message from the Malvik team.
- The police representative is again visiting.
- The Malvik team has seen a body drifting. The communication leader asks them their position. They are about 400 meter downstream the Stavne bridge. The communication leader asks to keep track of the body. He also contacts the other boat team [they are searching upstream from the bridge].
- The boat team finds the body. The police representative needs the location where the boat can disembark the body and meet the ambulance. The action leader selects a position and asks the communication leader to transmit it to the boat team leader [Again the situation is a bit chaotic].
- [SINTEF was not allowed to participate to the session following the game that was dedicated to the evaluation of the leader team, in particular that of the action leader.]
### A.8 Enterprise Participatory Demonstration Tasks

The following is the text given to the enterprise trial participants during the participatory demonstration session for SOCIETIES’ first prototype trial.

*Please complete the following tasks to familiarize yourself with SOCIETIES applications. As you attempt the tasks, please add answers/comments:*

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Answers/Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Discovering Friends</strong></td>
<td></td>
</tr>
<tr>
<td>25. How many suggested friends are indicated to have existing social network connections with you?</td>
<td></td>
</tr>
<tr>
<td>26. Send a friend request to someone you have an existing social network connection with</td>
<td></td>
</tr>
<tr>
<td>27. Accept a friend request if you receive one</td>
<td></td>
</tr>
<tr>
<td>28. Review Suggested Friends list. Note changes</td>
<td></td>
</tr>
<tr>
<td>29. Review friends list. Note changes.</td>
<td></td>
</tr>
<tr>
<td>30. Note any observations.</td>
<td></td>
</tr>
<tr>
<td><strong>Discovering Communities</strong></td>
<td></td>
</tr>
<tr>
<td>31. Use the Suggested Communities list to find a community to join</td>
<td></td>
</tr>
<tr>
<td>32. Review and accept its privacy policy</td>
<td></td>
</tr>
<tr>
<td>33. After joining the community – review the members list</td>
<td></td>
</tr>
<tr>
<td>34. Read messages in activity feed</td>
<td></td>
</tr>
<tr>
<td>35. Post a message to its activity feed</td>
<td></td>
</tr>
<tr>
<td><strong>Creating Communities</strong></td>
<td></td>
</tr>
<tr>
<td>36. Attempt to create a new Community, adding a name, category, description and a privacy level</td>
<td></td>
</tr>
<tr>
<td>37. Review your created community and its members</td>
<td></td>
</tr>
<tr>
<td>38. Share an App/Service with your community</td>
<td></td>
</tr>
<tr>
<td>39. Review the activity feed of your community and post a message</td>
<td></td>
</tr>
<tr>
<td>40. Review your community’s privacy policy</td>
<td></td>
</tr>
<tr>
<td><strong>Using Apps</strong></td>
<td></td>
</tr>
</tbody>
</table>
41. Review the list of available Cloud services and Apps

42. Select the ‘Context Aware Wall’ app and launch it

43. When launched, click on the Go button and review the list of available communities

44. Select a community and click ‘Set’

45. Note your zone location at the top of the view

46. Post a message

47. Take a photo and post it

48. Note other messages or photos posted by other users

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A.8.1  Treasure Trail

A.8.1.1  SETUP Tasks:

1. Create a ‘IOL Workshop’ community
2. Create ‘Sustainability’ community
3. Create ‘Cloud computing’ community
4. Leave messages in CAW @ breakout zone (‘IOL Workshop’ community)
   a. ‘Join the Sustainability Community’
   b. ‘Then go to the Showcase zone’
   c. ‘Then select this community in this app’
5. Post ‘cloud computing’ photos in CAW @ showcase when in ‘Sustainability’ community
6. Post messages in CAW also:
   a. ‘Join community named in photo’
   b. ‘Check its activity feed’
7. Post activity feed messages in ‘Cloud computing’ community
   a. ‘Go to presentation zone’
   b. ‘Launch Context Aware Wall’
   c. ‘Check out message’
8. Post message in CAW @ presentation (cloud computing community)
   a. ‘Well done for completing this task!’
   b. ‘Now time for lunch:)’

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A.8.1.2  Outline Description of Planned Interactions for Treasure Hunt Game

Trial Manager
Leaves a message in the context aware wall in Breakout Zone Conference Community.
“Join the Discussion Group Community”
“Go to the showcase zone”

Users discover the Discussion Group community.
Join the Discussion Group Community.
Go to Showcase Area. Get notification that they have entered the SZ. Accept the privacy policy of that zone.
Then go to CAW.
Select the Discussion Group Community.
See the image and the text “join the community shown in the image”

Go to SOCIETIES app.
Then see suggested communities.
See “cloud computing”.
Request to join.
Then they are members of the cloud computing community.

Leave a message in the cloud computing activity feed.
(Ck activity feed below in description of the community.)
“Go to presentation zone.” “Then launch context aware app.” “Select Cloud Computing activity.”

Go to presentation zone.
Check for popup notification. Click to accept the privacy policy.
Then you get another notification at the top, check.
Drag down bar to see notification details.
Click ok.
Read message in activity feed for cloud computing.
“Lunch is now ready”.

A.8.1.3 Considerations

How do we capture feedback from this activity?
It will be mostly verbal questions and asides.
Should users be invited to ‘play with it’ sending each other messages as well?

A.8.2 The Apprentice – Outline script

A.8.2.1 Paul

Paul is the Human Resources Manager of SuperCloud.
He is attending the conference with the goal of attracting a talented person to work for SuperCloud. He is also interested in identifying potential project partners for a new proposal. He is specifically interested in discovering and connecting with people with an interest in working on a Future Internet project with a focus on the architectural integration of the Internet of Things.

He wants to set up a members only community “IoT in the Future Internet”, so he can discover all the people interested in this topic. He will actively monitor this community (activity feed). Once it has a few members, he then is hoping to leave a cookie crumb trail to lure prospective employees to a secret meeting.

A.8.2.2 Steve

Steve has been employed by Rainmaker Technologies as a Senior Computer Scientist for many years. He has come to the conference to find out more about what is happening in the Internet of Things. He has a long established relationship with his boss Michael, and they are connection on Link’d’In and FourSquare.

However lately, he has been considering making a career move and is also secretly interested in discovering if there are any companies at the conference, who might be hiring someone to work in the area the Internet of Things. He has recently done some novel research in this area which when published was well received, and he is hoping to employ the SOCIETIES applications to raise his status, during the conference. He will be looking out for communities with interests specific to him to join, but he doesn’t want his boss, Michael to
know he is thinking of leaving Rainmaker Technologies. He intends to brag about his recent journal paper to
this community using the activity feed, and share as much personal information as he can without revealing
for which company he currently works.

A.8.2.3  Tim

Tim is a young entrepreneur. He has recently set up a company called M’OhJoey - (Mobile Objects Held
Jointly in Online and offline Existence), based around a framework for smart mobile applications he has
developed for the Internet of Things that run in the Cloud. He plans to sell mobile application templates that
use his framework in the cloud using a SAAS business model. However he has cash-flow problems his
company needs further investment or it will not survive.

His priority goal is to seek immediate investment for M’OhJoey. However Tim is a realist and he also has a
secondary goal to evaluate any other potentially interesting employment opportunities especially those
relating to the Internet of Things.

He wants to advertise his company on any available noticeboards, or communities. He also wants to be in the
right place for any interesting offers.

A.8.2.4  Challenge for participants

How would you use SOCIETIES to play out this scenario?

Write a list of action points for each character.
A.9 Enterprise Trial – Raw “Post-its” Feedback

A.9.1 SOCIETIES platform app:
- There is a click under Activity Feed for users which have joined that doesn’t work
- “Privacy” – “Symbolic level” location is vague and could have any level of resolution. Perhaps app should explain what this means for this app
- Can a malicious user share an application that can potentially damage the systems of his community? If yes, how we can avoid this?
- Suggested community shows a community that I created, then failed when I tried to join it
- No push on community number increase until I click on my communities again
- Security warning on about Redmine
- Privacy list is not a multi selection. If you select something that wasn’t requested you can still join
- Friends already accepted reappear in Suggested list
- Are Suggested friends most relevant first? Not stated anywhere
- Swiping notifications from notifier does not dismiss notification in app
- Listing of permissions for community is unintuitive: shows drop down list of radio buttons
- Filter results doesn’t show the filter you have previously selected
- The Disclaimer Privacy Terms of use is not functional – too small to click
- Friends request showed -2
- What happens if you “Decide Later”? 

A.9.2 Context Aware Wall app:
- Breakdown zone – typing not intuitive, not sure how to submit text
- It could be useful to have Send button on right of text box. It is difficult to find it the first time
- Crashed when I was running app and scrolled message into view
- Continuous time-lapsed photo might be desirable. Ideal for sounds recorded
- On logon, preferences would be desirable. Maybe context help
- Nice to have: instant join button for community
- Input of message is not obvious
- No facility to join/search a CIS
- “Its not consistent” – camera bug. “I’d like to have it blackscreened”
- Refresh CISs list after joining new CIS
- I would prefer not to have the real image in the background, it wastes battery
- Can it not use augmented reality
- App such as British Red Cross (try to mimic). Allow you to learn and be tested on the app as you use it

A.9.3 Networking Zone app:
- Apache Tomcat error 404 error web. Closes app when error occurs
- Attendee list st Conference versus people currently in the room
- When I find John using this app how do I then send him a message?
- Business card of user: not obvious why I can’t see details of user (because they hadn’t shared)
- People in same room a relevance indicator
- I can see that there is a John in the same room but how do I know who he is?
- “I’m bored in this room, who is in the other room?” Room-by-room relevance
- No indicator that I shared extra info with another user
- I don’t know could I have the same interactions on this Intro screen as in the secondary zone specific screen
- When you click on map why can you not see the message wall (Context Aware Wall) and attendees at the same time?
- I would like to see room by room relevance
- Niall commented on sharing: it isn’t obvious that relevance richness is as a result of sharing more, but this isn’t obvious
- How do I know that I have really shared info with John, there are no cues in the interface when I go back to the main Breakout zone interface?
- I saw a profile and then later it has been updated but it is not obvious to me from list
- Do I have to be in the same zone in order to view their profile?
- Why do I see different options when viewing Tim & John’s profile?
- It would be better to see sharing info greyed out than for it not to be at all visible. I didn’t know if there was something wrong.
- When I cam back out I had no idea I shared anything with any user
- I don’t know if this relevancy in the same room
- Integrate the two apps so that I can see who is in the CAW app
- Can you look up data from the day before?
- It is painful but I understand
- Oh it is share your interests, I didn’t get that!
- Messaging: not integrating; who/who not joined with
- Joining groups
- Similar journey
- Presenter
- In the 2nd game: why not have everything in the same app? Going back and forth is cumbersome

A.9.4 Comments on the script:
- Damian: script seems out of sequence with what was on the Context Aware Wall app

A.9.5 Questions for Discussion:
- Did you know what you were sharing at all times?
- You can join a community if a user invites you or you can create a new one and invite already friends How about search and join a community where you do not have friends?

A.9.6 Technical issues:
- What are the challenges to integrate the Soc app in an already deployed middleware (eg a home energy management system)?
- I was using the wrong Back button
- Sniffer problem: location changed randomly
- Ping on User6
A.9.7 Known bugs:

- The Back button doesn’t work in the app
A.10 1st Student Developer Questionnaire

Question 1:
“At the induction meeting on the 14th January you were presented with an overview of the project platform and information relating to the development of services... At that time how obvious was the platform innovation and novelty to you?”

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<tr>
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Question 2:
“Did the presentations give you sufficient information about the platform?”

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<td>More than sufficient</td>
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<tr>
<td>Very complex</td>
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<td>Average</td>
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Question 3:
“What was your initial impression of the platform from a conceptual perspective?”

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<td></td>
</tr>
<tr>
<td>Average</td>
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Question 4:
“Since the induction meeting you have been brainstorming ideas for services. Has there been a sense of fun at these brainstorming sessions?”

<table>
<thead>
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<td>Very good fun</td>
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</tr>
<tr>
<td>4</td>
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</tr>
<tr>
<td>Average</td>
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Question 5:
“If you have had an opportunity to look at the service developer documentation, what are your initial thoughts?”

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</tr>
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<td>Average</td>
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**Question 6:**

“How comfortable do you feel using the Redmine Discussion Boards?”

<table>
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<th>4</th>
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</table>
A.11 2nd Student Developer Questionnaire

Question 1:
“How responsive have we been to fixing the Redmine tickets that you have issued?”

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<tr>
<td>5</td>
<td>4.4</td>
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Question 2:
“How successful have we been in resolving your Redmine problems?”

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<tr>
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<tbody>
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<tr>
<td>5</td>
<td>3.8</td>
<td>(5)</td>
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Question 3:
“Now that you have had time to familiarise yourself with the platform and specify your 3rd party service, how novel or innovative do you now find the APIs presented by the platform?”

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<td>(0)</td>
</tr>
<tr>
<td>5</td>
<td>3.2</td>
<td>(6)</td>
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</tbody>
</table>

Question 4:
“Do you feel that the actual APIs fully expose the concepts presented by the platform?”

<table>
<thead>
<tr>
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</thead>
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<tr>
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<tr>
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<td>(2)</td>
</tr>
<tr>
<td>5</td>
<td>3.6</td>
<td>(5)</td>
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</table>

Question 5:
“How innovative do you find your 3rd party service?”

<table>
<thead>
<tr>
<th>Rating</th>
<th>Average</th>
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</tr>
</thead>
<tbody>
<tr>
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<td>4</td>
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<td>(0)</td>
</tr>
<tr>
<td>5</td>
<td>3</td>
<td>(6)</td>
</tr>
</tbody>
</table>

Question 6:
“Was the innovation of your service stimulated in any way by the innovation presented by the platform?”
### Question 7:
“Do you feel that you would need the platform innovations to actually build your service or would you be able to build your service using other tools?”

<table>
<thead>
<tr>
<th>Not stimulated</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>Very stimulated</th>
<th>Rating Average</th>
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<td>0.0% (0)</td>
<td>3.2</td>
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</table>

### Question 8:
“Have you been able to make any reflections/opinions to your diary/log entries?”

<table>
<thead>
<tr>
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<th>2</th>
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<th>4</th>
<th>Very reflective</th>
<th>Rating Average</th>
<th>Rating Count</th>
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<tbody>
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<td>16.7% (1)</td>
<td>16.7% (1)</td>
<td>33.3% (2)</td>
<td>16.7% (1)</td>
<td>3.2</td>
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</table>
A.12 Final Student Developer Questionnaire

Question 1:
“I was well informed about the SOCIETIES EU FP7 project objectives in relation to this Third Party Developer project”

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Not applicable</th>
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<th>Rating Count</th>
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<td>0.0% (0)</td>
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</table>

Question 2:
“The innovative potential of the SOCIETIES third party developer environment presented during the initial introduction was immediately apparent”

<table>
<thead>
<tr>
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<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
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<th>Rating Average</th>
<th>Rating Count</th>
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</table>

Question 3:
“The SOCIETIES third party developer environment lived up to my expectations from the initial introduction”

<table>
<thead>
<tr>
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<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Not applicable</th>
<th>Rating Average</th>
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Question 4:
“The SOCIETIES third party developer group project was enjoyable”

<table>
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<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Not applicable</th>
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</table>

Question 5:
“The SOCIETIES third party developer group project was relevant and beneficial to me”

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<thead>
<tr>
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<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Not applicable</th>
<th>Rating Average</th>
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</table>

Question 6:
“The SOCIETIES third party developer documentation for set up and support worked well for me”
### Question 7:
“The SOCIETIES support tools (i.e. Redmine, etc) worked well for me”

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Not applicable</th>
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<th>Rating Count</th>
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<td>0.0% (0)</td>
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</table>

### Question 8:
“The SOCIETIES third party developer platform APIs worked well for me”

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<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
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<th>Strongly agree</th>
<th>Not applicable</th>
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<td>40.0% (2)</td>
<td>0.0% (0)</td>
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</tbody>
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### Question 9:
“The status of all of the platform APIs was communicated to me at the commencement of this exercise, and any updates to same, continued to be clearly communicated to me during the lifecycle of the group project”

<table>
<thead>
<tr>
<th>Strongly disagree</th>
<th>Disagree</th>
<th>Neither agree nor disagree</th>
<th>Agree</th>
<th>Strongly agree</th>
<th>Not applicable</th>
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### Question 10:
“The SOCIETIES third party developer environment stimulated and supported us to create innovative social features in our applications”

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### Question 11:
“The SOCIETIES third party developer environment stimulated and supported us to create innovative pervasive features in our applications”

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Question 12:
“The lack of availability of some of the proposed platform APIs inhibited us from developing the innovative social applications that we designed”

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Question 13:
“The lack of availability of some of the proposed platform APIs inhibited us from developing the innovative pervasive applications that we designed”

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Question 14:
“Participating in the project augmented my knowledge of social and pervasive technologies”

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Question 15:
“Please list the technologies used to develop your service (i.e. Java, HTML5, etc):”
- Java, Java servlets, RMI, HTML5, CSS3, Dropbox API, Git hub, REST API
- Java, Google Drive API, Java SFTP Library
- Java, Sockets
- Java
- HTML, Java, Java RMI, CSS3, CURL, Java servlets

Question 16:
“The group aspect of the project was particularly rewarding”

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Question 17:
“The response times and feedback to problems encountered was adequate”
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**Question 18:**
“The duration given to complete the group project was adequate”

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**Question 19:**
“I was satisfied that I achieved my objectives in the exercise”

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**Question 20:**
“I was satisfied with the level of support that I received”

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**Question 21:**
“This was as a highly innovative experience”

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**Question 22:**
“It was an innovative experience because of the features provided by the platform”

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Question 23:
“I would be interested in using the platform in the future”

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A.13 Weekly Student Reports

A.13.1 1st Report

The students are still brainstorming about the types of services they want to use but they were wondering if they can use mobile phones so we explained that it's not recommended to use the android release as it's not stable. This lead to an idea of using GPS from the phone so we suggested that they write a service that acts as a context source. So one of the services will be retrieving GPS coordinates off the phone and inserting them into the Context Broker using the Context Source Management component. There are already examples of other services that do similar things so they can look at those and duplicate some of the work.

They enquired about whether the platform exposes functionality to identify and create CISs from the 3p service POV. One of the ideas was to write a service such as Shazam (http://www.shazam.com/) that recognises the music the user listens to and tries to create CISs based on users listening to the same genre.

On the technical side, they did suggest that they had problems with the documentation and the guidelines: There is not one guideline that says how to install everything and run it. The guidelines are split into many files that tell you what to do. This makes it difficult as the order in which things have to be done is not clear. For example, they mentioned that they followed the guidelines to install everything but there was no guideline to tell them how to run societies and see what it looks like. The previous guidelines stop at the end of the installation.

We discussed the use of openfire and the fact that it's not easy to understand why it's needed and how it's linked to the SOCIETIES platform. So, we suggested to run Openfire and the domain-authority on the server at all times so they can use that and not worry about it. It is not ideal but it would be easier for them. We will have to explain how to register their CSS nodes with the domain authority.

One of the students installed everything and then realised that he couldn't find the release. The guidelines for installing everything suggested installing virgo from the eclipse website and not using the release from our dropbox folder. He read in the guidelines that JARs need to be dropped in the pickup folder of the virgo installation to start the societies platform. This is out dated. They shouldn't have been given these instructions. They should have been told to download the release and just start the container using the startup scripts.

A.13.2 2nd Report

From the previous brainstorming sessions the following services have been proposed:

4. Group Collaboration Tool

The service will allow students to organise meetings, create CISs for a specific purpose and use the Activity Feed to post notifications to the CIS members for upcoming meetings and other important information. The service will also make use of git/svn and dropbox API to enhance the collaboration nature of the service.

5. Adaptive Music Playlists

The service will be able to recognise genres of the music that the user listens to and will feed this information to the profile of the user.

The service will share this information with friends, CISs or publicly if the user wishes to do so. Additionally, it will also make use of the UserActionMonitor to allow the platform to learn context-aware music preferences as well as community music preferences.

6. Location-Aware Content Delivery
The service will be available on android connected to a backend service running on the CSS. It will consume profile information from the platform and leverage the GoogleMaps API to display relevant information to the user on the map.

Technical observations:
- One of the students has started setting up their development environment in eclipse and got to the point where he started creating a service but could not use the API as the maven JARs are not loaded into the .m2 repository. Therefore, we need a kind of script to add them to the local maven repository.
- Eliza suggested to the students that they can use the HWU openfire and Domain authority node so I will provide them with the appropriate xc.properties file.

A.13.3 3rd Report

Discussed use of SOCIETIES innovations:
- Pro-activity: discussed how services can be proactively started. As the platform does not support pro-activity in service management and services are automatically started in Virgo, the discussion focused on proactively starting specific activities in the 3p service.
- Context: discussed how some context data can be used to change the behaviour of the 3p services as well as how these can be used in the personalisation and learning of preferences for the services.
- CIS: follow-up from last week's questions about services creating CISs and using the CIS activity feed.

3p service progress:
- The students are now split into two groups of 3.
- One group has made considerable progress with their architecture and has considered options for deployment of their service components. They have also prepared the development environment for starting implementation. The Redmine tickets have been submitted by this group.

Redmine use:
- A few tickets have been submitted regarding CIS creation and CIS activity feed usage and Virgo setup.
- Students complained that some answers were not explanatory (CIS activity feed related.
- Students were asking why some of the guidelines on Redmine are marked as "(to be moved to this Wiki)" and said they couldn't access these links (permission denied). It was explained to them that these should not have been made available to them as they are guidelines for platform developers and not 3p service developers. (The Wiki contents are too much maybe? Is it confusing to them?)

A.13.4 4th Report

Group 1: Collaborative Tool service

Service description: The Collaborative tool service allows users that work in collaborative projects to organise their work such as their shared tasks, schedules, files etc. The service offers integration with DropBox, github and Google Drive. A group of users joins the same CIS and leverages CIS activityfeed functionality to notify other members of the progress of the work and to post notifications about events, tasks, github commits, Dropbox uploads.

The service has three parts:
- A web-app that runs separately from the SOCIETIES platform and provides integration with external services such as Dropbox, Github and GoogleDrive.
- A SOCIETIES 3p server service. This is hosted on the CSS that acts as the CIS administrator. It is responsible for hosting the shared information and administering and the group session.

- A SOCIETIES 3p client service. The CIS member CSSs download the service from the CIS. The client part of the service uses information from the platform such as context (user location, status), preferences and the CIS activity feed to share information with other CIS members.

Service description has been finalised, architecture has also been finalised. The skeleton of the web-app part of the service which runs separately from the SOCIETIES platform has also been completed.

Some issues with the Redmine tickets:

- [https://redmine.ict-societies.eu/issues/1765](https://redmine.ict-societies.eu/issues/1765) - We provided the solution during the meeting.
- [https://redmine.ict-societies.eu/issues/1742](https://redmine.ict-societies.eu/issues/1742) - There is still a question mark over this.

Only one of the three students has installed the platform and has started to create a SOCIETIES 3rd party service but the other two are going to do it this week.

Group 2: The service doesn’t have a name yet, it is a content analysis service

This service provides three different functionalities:
- RSS Feeds contents analysis and filtering based on interests and context.
- Music analysis and inference of music interests for CSSs. Demonstrates learning of music preferences in different contexts.
- Social Events service that runs on android and leverages context information such as location and interests and preferences to recommend interesting events the user might want to attend.

The Architecture has not been finalised but some parts of the services have been worked on already. The group will be meeting this week to discuss integration with the SOCIETIES platform as well as start setting up their development environment for integration with SOCIETIES.

A.13.5 5th Report

Group 1 (Collaboration tool):
- Issues with installing 3p service on CSS node – privacy policy location, fixed also with help from Sancho
- Working on integrating their service with Dropbox, SVN and Google Drive
- They had taken a privacy policy from an example service, because they hadn’t read the appropriate wiki page on how to create privacy policies, they were shown how to create them.
- Currently on track to deliver by week 11.
- They were asked to produce logs but the wiki page that explains how to create Virgo logs for DEBUG level was not linked from the main wiki page.

Some preliminary reports on their experience so far:
- Pre-setup Virgo useful
- Getting their service to build frustrating
- Getting their service to run frustrating
- If they didn’t need to use SOCIETIES for their course, they wouldn’t have bothered to fix all the problems
Group 2 (music thingy… not named yet):
- Currently working on the music identification algorithm and music recommendations
- Didn’t try to install the platform yet but they were going to do that on Wednesday (27th February).
- Only one student completed the survey

Group 2 were going to talk about the deployment of their service on the SOCIETIES platform but they still hadn’t installed the platform so they spent the time in the labs installing it and getting it to run. They used Redmine to create tickets and ask questions when they ran into problems while trying to run the platform. They had the platform running on Wednesday afternoon.

A.13.6 6th Report

Management of Redmine tickets from the student trial:
- Group 1 are planning to finish on week 11 (i.e. week starting 18th March)
- Group 2 are a bit delayed and will probably be issuing tickets during these two weeks
- Send tickets maybe directly to developers list, but this will probably not be managed and might be ad hoc in terms of responses back from the consortium. Flag to the developers in advance, picked up at the Developer weekly audio conference next week

Group 2 are currently having a problem running the platform.

A.13.7 7th Report

Redmine issues:
- Progress, tickets are being answered promptly.
- Some are still unsolved. Specifically tickets about running the platform.

Group1 (Collab tool):
- Specific questions about sharing services.

Group2 (Social Explorer - content filtering service based on RSS feeds):
- Questions about the SOCIETIES architecture. Why does the user have their own container? Mentioned the privacy aspects and the ability of users to run their own SOCIETIES environment without relying on big corporations to host SOCIETIES.
- The basic discussion was about deployment of their service and how this is influenced by the current SOCIETIES architecture.

As groups, 1 is ahead of 2, 2 hadn't read the documentation and went ahead with their design and implementation. So the discussion this week has been around this. It is obvious from the Redmine tickets generated by this group that they hadn't read the documentation. Group dynamics coming into play here. 4 out of 6 turned up for the induction day; did this have any impact on this dynamic? No overlap between the design concept of the two groups.

Status of 3rd party implementation/testing/deployment: working as individuals in the main, but they do meet as groups for integration - but this is different for each group.
A.13.8 8th Report

Redmine and other issues:
- 2 tickets outstanding – one from 3 days ago which has been assigned to Sancho
- Question about OSGi – a dependency JAR is not being copied to the Virgo directory. Need to discuss whether it’s better to package the JARs inside the deployable JAR, or have them separately.
- Problem with service init-method not returning/exiting – the service still starts correctly but the web interface hangs.

Headings suggestions for final group report:
- Platform (including thoughts on the innovations)
- Documentation (availability, coverage, accuracy)
- Support (Thoughts on using Redmine for support, quality of responses)

Headings suggestions for individual report:
- Ideas followed individually, but which didn’t make it into final system/group report
- How innovative their service is
- Has SOCIETIES helped or hindered
A.14 Final Student Group Report

Design and Code Group Project Masters Group 2013

This document covers our general ideas on the platform robustness, the platform’s innovations. It also comments on the support we received and what else could be improved from the perspective of a third party developer.

General

All of us took a long time to understand what the SOCIETIES platform was. This misunderstanding meant we took a long time to get going and get something working. Once we did get under way, there always seemed to be something wrong, there was not a single SOCIETIES related task that was undertaken without at least one problem. Our lack of experience with the platform combined with the lack of desired explanation from the documentation resulted in a lot of time spent in getting the platform to run and less time for actual service development.

Platform robustness

The platform was difficult to work with initially, due to complications encountered while trying to understand the platform from a third party developer’s perspective. All of us had a lack of knowledge in the technologies used in the platform (Virgo, osgi, Maven, Tomcat) and this majorly hindered our progress while we learned how to use these technologies. We were also tied to using release 0.5. We were told that a ‘new’ release should be ready before the end of our course, which promised lots of new features and critical bug fixes. Some of us weren’t sure whether to wait or continue on with designing and coding our third party services. The situation of working between software releases was not the best position to be in especially in the limited 12 week time frame we had.

The platform was very temperamental and caused a lot of problems for us as third party developers. The platform would work one day and then crash the next without obvious reason. This was something that baffled us and also seem to baffle the people giving support via the ticket system. SOCIETIES is designed to support both Windows and Linux, which sometimes causes stability issues. We all had very different problems because of the different operating system choices and there was still an apparent favour towards windows because there were some simple errors in the Linux start-up scripts and setup instructions.

Once the platform was running, it ran smoothly with easily integrated logging for determining where any issues were. Most problems usually arise from new developers lacking knowledge necessary for the platform’s use which is maybe where we were going wrong.

There was an issue that when there is a mistake in the spring xml files, the whole Virgo container falls over. This had a negative effect on a third party service developers opinion of the platforms robustness. This is also not ideal especially when trying to develop your first service and have no experience with spring and OSGI. Restarting the Virgo container every time you make a mistake is not ideal especially given the time the container takes to restart. Virgo also sometimes fails to start because it complains that some files already exist. We would be surprised if many open source developers would be willing to put up with this.
However that said once your Spring and OSGI configuration files are correct and the platform is running, it seems to be robust enough to not fall over when mistakes are made in the code.

**Platform Innovations**

Tackling the issue of privacy is a difficult task in the world of social media. Whether the platform actually addresses this issue or just puts the users in control of their own security measures is probably something else to think about. User controlled security is never going to work as an average user does not know how to secure their data, which is why Google and Facebook are successful; they offer an (almost) care free social media experience.

We do not believe that letting users run their own servers is better. It is asking for a lot of problems, an average user of social media have nowhere near enough experience to be able to manage it. If it was then to be transferred to some outside companies we are in exact the same situation as we have now with Facebook. It is our opinion that the likely outcome of using external companies to run a user’s Virgo container for them would be that said companies (Google) say something like: “for us to run your Virgo container, you need this third party service and you need to accept this privacy policy” (total speculation of course, but based on Google’s data-hoarding nature).

A similar concept has been researched by Debian foundation and they come up with something called FreedomBox, it seems much better, not only providing the software but also hardware to run it on.

The platform is difficult to understand from an outsiders perspective and after much discussion, we all understood how the platform worked and the idea behind the architecture. We feel that the innovative aspects of the platform would be easier to appreciate if the platform’s capabilities, as well as the function of the platform as a whole, were presented in as clear, concise and understandable a manner as possible. The innovations the SOCIETIES platform provides, for example learning context of user actions or grouping users based on common interest do come across to the third party developers as innovative. The social features to assist with sharing resources and allowing users to specify which resources be made available on what level seems very useful for group working environments. It is the opinion of the third party developers involved in this project that there is potentially a large variety of unique and useful features available as part of the SOCIETIES platform. However that being said the aspects of client distribution, client server communication don't appear very innovative. As an example an app can be downloaded from the Google Play store that communicates with a server, others can download the same app and communicate with me. SOCIETIES does provide a generic method of communication on top of this without somebody having to write the client/server comms code, but it is the same idea.

We feel the support for user applications within the system and the idea of an unified social media application is a good one. However, the system can be so difficult to use at current that we feel it somewhat stifles the innovative aspects of the project. With greater usability SOCIETIES could be a much superior platform.

**Platform Improvements**

A widely agreed difficulty we had with SOCIETIES was relating to its general usability, despite SOCIETIES ambitions as an easily-usable Open-Source platform the experience we had with the platform was unfortunately radically different.

One particular improvement we all feel SOCIETIES could sorely benefit from would be a significant effort in improving overall usability of the system. Issues that particularly plagued us
regarding this were the lack of debug functionalities readily available to users of the system. Using logging in the system was a very time-consuming and frustrating activity, forcing us to come out of coding in order to observe and comprehend the logs provided. What might be a possible improvement in this regard would be to set up an Eclipse project that could have a debugger attached, whilst we are not entirely sure this would be possible it would certainly be very helpful if it were and most certainly worth looking into.

Another major issue we had with system usability was the seeming lack of stability of the Virgo platform, often times requiring multiple restarts to get the system into a working state, not being experts in using Virgo we cannot say for sure whether this is a bug with SOCIETIES or Virgo itself but it is one worth looking into.

Lastly, although SOCIETIES did become easier to use as time went along, the learning curve of the system was shockingly steep for a project that has ambitions of being adopted by the Open Source community. Improvements we could suggest regarding this would be: an overhaul and standardisation of the available wiki documentation; a single available package to ease the otherwise currently very complicated installation process; and lastly, pre-configured options for various models of development to both ease initial start-up and system redesign.

**Support**

Overall we really like Redmine and had a good experience using it. Although Redmine is more of a platform development tool than a third party development tool. The ticketing system was really useful where tickets were directed to those who could answer them and the other developers were always replying to our tickets in good time. A reply would be received on the same day or the day after.

The wiki detailed every aspect of setting up SOCIETIES and how to include its features into a service. That said, some problems were encountered even after following the wiki instructions exactly. This needed a ticket to conclude the issue. This would suggest that something was either missing from the instructions or from the Release builds given.

The local support we received at Heriot-Watt University was also very useful, with the onsite SOCIETIES developers were available and willing to help third party developers with both the setup of the platform and the integration of our third party services.
A.15 Final Individual Student Reports

Student 1 Report

Personal Achievements

As part of our SOCIETIES project I had a number of personal achievements and shared achievements alongside my team mate Student 2.

SOCIETIES Platform Integration

In this group project we were given the opportunity to work with SOCIETIES, an in development EU funded project for building an architecture for pervasive and social computing.

Due to SOCIETIES being still currently in development, we had to contend with a number of issues with platform stability and completion as well as a constantly altering work environment and incomplete documentation. Whilst this was quite the challenge it was also a very much experience, forcing us to ask questions, investigate and improvise over the course of the project rather than have everything handed to us on a silver platter. I believe that my acquired ability to deal with incomplete documentation and perform personal investigation into functionality which was not sufficiently documented is one which may well serve me very well in future and I was glad for a chance to gain it in a controlled environment.

Despite my criticism of the documentation itself however, the personal support we were given by the team was invaluable and really encouraged me to be inquisitive and ask questions more readily in future when I cannot comprehend some code or work around a particular issue entirely on my own steam.

Working as a team

To aid in the development of our SOCIETIES application myself and Student 2 had to ensure we could work in such a way that was non-disruptive to one another. In order to do this best we spent a good period of time in planning, ensuring we both had an equal understanding of how the system would work with many of the most common interfaces being designed with both of us on the same computer writing them. In addition we also made use of GitHub for code storage to ensure any changes were effectively communicated and shared as well.

Plugin system

In order to work most effectively we decided to use a plugins architecture for our GitHub and Dropbox connectors with each making use of a common interface for pulling changes and building them into a similarly generic message format. This design choice allows the system to be easily expanded with possible additional connectors (SVN, Google Drive, GoogleDocs, Microsoft SkyDrive etc.)

WebApp Development

In developing our SOCIETIES WebApp we used a combination of various technologies such as: Java Servlets, Java RMI, JavaScript, HTML and CSS3. Working with all of these technologies in a fully integrated environment allowed me to not only improve my skill with each of them individually but also when using them as part of a larger whole.

Personal / Miscellaneous
Over the course of the development of our SOCIETIES service I believe I developed personal skills in working as a team, timekeeping and organisation and am overall very glad for the opportunity to work and contribute on such a project.

What did I do that was innovative?

In terms of project innovation, we part developed a group based project management system which was capable of polling various version control and storage systems through plug-ins. In addition, we made usage of innovations provided by SOCIETIES itself (such as personalisation and the activity feed) to facilitate this system.

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Student 2 Report

During the course of the 5th year group project, I worked in a team with Student 1 and 6. We developed the Group Collaboration tool for software projects. In this report I will outline my personal achievements and contributions to the project followed by my personal thoughts on the innovativeness of my ideas.

Personal Achievements

Right at the very start of this project, from week one I began installing the societies combined DA and user virgo node on my home PC so that I could develop this while home. To get it working I was in communication with developers from the SOCIETIES project by creating tickets. The tickets were in relation to some of the documentation on red mine. As per the tickets I created some of the documents were conflicting.

After getting the development environment setup, I started work on trying to get a simple 3p-service installed on the platform. I had issues with this, because there were parent POM references in the sample POM that was in the documentation. After a few other problems, which eventually were solved, the test 3p-service was installed on the platform.

Once I had a service installing I began implementing it, using dependency injection features to get a list of the CIS’s my service was attached to so I could post on the activity feed. However when I did that I discovered that I couldn’t use any of the SOCIETIES schema classes, as they weren’t being exported from the main societies jar. Meaning that I couldn’t work on any of the SOCIETIES functionality.

During this time I implemented the dropbox component, using the interface me and Student 1 designed. Setup a skeleton java servlet project, which rendered the HTML me and Student 1 designed and implemented the Java RMI component so that the webapp could communicate with the SOCIETIES 3p-service. It was good that I got to used these technologies (RMI, servlets) in this project, because I had never used them before, being had been meaning to look at them. The same can be said for Virgo, maven and spring +OSGi, although I had not previously even heard of any of them it was good to be exposed to them.

The ticket for the schema classes was eventually resolved, after some communication between me and the project which resulted in a change to the SOCIETIES Nexus server. So I carried on working on the SOCIETIES service, integrating the dropbox and git components into the service and making calls to the CIS Activity feed to put activities on the feed and get them off and pass them back the web server to be displayed via the RMI interface I created earlier.

The last part of the project was utilising the 3p-client architecture that SOCIETIES provides. The deployment of the 3p-client was not working for a long time. It took many tickets until eventually one of the SOCIETIES project developers realised that it was because I was using version 0.5, and the 3p-client architecture only
works in version 0.6. Luckily that same developer provided me with a workaround to get it to work on version 0.5. This allowed me to implement the personalisation bit and ultimately finish the project on time.

**Personal achievements summary (chronological order):**

- Installation of combined societies virgo node complete with maven, openfire and eclipse m2e
- Societies 3p-Service
  - Made use of activity feeds
- Java servlet skeleton
- RMI
- Societies 3p-Service
  - RMI integration
- Drop box connector
- Societies 3p-client
  - RMI integration
  - Personalisation manager
  - CIS activity feed reading

**Innovative**

The original idea of a service that groups people based on interest in a software development project could be seen as innovative. The next thing is perhaps utilising the CIS activity feed as not only a record of the project progress, but also as a mechanism for distributing the activates to the clients.

Envisaging that the personalisation manager could be used to determine what type of project member (programmer, project manager,... ) was using the tool and refining the content based on that.

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**Student 3 Report**

**Support, online resources and development**

Societies online resources seem to be adequate. I like the idea of having extensive wiki page, divided into different sub-topics. I found Redmine ticket system very useful. I know it is widely used in commercial environment and it is great to see it being part of Societies. I found it easy to navigate, with clear definition of status, assignees and progress state / updates. Moreover, all the tickets that were issued either by myself or a my peers were answered in a timely fashion. The accuracy of the advice given was good, it is hard to pin point a specific cause of the problem in a distributed environment, that is set-up on various operating systems with different version of software components running.

I found knowledge sharing – wiki – part of the resources somehow unclear and confusing. It seemed as if it was put together in a rush. When trying to install the platform, I exactly followed all the steps and still didn’t manage to succeed (I know that the same happened to at least two other students). The guides contained errors (as others pointed out), there were many references to other guides / tutorials, it was lacking a definitive “how to...” user guide. I can not see the platform in its current state being able to be used by an outside developer. Each of us issued multiple tickets, we had great internal support from both Patrick and Elizabeth (whom we owe a big thank you) and we still struggled to get the service up and running. Most of the time was devoted towards getting the platform set-up, rather than developing our third party service.
Societies platform

Comparison to well established social media platforms (such as Facebook or Twitter) seems inevitable. I can understand that there was a privacy problem with these platforms. Users are no longer in possession of the data and have to rely on companies' policies. The bit that I struggle with is how is having distributed nodes owned by users going to help with that problem. One would hope that such sophisticated organism as European Union would be able to enforce appropriate handling of personal information and if that was not the case, should the effort not be made to change such situation? I don't own a personal server and don't think that average consumer of social media will either. And even if they did, the main reason people are so keen on services like Facebook or Gmail is because they are hassle free. I can't see Average Joe fiddling with his Virgo distribution, doing daily data backups, hot-swapping the data, maintaining balanced throughput. Broadband speed nowadays is rather good, but when it comes to upload speed it is still a bit to wish for, what would happen if I was to publish an HD video and a bunch of my friends would like to watch it and what would happen if a bunch of friends of friends would like to do the same...

This leads to the conclusion that no ordinary user would be able to operate the platform and it would have to be hosted by professional companies. Which is almost what we have now. Admittedly user would have a right to choose what host should look after user's data, but the privacy problem is much the same.

As a side note there are millions spent on energy efficient server technologies, the advance of low power general purpose graphic processing units, the big battle to shave of watts wherever it is possible; asking users to run servers on out of the shelf boxes, seems a bit against that ideology.

I also struggle to see innovation aspect of the platform. It is an implementation of OSGI system running Virgo paired up with Tomcat. The issue of privacy in digital world has been addressed by many. I find Richard Stallman's and the Debian foundation particularly interesting. They came up with a solution that not only involves software, but also a hardware component. FreedomBox seems to be tackling very much the same problems as the creators of Societies have identified and adds machine support as well.

Perhaps I am biased and/or not knowledgeable enough, and if such is the case I do apologise, but I struggle to see the benefit of Societies platform and my personal viewpoint is that the architecture design seems wrong.

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Student 4 Report

Personal achievements

By taking part in the Masters Group Project, I have had an opportunity to work on a large European project which has a number of partners. This has been an interesting experience as there is an international collaborative effort to progress this project. It is nice to see a number of companies working on a common task and, at least from the outside, seeming to agree on the path the project should take.

I have also had the opportunity to work in a group of students who have all completed professional Software Engineering internships at Edinburgh based companies. This was an exciting prospect as all of us are very driven people after experiencing project work at a graduate level. This was the case but the project that was asked of us caused us problems such as initial confusion of the current software system and some of the technologies used in this software system.
I have also had an opportunity to learn new development tools such as Maven and the Android SDK and also have an opportunity to relearn parts of the Java programming language that I had forgotten.

**Encountered Problems**

My initial misunderstanding of the platform and the implemented technologies was the main problem I encountered. I found the Maven commands quite cryptic since I was not used to it. I also didn’t understand how the platform interacted with the Virgo container. Once this had been cleared I could get on with the required work. The local support I received from Eliza and Patrick was outstanding. Without their help and feedback I probably would not have understood the platform or the technologies used in the required time frame.

We did discuss a list of available platform features and quickly glanced over a number of features that may or may not be implemented depending on release times and which version we would be using. This also caused some confusion because I was not sure which version to take advantage of.

Installing the platform was problematic. My group member's platform installed and ran perfectly well where mine complained and would not launch cleanly. This restricted us to one working SOCIETIES container to test our service.

I did all of my development and testing in a Linux environment. This had a number of different problems from my group members who were doing their development on Windows systems. I encountered start up script errors, missing environment variables and repository path problems which were all quickly rectified by some problem solving or issuing tickets via the ticketing system on the SOCIETIES redmine instance.

**Service Innovations**

My idea was to tie a common internet news reading protocol to the SOCIETIES platform. I offer a widely used service that takes advantage of the SOCIETIES platform by allowing users to collaborate in sharing news feeds.

If I could have somehow shoehorned more of my own interests into the service I was providing I may have found the project more exciting. The areas of web and social programming do not really interest me a great deal. I enjoy more low level, feature driven, embedded challenges which I can see performing some sort of real world task. The area of ubiquitous or pervasive computing does interest me to some degree as it is such a wide area but the pervasive resources available to us at the university consisted of RFID readers which seemed to be a complicated system to take advantage of.

**Given more time**

Given more time, I would have implemented a better demonstration where my service could have possibly been running on an actual mobile device instead of on the Android emulator. I would have also explored more of the SOCIETIES API if I had the time. Since I was sharing my time on SOCIETIES with 3 other courses at the University, there were a few short cuts and quick fixes that could have been worked on, streamlined and improved upon.

**Everything else**

It would have been more interesting to have a larger task to complete as an overall masters group which required more member management and tracking of individual work but what we came out with was worthwhile and fun (in the end). We sort of joked and discussed as a group that we would have liked 15 million Euros to see what we could come up with. Maybe this was a valid discussion because the platform does not feel like it had eaten through that much money to be in the state it is in currently. It is very
temperamental, working one moment and broken the next without obvious reason or cause. There needs to be serious work into the basic stability of the SOCIETIES platform before any third party developer will be willing to take it up and work with it. The constant issues we faced as a group took away from the joy of doing something together and I feel the quality of work could have been better if we were not faced with these issues.

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**Student 5 Report**

This report will cover my contributions and experience gained during my work with the SOCIETIES platform as part of the MEng Software Engineering Design and Code group project. This project involved having me set up and learn to understand the SOCIETIES platform and design a 3rd party service for it that would make use it's features for an innovative purpose.

**Working with the platform**

The project I designed was to use the SOCIETIES platform's context management and XMPP messaging between users to share music preferences and compile a list of music that would suit multiple parties. After discussing with the local support team it was decided that this could be done with either a CIS to associate the users together or by grouping the users as clients under a server. It was decided to use the client/server deployment strategy as the current level of CIS functionality did not allow for inviting members to a group, users would have to join a specific group for the service to collate their music taste data which would not be as realistic a user experience as having the server release automatically do this for the related clients.

For these specific tasks the wiki provided a great deal of help during the coding process, with the Java API providing plenty of information on the XMPP methods and interfaces, especially for sending messages and having a callback method waiting to receive. The wiki was also very helpful for setting up the platform for using multiple nodes and deploying my service as a server/client release model. Once this was set-up it was much easier to use the platform and try installing/debugging my service for it, although there were several new problems when switching to 0.6 and trying to activate/start my service. The local support was always on hand and quick to respond when these new problems arose however. The examples on the SOCIETIES github were also very helpful for showing SOCIETIES api code in action and showing potential uses/applications.

**Personal achievements**

Working on a solo project within a new platform that involved developing an understanding for several new technologies within a limited time-frame. This caused me to improve my ability to adapt quickly, research and plan how to work with unfamiliar aspects and form suitable queries for information that would provide enough useful input to get the most helpful and informative response.

In terms of group collaboration, while my service was done as a solo development, it was useful to have a team of developers working from the same starting point, encountering the same issues and reporting on them so that the rest of the team had access to the help relating to the common issues. This allowed for some indirect collaboration and cooperating with each other when attempting the journey through SOCIETIES set-up, installation and service initialisation.

**Innovation**
My idea for a service was based on existing work, such as the Shazam over-the-air music analysis tool and the Last FM recommended music radio tool. My service aimed to build on these existing tools by incorporating the SOCIETIES social/group aspects to create something that would provide the same feature set but aim at providing music that would appeal to a group of people. It would also allow them to provide feedback, add to their own music through the use of the app and allow the app to learn more about their taste based on their reaction to recommendations over time.

Conclusion

I feel that the SOCIETIES platform did cause several complications during set up and when attempting to integrate its features into existing code, it does provide a wide array of features that help promote innovation and improve existing ideas. Once more of these features were made available in the release distributions and if more time was allowed to let developers familiarise themselves with the technologies involved, it would be possible to produce much more complex and innovative services and establish a more complete, robust and polished version of them whilst making the most of the possibilities available.