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Deliverable D2.3
Elder-Spaces Platform Architecture

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Abstract:

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GLOSSARY

AAL	Ambient Assisted Living
BPML	Business Process Modelling Language
CET	Central European Time
CRUD	Create, Read, Update, Delete
ESB	Enterprise Service Bus
FTP	File Transfer Protocol
HTTP	Hypertext Transfer Protocol
JSON	JavaScript Object Notation
REST	REpresentational State Transfer
SMTP	Simple Mail Transfer Protocol
SOA	Service Oriented Architecture
SOAP	Simple Object Access Protocol
URL	Uniform Resource Identifier
WS-*	Set of Web Service Specifications
WSDL	Web Service Description Language
WSFL	Web Services Flow Language
XML	eXtensible Markup Language
XMLNS	eXtensible Markup Language NameSpace

Executive Summary

Deliverable D2.3 "Elder-Spaces Platform Architecture" comprises mainly the results of Task *T2.5* "*Modular and Extensible Architecture*" within Workpackage WP2 "Social Networking Services and Applications Specification".

It was extended after the project review in September to include content from previous tasks, extending the documentation previously delivered. Specifically:

- New user requirement trials were conducted and the results were integrated to the document and the design specifications of the platform.

  In both Hungary and Greece, new user trials were carried out. A total of 100 people over 55 in each country participated in the requirements process. The user mixture was representative with respect to age groups and gender.

  Users validated the colour scheme and draft UIs. They provided positive feedback to the presented functionality, particularly on the simplicity of the user interface and actions. It was fairly easy to understand and not complicated to follow. They emphasized the need to be able to adjust text size and colour contrast.

  Furthermore, they validated all selected functionalities and applications. They also expressed particular interest on applications and functionality related to photo sharing and exchanging of experiences.

  Finally, they were interested in the tabletop application, as they found it intriguing to directly interact with the application with no interfaces like a mouse or keyboard.

- Detailed information on the accessibility and usability framework is added to the deliverable. The introduction of WCAG Level AA has guided all UI restructure and functionality considerations.

- All user interface wireframes were revised. They are introduced in this deliverable, and an online functional version of the site is also available, demonstrating functionality and design concepts.

  Based on the initial input from the users and the guidelines from WCAG, we updated and redesigned the user interface. The result is now a complete draft of the entire site and not just parts of it. Over 40 web pages are defined and drafted, along with over dozen screens for the MS PixelSense application.

  This process was done in four repetitions where feedback from internal reviewers and users – in the last repetition – was incorporated to the design and enhancing it. Besides the actual web pages, a web guideline was also putted together to provide the necessary rules for any adjustments we might need to make during development.

- Besides the general platform architecture, a detailed technical specification of basic functionality and applications for both the web and the MS PixelSense systems are introduced.

All of the entities that are going to be used are clearly defined and their XML, JSON and ATOM representations are included in the appendix (API Appendix). Furthermore, we have a complete and detailed specification for all REST services that support web and tabletop functionality. These are 29 rest services with corresponding verbs (GET, POST, PUT), able to perform more than 50 functions as they were described in the use cases.

We have three appendix files, which accompany this document. In an effort to maintain size and coherence in this document, much of the technical specification has been edited out to separate files.

- ELDER-SPACES_BYTE_WP2_D2 3_Appendix_API_specification_v0.3_121203

  This is the file containing all details about the entities used in Elder-Spaces platform, their representations (XLM. JSON and ATOM) along with a detailed specification of all RESTful services. For each service, we present detailed information on its workings and parameters, use cases and examples.

- ELDER-SPACES_BYTE_WP2_D2 3_UI_Appendix_0.3_121203

  This file contains most of the UI wireframes. For each wireframe, there is also a short description of the elements it uses and available functionality.

- ELDER-SPACES_BYTE_WP2_D2 3_UI Guidelines

  This file illustrates the design guidelines for the web site. It has technical details on colour schemes, labels, icons and layout necessary for final implementation of the web pages.

1. Introduction

1.1 Overview

Deliverable D2.3 "Elder-Spaces Platform Architecture" comprises mainly the results of Task *T2.5* "*Modular and Extensible Architecture*" within Workpackage WP2 "Social Networking Services and Applications Specification".

It was extended after the project review in September to include content from previous tasks, extending the documentation previously delivered. Specifically:

From Workpackage WP1 "Requirements and Use Cases" it includes extra content for tasks:

- T1.4 "Users Segmentation and Selection". As requested, a series of user requirement sessions were carried out to improve on the initial limited number of end-users that participated in the requirements analysis phase. The methodology, descriptions of the sessions and results are included in this deliverable.

From Workpackage WP2 it includes extra content for tasks:

- T2.1 "Specification of User Interfaces, Cognitive Social Search and Personalization". New and extended interface wireframes along with more detailed specification of the Cognitive Social Search.
- T2.2 "Games and Events Management Specification". Additional specifications and improved UI wireframes for games and Events Management.
- T2.4 Structured Training and Lifelong Learning. New specifications and UI wireframes.

The purpose of this document is to provide the technical specification of the Elder-Spaces platform. As it was extended, it also provides content on user requirements, the user interface and specifications for the applications and functionalities that will be available through the platform.

The addition of this material to the initial document has resulted in a rather large deliverable. In order to maintain the document structure and improve the overall result, a number of appendixes are included, which present the technical details with respect to component specifications. This way, the reader is not encumbered with lengthy technical specifications, while reading the deliverable.

Chapter 2 contains the updated content related to requirements. It presents the methodology and findings of the new user requirement sessions that were carried out in Hungary and Greece.

Chapter 3 presents information on the technologies that are utilized by the platform architecture. This chapter aims in introducing the reader to the technologies that have been selected for development. It has been condensed in an attempt to reduce the size of the deliverable.

Chapter 4 provides an overview of the platform architecture and its main components. Emphasis is given in presenting an enhanced description on the workings of the Social Cognitive Recommendation service which is one of the innovations of the project.

Chapter 5 presents UML design diagrams that show different design aspects, providing a detailed specification of the platform.

Chapter 6 provides, in continuation from the design diagrams, all the necessary detailed specifications for the data entities, data exchange, and core API of the platform. Note that due to the size of the detailed specifications of the RESTful services, they are presented in the accompanying appendix file API Specification.

(ELDER-SPACES_BYTE_WP2_D2 3_Appendix_API_specification)

Chapter 7 is organized by functionality providing detailed specifications on the UI, provided functionality and technical specification for the implementation of the different services and applications. Aspects of accessibility are also covered here, in terms of the WCAG2.0 Level AA recommendations that the site will comply with, the testing of the compliance along with extensions and provisions made especially for this development.

The detailed UI wireframe specification is presented in the appendix file: UI Appendix (ELDER-SPACES_BYTE_WP2_D2 3_UI Appendix_specification)

Chapter 8 is dedicated to the Elder-Spaces Tabletop application. Overall design and specification is included, along with UI and functionality on all internal applications that are going to be provided.

Chapter 9 provides the conclusions of the deliverable.

1.2 Relation with other tasks and workpackages

Deliverable 2.3., as it was extended after the review, is based on the findings from WP1 and presents with more technical details the tasks performed at WP2 Social Networking Services and Applications Specification.

Furthermore, there is some of the work related to user specifications included in this deliverable, as the result of additional user trials. The findings were used for the design decisions made in this deliverable and all included specifications.

The specifications presented in the document and its related appendixes will be used for the development and testing tasks, that follow in workpackages WP3, WP4 and WP5. Additionally, this document sets the specifications for the accessibility and usability framework, which will be validated in WP6 Task T 6.3. “Platform, Services and Application Evaluation”.

2. Evaluation of Specifications

2.1 Methodology

The first part of the work with the end users took place with a small number of users which was indeed rather insufficient having limited results for the deduction of the appropriate end user requirements. The main reason which led into this result was the fact during that period of time the region of Trikala had really unprecedented bad weather conditions. It was difficult for the elderly even to go out of their homes for the basic needs like going to the supermarket. This occasion worsened the recruitment of the potential end users. For this reason, it was quite inefficient to deduct clear requirements. Apart from this, the lack of dissemination means also led to the small numbers of end users.

Nevertheless, it should not be disregarded that there was a plan even from the first phase that was not used in the appropriate manner leading to incomplete end user requirements.

2.1.1.1 Justification for further development

As a result the process of the user requirement evaluation was repeated in order to achieve more structured and complete conclusions using a more representative group of users. In this way, there were be a more practical way of deducting clear.

2.1.1.2 Fine tuning actions

In more practical terms, there was a combination of the questionnaires along with the organization of separate slots of open days. Knowing that this number of users was insufficient a second phase of meeting was conducted in order to deduct a more complete and stable view on user requirements concerning social networks targeted towards 55+ people. During the open days that were organized with the end users a maximum of 100 people was targeted.

2.1.1.3 Questionnaire (e-Trikala, SOTE)

SOTE has developed a 34 question paper and pencil questionnaire that was filled out by 100 Hungarian and 100 Greek users. The questionnaire was accepted by all the Elder-Spaces project partners. Besides the general data, the questionnaire focuses on the ICT, internet and social networking knowledge and skills of the end users. The questionnaire examines what functions do the users prefer to use while surfing the internet or connecting to a social network. Furthermore, the questionnaire examines what requirements and preferences those users, who have not been using the internet or social networking, would have.

2.1.1.4 Intermediate questionnaires results

Once the 100 users filled in the questionnaires, corresponding results were gathered within a 5 day period. In this way, a general scheme concerning the level of ICT familiarity of the users was created. Consequently, a better design of the open day's sessions was achieved.

2.2 Case Study e-Trikala

2.2.1 Open days

First of all, there were a first contact to the corresponding user group organizations to get their response until the 25th of October. In parallel, during this initial contact, the responsible of the user group organizations were informed in more depth about the project through corresponding leaflets, website, informative video and demo about the hardware to be used.

Additionally, the working team of the project visited the premises of the user group organizations in order to examine whether there are the adequate circumstances to conduct the focus group. It is understood that due to the increased size of the participants that attended the meeting, the main event had to be divided into different slots that took place in three envisaged Open Day Care centres within one week. It is also necessary to mention that the meeting was organized in this way due to the fact that it would have been difficult for the elderly to reach a more distanced place. The sessions were dissociated between the existing user groups. One of the sessions targeted to first user group which is 55 – 70, the second targeted 70+, while the third one targeted both of them.

2.2.2 Open Days – Schedule

The next step for the working group of the Elder Spaces project was to identify the time, the duration and the material that was used during the meetings. These open days were organized from the 5th until the 15th of November. As it was obvious from previous experience and collaboration with these user group organizations it would be more convenient that the meetings were organized during midday as it was more convenient for the elderly. In this direction, the duration of each of the three meetings was one to two hours. As far as it concerns the material that was used, there has been an interactive presentation and demonstration of the relevant issues.

Moreover, the sessions started with an informative presentation of the project with the use of a power point presentation. Then, a quick overview of the project website was provided. It was quite essential to identify the level of the familiarization of the participants with concepts like ICT and social networks along with the socialization in general. For this reason, during this slot there was fruitful conversation and brainstorming between the participants assisted by the working team. In this scope, a real life demonstration of a social network was provided in order to present the main features and the general concept of the most widely used social networks. The agenda of the Open Days session had the following structure:

Agenda

Session 1:

17:00 – 17:15 Welcome and company overview

- Status and main activities of the company

17:15 – 17:30 Presentation of the project (ppt)

- Introduction
- Main scope of the program
- Work to be achieved by the end of the project

17:30 – 17:40 Participants feedback

- Gather the comments of the participants

17:40 – 18:15 Social networks (ppt)

- Physical networks
- Social networking fundamentals
- Examples of social networks
- Main functionalities

18:15 – 18:30 Discussion with the Participants

- Social networks comments
- Feedback of the participants

18:30 – 18:35 Table Surface video live demonstration (video)

18: 35 – 19:00 Discussion with the Participants

19:00 End of session 1

2.2.3 Open Days Equipment

The equipment that was used was 7 PCs and 2 HP Touchsmart tablet-devices. Additionally, phones cards including contact phone numbers of the working team were distributed. The main reactions, comments and questions of the participants were gathered and recorded throughout the meeting in electronic format. The specific content was categorized and answered accordingly. During the sessions apart from the working team of the project, there were two psychologists and social workers while the sessions were introduced by the Vice mayor.

2.2.4 Open Days session

On the 22nd of November 2012 there was a first open day session more in the form of a presentation in cooperation to another presentation talking about dementia and depression. The

event took place at the Municipal council hall and there were about 70 participants. In general, during this session the main concept and characteristics of a social network were presented. Firstly, social networking was presented as a way of communication with others and to avoid problems like mild depression. Then the presentation was continued with the use of a Power Point Presentation describing the main functionalities that are offered through the social network. When this slot was ended there was a rather extended conversation about the opinions of the participants upon the impacts that social networks have on people's lives. Most of the participants were aware of what someone can do through the involvement with the social network but few of them seemed to have been registered to a social network. A descriptive video demonstrating the core functionalities of the table surface was also presented. The fundamental User Interfaces were presented to the participants and they made the following comments:

Colours – Look and feel: Participants agreed that the combination of the colours is of great success as bright colours are correspondingly combined with a less bright colour. This is quite relaxing for the eyes as there are many irrelevant colours mixed one to the other. Participants mentioned that the Login page was more eloquent especially when compared to Facebook's login page.

Structure of the content: Participants seemed to be really satisfied of the simplicity that each Activity provides in the column structure and the separation that the content has as well as the clear division between the basic columns. Some of them had difficulty in identifying the functionality of "change contrast" and "resize text" toolbar. Registration could be a bit simpler as some of the participants don't have email accounts in order to complete the whole procedure.

Visibility: Although the basic categories like Profile, Friends and Groups etc. keep a clear structure, on the other hand, font letters of the Activities column should be larger. In this direction it was clarified that "Resize Text" toolbar could be used to change the size of the letters. Nevertheless, some of them were reluctant to use this button. One participant mentioned that the text in the buttons like "Login" should not be underlined as it would be clearer due to usability reasons.

2.2.5 Dissemination

In order to help the dissemination of the meeting and acquaint the adequate number of participants, there were articles and press releases published to the local media as well as the electronic media of the region. Apart from these, the user group organizations invited the adequate numbers of elderly to participate.

The main objective of this event was to request input regarding the participants' feelings about the proposed Elder-Spaces applications and the opinion about what other applications and services they would use.

2.3 Case Study Semmelweiss

Semmelweis University joined the project with a year delay. In the first year of the project the partners started to work on gathering information regarding end user requirements, which they summarized in D1.1. As the interviews conducted by Semmelweis University with the end users regarding the application specifications and accessibility features have not provided us with new information compared to the results of the interviews taken by e-Trikala we did not publish these results in the deliverable. Semmelweis University developed a questionnaire which focuses on the end users preferences regarding functions of a social networking site.

2.3.1 Population

The targeted elderly population was over 55 years old. Within this population we chose random participants from two groups. One group consists of individuals visiting Day Centres and Retirement Clubs, the other group consist of individuals who stay at home and are socially isolated.

2.3.2 Elder-Spaces project presentation

Besides the 100 participants who were informed about the objectives of the project after filling out the questionnaires we held Elder-Spaces Open Days in three occasions in retirement homes, clubs and social organizations and evaluated the participants' intention of joining and using the Elder-Spaces social network.

2.3.3 Evaluation

Semmelweiss evaluated the gathered data and provided this information to the consortium partners to enable them to carry out the developments in an even more efficient manner.

2.3.4 Dissemination

We notified the local media about the Elder-Spaces project as well as the Elder-Spaces Open Days. In addition, we published information about the Elder-Spaces project and open days on the Semmelweis University's and other social organizations' website.

2.4 Results / Findings

Despite the fact that the elderly in Greece and Hungary are not computer literate and in first place they were not accustomed to such initiatives, they seemed quite interested when some more concrete processes were presented to them during the Open Days sessions in both countries. At this point in time they were in place to acknowledge the practical issues of the envisaged platform, as a demo video briefly showed and explained the usage of the Surface and the way it could adopt the platform's functionality.

Additionally, the target audience during this phase was larger, as it involved up to 100 participants for Greece and an equivalent number for Hungary. The whole process was more direct and efficient while the users were willing to provide feedback and participate through brainstorming process. They were encouraged to break the flow of the presentation and ask whatever they did not understand. In fact, their comments concerning specifically the user interface were the most significant, as they were recorded and forwarded to the technical partners for editing and potential implementation/integration on the platform. Furthermore, they ranked in the same way the usage of the provided services as the first user audience, without any deviation.

It was made clear that the access on the platform would be easy and would potentially involve minimum requirements. For example, there was explained that anyone who do not possess a PC at home could use the public PC of the special centres (e.g. KAPI centre), broadening as much as possible social inclusion, especially for the relatively older people of the target groups.

As a result, most of the participants agreed to the existing user requirements, as they were not in place to provide anything radically different from the developed user requirements framework. As a general sense, they confirmed that this platform would be quite useful for their routine. "I would never imagine that one can use a 'machine' as the old time magazine, browsing photographs of their beloved family members so easily with one finger, without any particular knowledge of technology!" mentioned a 69 year old pensioner, obviously amazed during the session. "I would be extremely interested in finding old time friends from the army, with most of whom I have lost contact over the last four decades!" claimed another elder.

In the following table there is the schedule concerning the facts and the deadlines:

Table 1: Study execution schedule

Fact	Deadline	Target
Questionnaires filled out by 100 Hungarian 55+ individuals	29nd October 2012	Evaluation of the elderly population's internet and social network use
Questionnaires results delivery	5th November 2012	Requirements and interests assessment
Elder-Spaces events	From 5th to 15th November 2012	Notify elderly about social networks
General summary deduction	19th November 2012	Summarize experiences based on questionnaire results and Open days

2.4.1 Semmelweiss results on Questionnaire

We have examined 100 individuals with a 34 item questionnaire focusing on their computer, internet and social networking knowledge and habits and their suggestions regarding their requirements. The questionnaire participants were randomly selected from day centres as well as from individuals living alone and not attending any day centres or clubs.

The average age of the examined individuals was 62.51 years. The youngest participant was 55 year old and the oldest was 77 year old. The examined group's gender division was; 64 females and 36 males. Out of the examined population 79% live in a larger city and 21% in smaller towns or villages. Out of the 100 examined individuals 54 have a computer in their homes and 46 do not. Out of the 46 individuals who do not have computer access in their homes 23 individuals have computer access somewhere else. Altogether 77 individuals have computer access out of which 71 have internet access as well.

From the examined population 78% is able to open a web page individually. Out of the 77 individuals who have computer access, 27% thinks that they would not be able to open a webpage even with help. Out of the 71 individual who have access to the internet 53% is able to download documents or pictures from the internet and 37% thinks that they would not be able to complete a download even with help.

To the question whether they can upload a picture or document to a webpage on their own 38% answered yes and 36% thought that they would not be able to upload even with help. Out of the 71 individuals with internet access 62% are familiar with social networking sites, from which 45% knows iWiW and 52% knows Facebook.

The internet user population completes the following activities online: 71% read online newspapers and use it for gaining information, 62% use it for keeping in touch with friends and family through social networking, 45% use it for surfing/browsing, 45% use it to gain information about solving their health problems, 31% use it for online shopping and 17% use it for travel purposes. Out of the internet users (71 individuals), 8% use a social network a few times a day, 9% daily, 14% few times a week, 7% weekly, 1% few times a month, 4% monthly and 17% less than once a month.

Out of the 100 individuals 72% uses glasses or magnifiers for reading. Out of the 77 computer users only 8 prefers the keyboard and the rest prefer to use the mouse for navigation. Out of the 100 individuals 52% would participate in testing a new webpage developed for the elderly.

Those participants who said to be familiar with iWiW marked the followings as the most used features and applications: mail, chat, finding friends, keeping in touch with friends, uploading pictures, games, classified (market), newsfeed and online dating.

Those participants who said to be familiar with Facebook marked the followings as the most used features and applications: mail, chat, uploading/sharing pictures and videos, creating albums, games, birthday application, finding and keeping in touch with friends, following friends' life events through newsfeed, marketplace and online dating.

Computer user participants provided suggestions to improve computer and internet use in the categories below:

1. Regarding the screen and keyboard, the participants' preferences are: larger letters on the screen and on the keyboard, touch screen and wireless devices.
2. Regarding the appearance of the programs the participants would prefer less distracting design, more logical and transparent layout and fewer advertisements.
3. Regarding the appearance and usability of social networking pages (iWiW, Facebook, Elder-Spaces) some participants think that the older versions of iWiW were more elderly friendly from the perspective of usability and appearance, many participants think that the newer versions of the social networking sites use increasingly smaller letters. In addition participants would prefer simplified language and descriptions on the pages, as well as simplified registration to the page. Some participants said that iWiW is too complicated for them to use.
4. Regarding the contents of programs, applications and services participants would prefer to use games, online newspapers and online dating applications. In addition many participants would like to use applications that offer various activities (events) and forums for their personal interests.

After processing the examined population's input, we can determine that 23% of the 55+ population in Hungary does not use a computer and does not have internet access. Out of the 77% who use computers, 27% would not want to learn the use of internet even with help. Despite this percentage, we can determine that in Hungary there is a need in both the population of computer use and not users for the use of social networking including the applications.

After the participants filled out the questionnaires in the day centres, they were presented with the iWiW webpage and the travel memories application. Following the presentations they were asked what other applications and programs would they like to use in a webpage developed for the elderly and the answers did not differ from the answers given in the questionnaires.

Table 2: Questionnaire results in Hungary

Questionnaire results	out of 100 participants
Average age	62.5 years
Computer access at home	54%
Computer access elsewhere	23%
Internet access at home or elsewhere	71%
Able to open a webpage without help	78% of the participants with internet access
Able to download documents/pictures from the internet without help	53% of the participants with internet access
Able to upload documents/pictures to the internet without help	38% of the participants with internet access
Familiar with social networking sites	62% of the participants with internet access
Familiar with iWiW	45% of the participants with internet access

Questionnaire results	out of 100 participants
Familiar with Facebook	52% of the participants with internet access
Purposes of internet use	71% news, gaining information 62% keeping in touch with friends and family through social networking 45% surfing/browsing 45% solving their health problems 31% online shopping 17% travel purposes
Frequency of social networking usage	8% few times a day 9% daily 14% few times a week 7% weekly 1% few times a month 4% monthly 17% less than once
Willingness to try out a social networking site developed for the elderly	52% of the examined population
Social Network users' application preferences	1. mail 2. chat 3. uploading/sharing pictures and videos 4. creating albums 5. games 6. birthday application 7. finding and keeping in touch with friends 8. following friends' life events through newsfeed 9. marketplace 10. online dating
Participants' suggestions for an elderly friendly webpage	1. larger letters on the screen and on the keyboard 2. touch screen and wireless devices 3. less distracting design 4. more logical and transparent layout 5. less advertisements 6. simplified language and descriptions on the pages 7. simplified registration to a social networking site

2.4.2 e-Trikala results on Questionnaire

e-Trikala has examined 70 individuals with the same questionnaire focusing on their computer, internet and social networking knowledge and habits and their suggestions regarding their requirements. These people were selected throughout the six Open Day Care Centres for the

Elderly as well as other people randomly selected. In the following text, there is the export and report of the data that have been gathered from the questioned audience.

First of all, people that have a PC into their house run up to 64,3% while there is a 62,3% of the people questioned, that do not have access to a PC at home, but use someone else's. In this direction, the 50% of those who have PC at their home, they also have internet access.

Then there are some questions trying to identify the text and multimedia skills. More specifically, 50% of the questioned can write a letter using the Word processor, while the 40% of those who cannot write a letter on their own, could write it with someone else's help. The percentage of the people who would need help to print a text is 48,6% while those who need help in opening an internet page is 48,57%. Additionally, 40% of the questioned said that they can send and receive emails while 37% can download photographs and texts through Internet without help of someone else.

In the multimedia section only 30% of the participant affirmed that they can upload photos on the Web while this percentage is increased up to 54% if someone provides his/her help. Accordingly, the same percentage (30%) can communicate with friends and family through Skype. On the other hand, it doesn't seem that people can be helped in an effective way in communicating with family and friends through Skype as the percentage remains almost the same.

The respondents don't seem to be aware of the social networks that exist through the Web as only 18,5% answered positively in this question. On the other hand, 28,5 of the respondents have heard about Facebook and its services. From these two results it is understood that people haven't discriminated the concept of social networks as some of them doesn't recognize Facebook as a social network. iWiW is not well known as only 8,5% has answered positively in being aware of this social network.

There were also several questions trying to figure out the percentage of the users who use Internet as a source of information, entertainment and communication. The results seems to be really low as only 15% use the Internet as an informative source of news while only 7,5% uses it for entertainment (playing games, watch movies or listening to the music). This percentage is also really low, keeping the same number, for activities like communication with friends and family through social networks, online shopping and surfing in the web. In more detail, 21% use internet as an information source less than once per month, while 17% use it on a daily basis for the same purpose. The percentage of people that use internet for entertainment once a month is 30% but only 4,3% browse the web on a daily basis for the same reason. As far as it concerns the use of Internet as a communication tool with friends and family the percentage reaches 52% (See Figures below).

Participants have also submitted their opinions based on their experiences on the following categories:

1. **Regarding screen and keyboard:** Clear and distinct resolution, Clarity of content, Simpler keyboard, distinct and bigger buttons and letters
2. **Regarding appearance of the programs:** Clarity, Simple menus without many useless graphics, Simpler instructions
3. **Regarding appearance of social networking pages:** Simplification of the pages, organization of many different pages into a single one in order to have a total view.

Simple menus without menus useless graphics. Simpler steps from one procedure to another

4. **Regarding the content of the programs, the applications and the services:** Simpler content for elderly users, more clear functions. Direct access without having to install other programs
5. **What type of programs do you prefer to use:** Training, Health, Sports while many participants prefer not to answer in this questions
6. **Regarding the type of programs that would motivate them to use internet:** Monitoring physical conditions, Information on local issues, Sharing photos and music.

In the following diagrams, there is the schematic representation of the demographic characteristics of the questionnaire participants.

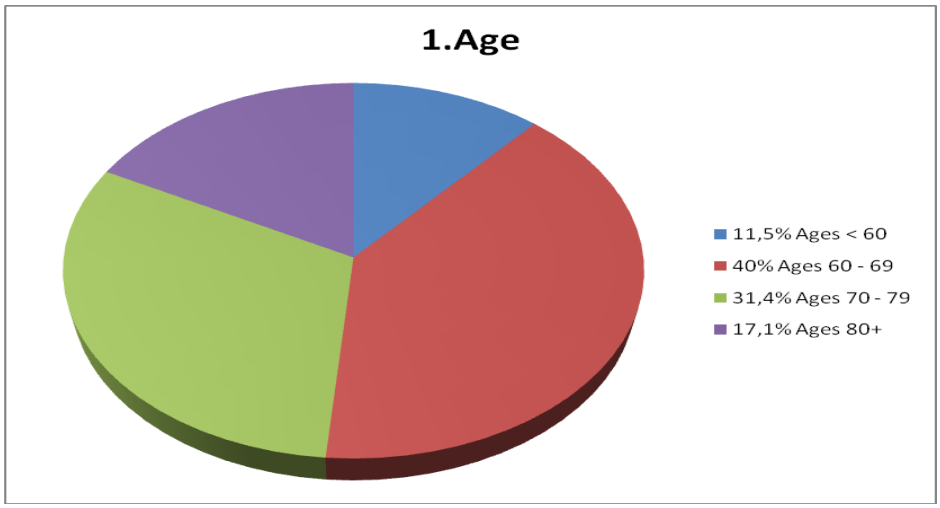

Figure 1: Pie chart – Population's age distribution

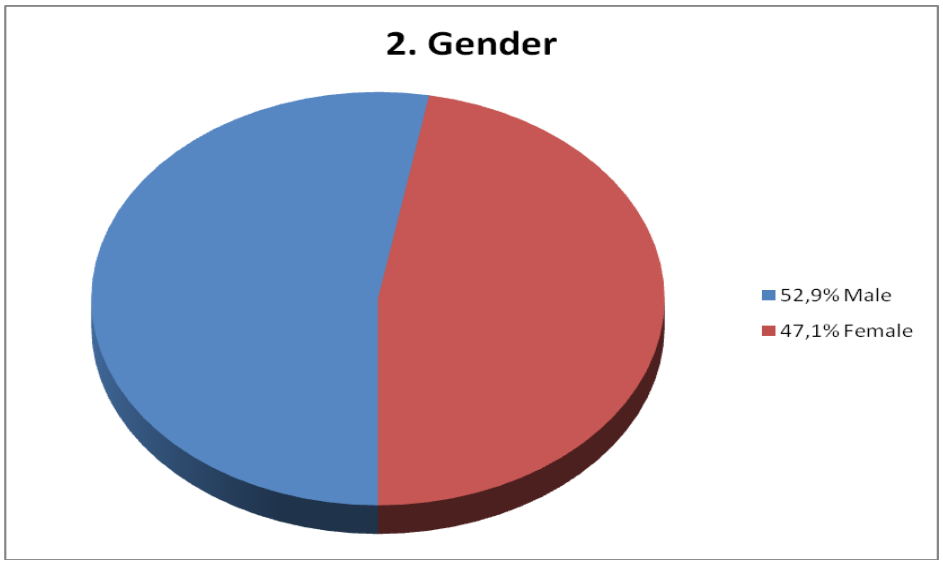

Figure 2: Pie chart – Population's gender distribution

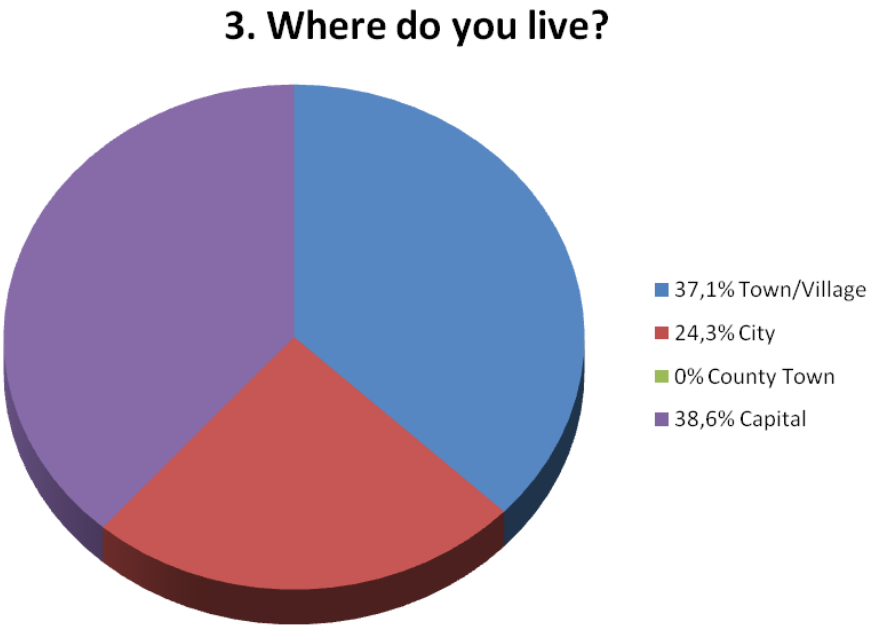

Figure 3: Pie chart – Population's living area distribution

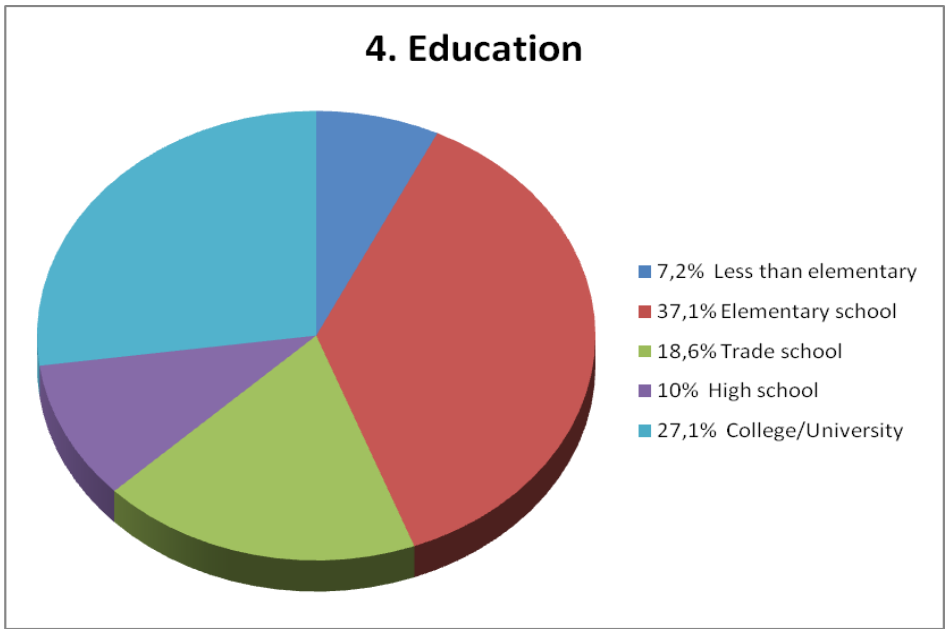

Figure 4: Pie chart – Population's education level distribution

Table 3: Questionnaire results in Greece

Question Result	percent of replies
Owning a computer	64,30%
Have internet access	62,80%
If yes, do you have internet access, or internet connection?	50%

Question Result	percent of replies
Able to write a letter using the computer	50%
Able to write a letter on a computer with assistance	40%
Able to print a letter	40%
Able to print a letter with assistance	48,60%
Able to open a specific webpage	45,70%
Able to open a specific webpage with assistance	52,80%
Able to send and receive emails	40%
Able to send and receive emails with assistance	44,30%
Able to download pictures or documents from the internet	37,10%
Able to download pictures or documents from the internet with assistance	47,10%
Able to upload photos on the internet	30%
Able to upload photos on the internet with assistance	54,30%
Able to establish connection with friends and family through Skype	30%
Able to establish connection with friends and family through Skype with assistance	32,80%
Knowing any social networking sites on the internet	18,60%
If yes, how many	1
Could you name some of them?	FACEBOOK, YOUTUBE, TWITTER, FLICKR
Aware of iWiW and the services it provides	8,60%
If yes, could you name some of the services?	NO
Aware of Facebook and the services it provides	28,60%
If yes, could yo name some of the services?	CHAT, GAMES, NEWSFEED, CONTACT WITH FRIENDS, PHOTOGRAPHS

2.4.3 Participants' confirmation on Travel Memories deployment

Users have confirmed that applications like travel memories and e-learning are of great importance especially during this phase of their lives. User Memories in combination with ICT skills need to be developed in the most efficient way. It is mentioned that it is really essential for them to remember moments from them past. Participants admitted that it is quite common to discuss about activities or trips from the past in their everyday life. They mentioned that for this reason, it would be really interesting to have a visualized aspect of these memories. Another aspect of great interest is that they would see journeys of their friends. Moreover, the capability to comment on another's travel memory album, "like in real life" can be really exciting.

2.4.4 Academic – Scientific confirmation on Travel Memories deployment

The same statement, travel memories development, could be also certified by the academic starting point. The fact is that people live for much longer after retirement from work and are increasingly likely to spend more of this time alone, due to several reasons like children who leave on their own far from their parents. Additionally, the death of a spouse or a wife can be a reason of isolation. Consequently, due to the aforementioned and several other reasons, it becomes increasingly difficult for elderly people to live independently in their own homes and this leads quite frequently to institutionalization. Their lives are also aggravated by the rise of several types of dementias causing cognitive and memory loss problems.

It is scientifically proved that memory declines as the time passes caused by the normal aging. Normal aging is associated with a decline in various memory abilities in many cognitive tasks; the phenomenon is known as age-related memory impairment (AMI) or age-associated memory impairment (AAMI). The ability to encode new memories of events or facts and working memory shows decline in both cross-sectional and longitudinal studies[1]. Studies comparing the effects of aging on episodic memory, semantic memory, short-term memory and priming find that episodic memory is especially impaired in normal aging; some types of short-term memory are also impaired[2]. The deficits may be related to impairments seen in the ability to refresh recently processed information[3]. Source information is one type of episodic memory that suffers with old age; this kind of knowledge includes where and when the person learned the information. Knowing the source and context of information can be extremely important in daily decision-making, so this is one way in which memory decline can affect the lives of the elderly. Therefore, reliance on political stereotypes is one way to use their knowledge about the sources when making judgments, and the use of meta-cognitive knowledge gains importance[4]. This deficit may be related to declines in the ability to bind information together in memory during encoding and retrieve those associations at a later time[56].

Contemplation as an implemented procedure of reminiscence can be an effective way to activate and strengthen the memory. There is a program in Europe "The age exchange training program" that is internationally known for his involvement with the contemplation in all areas, including theatre, publications, exhibitions, intergenerational programs and workshops training. Several scholars noted the value of reminiscence before recent groups working in Europe and USA. One of the first was Socrates who said: "A man who does not consider his life is not worth living." Contemplation on past actions and events can create really amusing and constructive memories and make the person who is involved in this procedure to get in touch with other people, their cultures and broaden his scope of life. Especially when travel memories are connected with professional skills the positive impact is even greater. Reminiscence can also be a way of coping with mild dementia as well as depression as the memory of the person is energized. For all these reasons, it is deducted that travel memories should exist as a component of the Elder Spaces platform.

3. Methodology and Technical Specifications

Elder-Spaces is based on a Service Oriented Architecture. This is an architectural design paradigm for software systems that is based on single, possibly distributed, reusable and autonomous pieces of software called services, which communicate with each other over an existing network in well-defined, standardized message formats. These are mostly SOAP (Simple Object Access Protocol) messages in XML (eXtensible Markup Language) or JSON (JavaScript Object Notation) messages, which are explained in detail in chapter 3.1.2. The services are uniquely identified by an URI (Uniform Resource Identifier).

In the following sections the Service Oriented Architecture and the underlying technologies and will be explained.

3.1 Data interchange formats

There are currently two different data interchange formats, the eXtensible Markup Language (XML) and the JavaScript Object Notation (JSON).

3.1.1 XML

The eXtensible Markup Language is a tag based data transport and storage protocol developed since 1996 by the XML working group under auspices of the World Wide Web Consortium.

XML mostly uses HTTP as transport protocol but can also be transported by SMTP and FTP or even by a portable storage device. By its extensibility it is very flexible and can be parsed by manifold libraries in all common programming languages. The elements can be retrieved by their name. Because XML is fully text driven it could be read without any additional software on any operating system. It has no restrictions concerning descriptive names and can be derived directly from a database schema or object oriented class structure.

XML documents are formed as a tree structure. The top level element is generally called the "root"-element. Elements may contain other elements to model complex data structures. The relationships between the elements are commonly described like family relationships. The elements of higher levels are called "parents", their sub-elements "children" and elements on the same level are called "siblings".

3.1.2 JSON

The JavaScript Object Notation is a subset of JavaScript specified in 2006 by David Crockford in RFC 4627[7]. It is a text-based data exchange protocol similar to XML developed with focus on portability, minimalism and textual representation. A valid JSON-text is, as the name implies a serialized JavaScript-object, which can be assigned in JavaScript by using the eval-command.

JSON-text is structured as either an object or an array.

3.2 Web Services

Web services are separated software entities implemented in any programming language that are

reachable in a network and usable by network communication protocols like HTTP, SMTP and FTP. There are currently two mainstream technologies for providing web services, the WS-* web services and RESTful web services.

3.2.1 WS-* web services

The WS-* web services rely on a large set of standards recommended by the World Wide Web Consortium[8]. They are mostly used in business systems.

3.2.2 RESTful services

RESTful services are another approach to provide services over the web. The most used technology the RESTful protocol relies on is the HTTP protocol. The basic principle is to map entities and collections of entities to URIs. The RESTful protocol is hypermedia driven, which means that the answer of a RESTful service contains links to perform the standard operations like create, read, update and delete on the entity that is represented by the URI, if the rights to perform that operations are sufficient. Therefore they are called by their URI using a standard HTTP method like GET, POST, PUT or DELETE to determine what should be done. The service does not save any information about the state of the client and vice versa, which provides a minimum of coupling and by that ease scaling. The provided answer formats may differ and can be explicitly requested, if implemented in the service. This may be for example HTML, XML, JSON or even a byte representation of multimedia content.

Table 4: HTTP methods mapped to RESTful service actions

HTTP method	**Performed action**
GET	Retrieve a resource or a list of resources
POST	Create a resource
PUT	Create/ Update a resource
DELETE	Delete a resource

3.2.3 Classification of Web Services

Web services can be classified as shown in Figure 5[9].

Service type	Business-related service		Technical-related service	
Granularity	Business process	Task	Entity	Utility
Composition	Composite service		Elementary service	
Interaction	Synchronous (*blocking*)		Asynchronous (*non-blocking*)	
Exchange patterns	Request/Response	Notification (one-way)	Conversational Interaction	
State	Stateless		Stateful	
Accessibility	Intra-organizational		Inter-organizational	

Figure 5: Classification of web services

They are distinguished by

- Service type
  - Business-related services: Perform business-related tasks
  - Technical-related services: Perform tasks related to technical aspects of the system
- Granularity
  - Business process services: Perform whole business processes
  - Task services, which fulfil business tasks like accounting
  - Entity services: Execute CRUD (create, read, update, delete)-operations on objects
  - Utility services: Perform business-independent operations like encryption, monitoring, message transformation, etc.
- Composition
  - Composite services: A composition of elementary services
  - Elementary services: Atomic services
- Interaction
  - Synchronous services: The consumer has to wait for an answer till further processing
  - Asynchronous services: The consumer send a request and continues processing until receiving the answer
- Exchange patterns
  - Request/Response: The consumer send a request and gets a response
  - Notification: The consumer notifies the service, which does not respond
  - Conversational interaction: Consumer and provider exchange a set of messages to perform a task
- State
  - Stateless: The service and the consumer are not informed about each other's state
  - Stateful: The provider stores information about the consumers state
- Accessibility
  - Intra-organizational: The service is accessible from the intranet of an organization only

- Inter-organizational: The service is accessible even from external organizations or customers

3.3 SOA

SOA is the abbreviation for Service Oriented Architecture. Regarding to "The Open Group", an international consortium of companies and research organizations, is *"service-orientation […] a way of thinking in terms of services and service-based development and the outcomes of services."*[10]

3.3.1 Architectural characteristics

SOA consists of a set of service providers and their consumers, which may be even providers for other services.

For modelling complex business processes many different web services may be used. There are two ways of managing their interactions, choreography and orchestration.

Choreography

In a choreography every service knows when it has to become active and with which services it has to interact. This way the choreography consists of a chain of web service invocations. This is displayed in Figure 6.

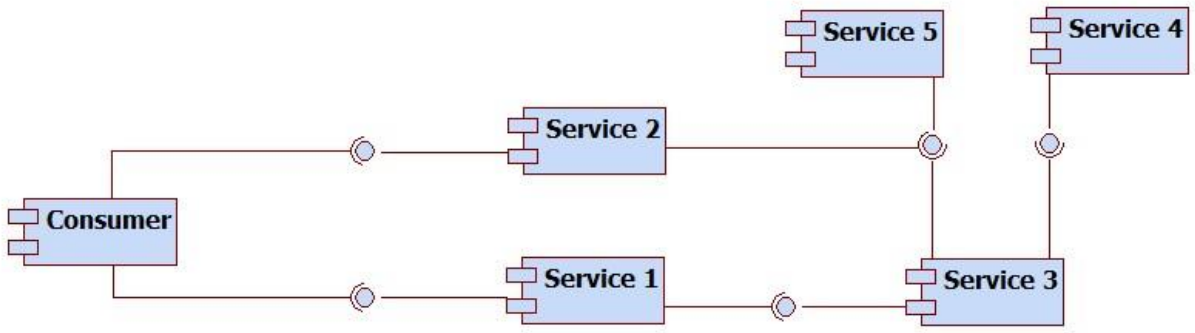

Figure 6: Component Diagram - Multiple service invocation choreography

Orchestration

Orchestration of web services is done centralized by an additional software component that may also be a web service. A schematic view of such a system is displayed in It manages the service invocation and transforms the message types if needed acting as a kind of business logic layer. For implementing the orchestration some specific languages, e.g. BPML, WSFL[11], etc. have been developed, which will not be further described.

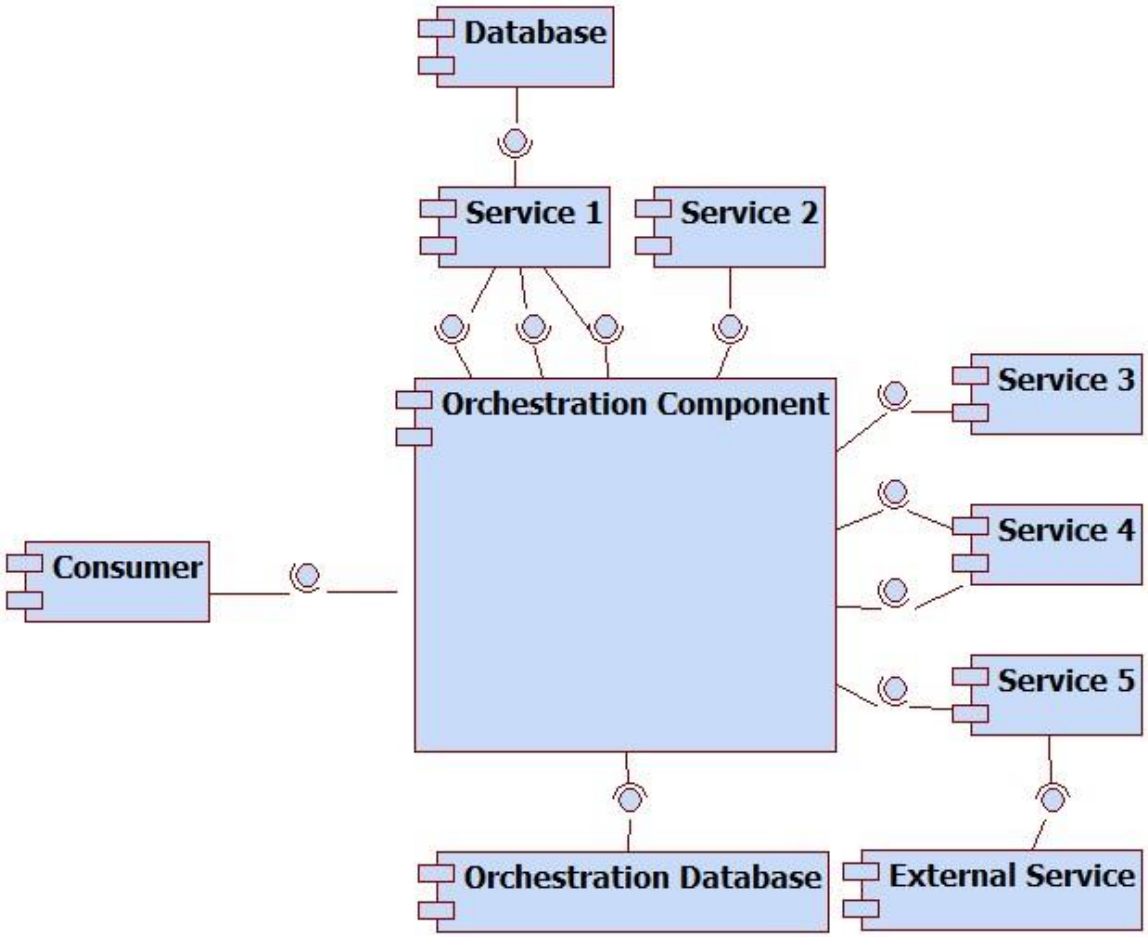

Figure 7: Component Diagram - Orchestration component managing service invocation

Enterprise Service Bus

If a SOA-based system is used in an enterprise environment a service bus can be used, which manages the communication and the interactions between the different service providers. Figure 8[12] displays a schematic view. The different services implemented on different servers connect and interact over the ESB, which provides among others centralized routing and transformation of the exchanged messages.

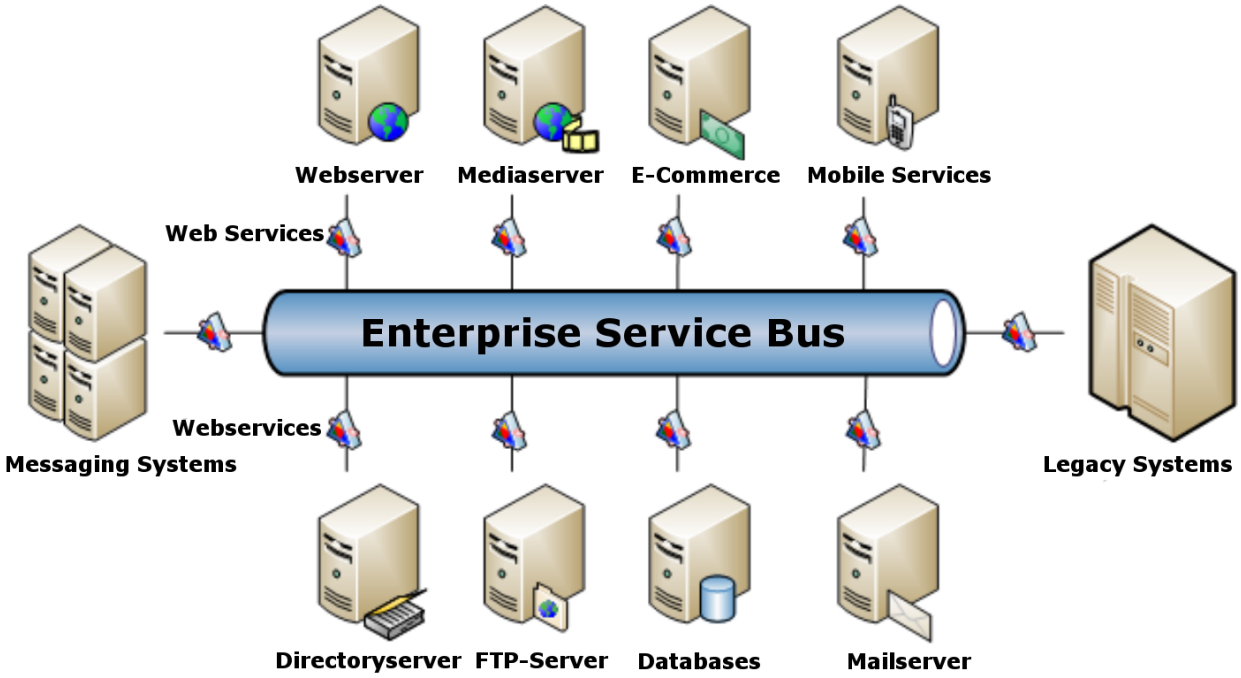

Figure 8: Schematic view of an Enterprise Service Bus

3.3.2 Key Benefits

In Figure 9[13] a system following the service oriented architecture paradigm is compared with a traditional monolithic system. The key features and benefits can partly be derived from there.

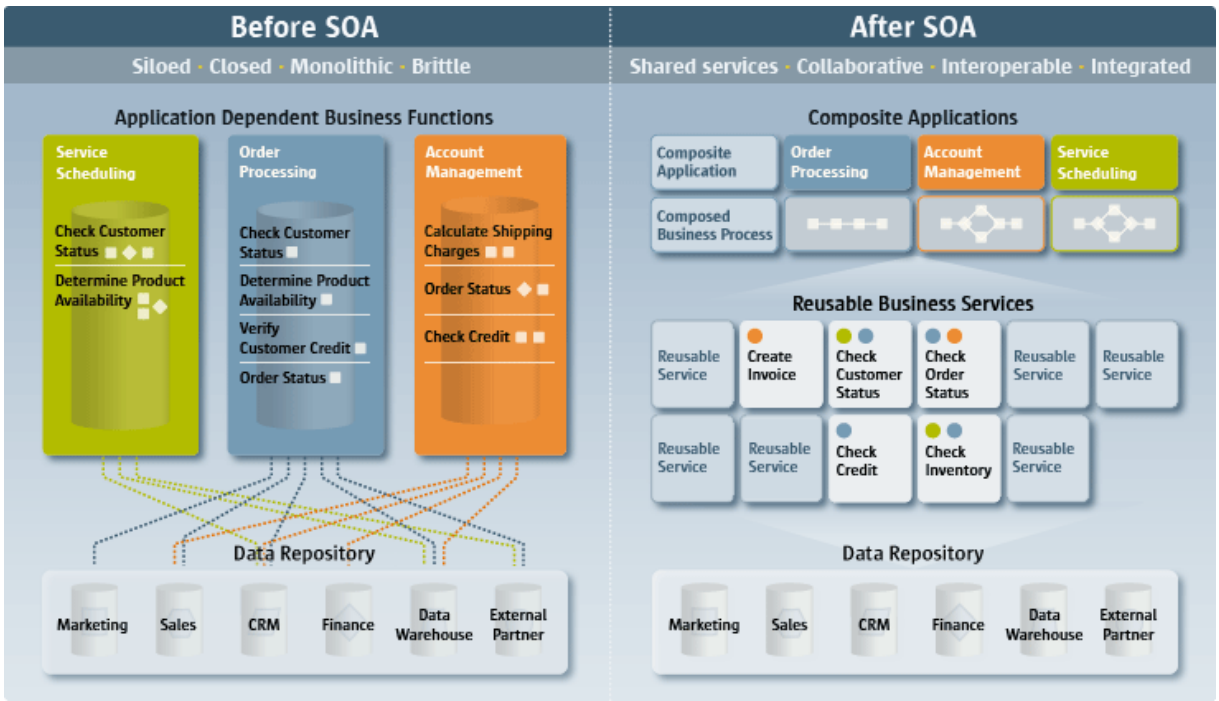

Figure 9: Comparison of monolithic and service oriented architecture

Transparent

By using fine-grained web services information can be easier retrieved than in monolithic systems. This eases the integration of new services and saves integration costs. It is easier to make the services available externally, e.g. to give information to customers, by configuration of the firewall. By monitoring the exchanged messages the underlying business processes can be analysed and optimized, the service-performance can be monitored by analysing the response times and even attacks can be detected by analysing the amount of messages exchanged. The messages can be analysed for debugging and a set of messages can be sent to different services for automated testing.

Flexible

In a SOA, it is easier to change business processes by redefining them or changing single services, e.g. due to changed requirements, saving development costs.

Re-usable

Services can be re-used and once deployed, can be used by multiple consumers, saving development, testing and maintenance costs. Rapid development of new services by combining existing services is possible.

Interoperable

By loose coupling using the exchange of messages the services are independent from operating systems and hardware locations. They can also be deployed redundant to provide scalability, fail-safety and high availability by load balancing the incoming requests.

Controllable

The access to services can be controlled in an easy way.

Secure

The exchanged messages can be encrypted to secure their transportation. Also integrity checks can be implemented by digitally signing them.

Standardized

The development of web services is highly standardized, lessen personnel training costs and enabling the development of general purpose tools for development.

Event-Responsiveness

Services are able to respond to event patterns, e.g. patterns of messages or changes in retrieved values from external sources. Thereby automated processes can be implemented, simplifying the structure of the business logic.[14]

3.4 MS PixelSense

3.4.1 Introduction

Microsoft's PixelSense 2.0[15] provides a solid platform capable of delivering novel and more "natural" interaction with one or more users. It is the abilities to identify and interact with real life objects, provide tactile interface, allow for multiuser interaction in a familiar and well documented development framework that makes it appealing and useful to the Elder-Spaces project.

MS PixelSense, formerly known as MS surface, runs on Windows 7 and supports Microsoft's streamline development methods. It provides a dedicated SDK for accessing the novel functionalities of the device. This is the second and improved version of the table top device. It is reasonably compact in size and weight, given that it provides a 40 inch interactive screen. For the purpose of the Elder-Spaces, we are interested in deploying the MS PixelSense in a table configuration.

The platform offers four key features:

- Direct "natural" and "intuitive" interaction

  The user may touch the interface, at the objects on the screen and directly interact with them as if they were physical objects. The is no need for I/O devices, mouse or keyboard, as the mouse is replace by the user's fingers and a keyboard is substituted by a virtual keyboard on the interface.

- Physical Object recognition

  The device is capable of identifying tagged objects, using a specific coding standard provided by Microsoft. This allows for applications to provide interaction with actual physical objects that a user may place on the screen, enhancing greatly both the user experience and the potential application's features.

- Multi-touch contact.

  The MS PixelSense allows for up to 50 simultaneous interactions. This large number of contact points far exceeds the one provided to standard applications using a mouse.

- Multi-user experience.

  As a result of the multi-touch contact feature, it is possible to have more than one users actively interacting with the device. Objects on the interface may act independently and different users may interact smoothly with the application.

3.4.2 PixelSense technology

MS PixelSense allows for fingers, hands and objects placed on the screen recognition. It enables vision-based interaction by sensing IR back light reflected from the objects touching the screen. PixelSense technology allows for the sensing and interpretation of reflected IR light, thus eliminating the need for cameras and image recognition that was the case on the first version of

the product.

The identification process is described below[16]:

1. A contact (finger/blob/tag/object) is placed on the display
2. IR back light unit provides light (though the optical sheets, LCD and protection glass) that hits the contact.
3. Light reflected back from the contact is seen by the integrated sensors
4. Sensors convert the light signal into an electrical signal/value
5. Values reported from all of the sensors are used to create a picture of what is on the display
6. The picture is analysed using image processing techniques
7. The output is sent to the PC. It includes the corrected sensor image and various contact types (fingers/blobs/tags)

3.4.3 Hardware specifications

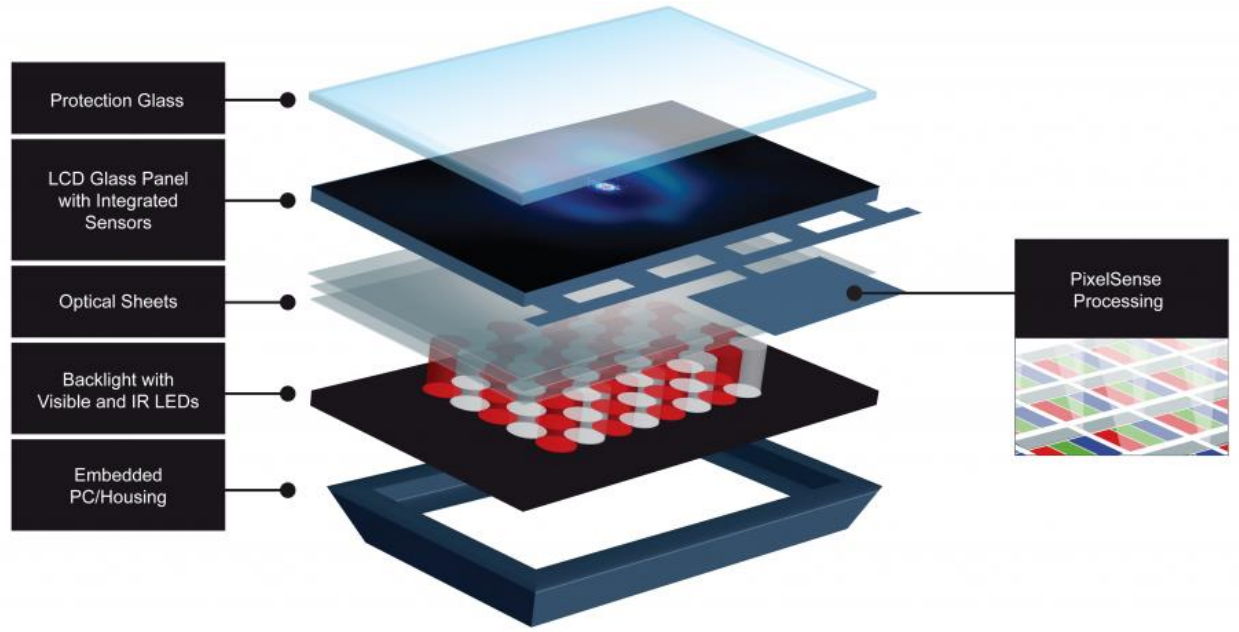

Figure 10: PixelSense technology hardware components

Figure 10 shows the MS PixelSense 2.0 device in the table top configuration. The technical specifications follow[17]:

- Physical Specifications
  - Dimensions (Without Stand) : 1,095 x 707.4 x 103.0 mm
  - Weight: 36.8 Kgr
- Technical Specifications
  - Display: 40 inch thin LCD with PixelSense technology
  - Resolution: 1920 x 1080 (16:9)

- Viewing Angle (H/V) : 178 / 178° (CR ≥ 10)
- CPU: AMD Athlon II X2 2.9 GHz dual core
- Graphics: AMD Radeon HD 6570M – 1 GB GDDR5
- Memory: 4GB DDR3
- Storage: 320 GB HDD
- Extensions (ports): HDMI input & output, S/PDIF 5.1 digital audio surround sound out, RCA audio out, 3.5 mm TRS (stereo mini-jack) audio out, 4 USB ports
- Networking: Wi-Fi 802.11n, Bluetooth, and Ethernet 10/100/1000
- Operating System: Embedded Windows 7 Professional 64-bit

Figure 11: MS PixelSense 2.0 – Samsung SUR40

3.4.4 Software Development

The MS PixelSense 2.0 builds upon:

- Embedded Windows 7 Professional 64-Bit OS
- Supports .Net Framework 4.0
- Windows Presentation Foundation (WPF) 4.0
- Microsoft XNA® Framework 4.0
- Windows PowerShell and DMTF DASH support, and enhanced administrator tools

Microsoft also provides a specialized Software Development Kit (MS Surface 2.0 SDK) which provides access to the novel functionalities of the tabletop along with a series of controls for easier and faster application development.

In particular, Elder-Spaces application will utilize the Presentation Layer of the SDK, making use of Microsoft's Windows Presentation Foundation (WPF). The Presentation layer includes a suite of Surface-enabled WPF controls and also supports the use of XAML for UI development.

The following diagram depicts the logical architecture of the MS PixelSense. It presents the main software components that enable implementation and execution of applications over the

MS PixelSense.

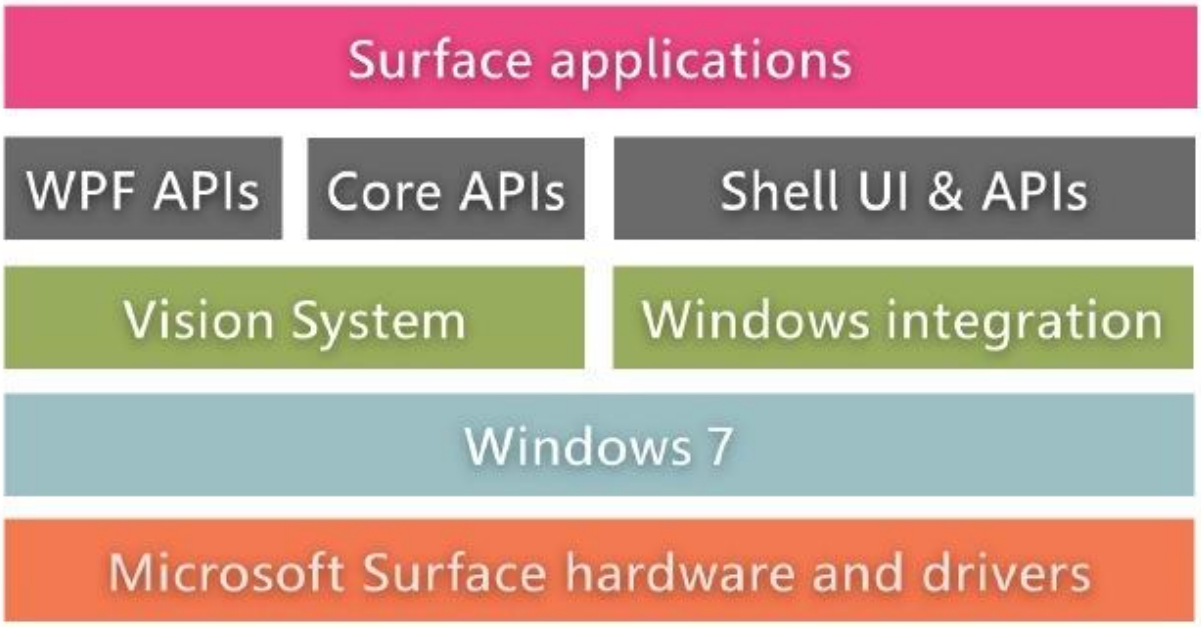

Figure 12: MS PixelSense 2.0 logical architecture diagram

The vision system is responsible for capturing and interpreting touch data from raw visual input. It can distinguish when a person touches, or moves a finger on the screen. It can also identify both tagged and untagged objects on the screen.

In conjunction with the APIs provided by the Surface 2.0 SDK, it enables to create applications that utilize advanced tactile input. The SKD's Presentation Layer provides streamlined access to the most popular controls and functionalities allowing for fast and reliable development.

4. Architecture Overview

4.1 Overview

Elder-Spaces uses a modular approach to system composition. Components are divided into separate layers to ensure modularity and separation. There is a set of main functionalities supported by the platform and on top of that, a series of specialized applications are going to be implemented. Each new application or functionality utilizes part of the existing infrastructure and also introduces specific modules to cover its needs.

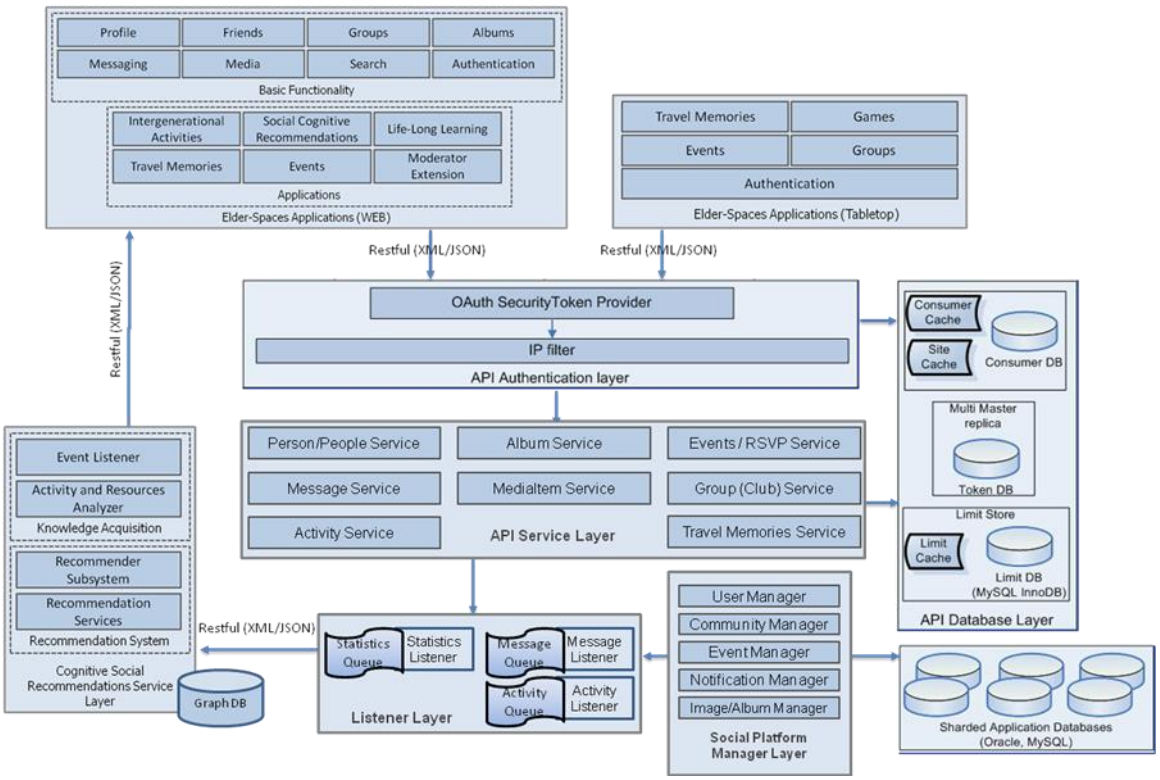

Figure 13: Architecture Overview

4.2 System's Components

4.2.1 API Service Layer

This layer contains all the services that the Elder-Spaces site will use through the API.

Detailed information of these services can be found in chapter **Error! Reference source not found.**.

4.2.2 API Authentication Layer

This layer implements an OAuth 1.0 standard 3-legged REST authentication module. The user can be logged in to the Elder-Spaces site through this layer.

Detailed information of the authentication can be found in chapter **Error! Reference source not found.**

4.2.3 Social Platform manager Layer

The task of this layer is managing the data storage and query of the services, and also executing the back-end algorithms of the functions that are called through the services.

4.2.4 Listener Layer

This layer provides queues for the highly frequently generated entities (activities, messages) in case of better performance result. These entities are collected in queues and served in FIFO (First In, First Out) order. Listeners monitor these queues all continuously and alert at dedicated state of the queues.

4.2.5 API Database Layer

The Elder-Spaces system provides the possibility for 3rd party developers to develop the site through the API by using the OpenSocial 0.9 standard. These databases contain the data that 3rd party developers need to be able to develop.

4.2.6 Shared Application Databases

This layer contains all the main databases of the Elder-Spaces system.

Detailed information of the databases can be found on the Component view diagram in chapter 5.2.

4.2.7 Cognitive Social Recommendations

The cognitive social recommendations system is composed by two main components: Knowledge acquisition system and Recommendation system. Knowledge acquisition system is designed to acquire knowledge from the Elder-Spaces platform, such as users, groups and events. The subsystem acquires and analyses the resources in order to create recommendations. Recommendation system is designed to use the knowledge acquired in order to create sets of

recommendations for each user.

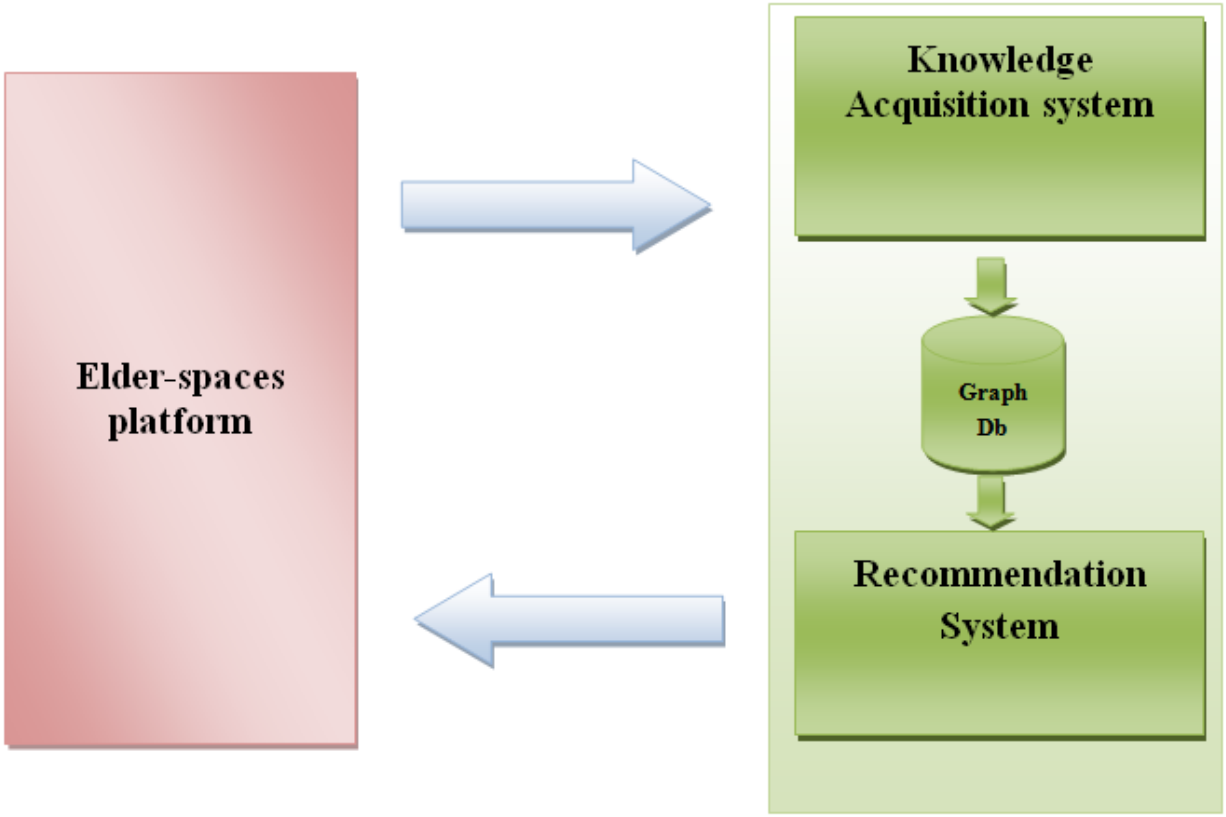

Figure 14: Cognitive Social recommendation system and services architecture

The Knowledge acquisition system architecture is composed by two main sub-modules: the Event listener and the Activities and Resource Analyser. Each sub-module has a specific responsibility. The following sub-sections detail each module from an architectural point of view.

The Knowledge acquisition system will be in charge of receiving, translating and enriching data about the resources managed inside the Elder-Spaces social platform, for example; Users, Clubs, Events, Documents, their inter-relations and other activities that involve them. The following is list of the activities that will be notified to the event listener by the platform:

- add new friend
- send friend request
- delete friend connection
- modify profile data
- delete user
- post activity
- delete activity
- create club
- modify club

- delete club
- join to club
- leave club
- post activity to club
- delete club activity
- create event
- modify event
- delete event
- invite to event
- RSVP response to event
- comment event
- delete event comment

In order to provide a robust infrastructure that allows the subsystem to be aligned and consistent for what concerns updates of this data, we have chosen to manage it with an event system, where the event containing the user's activity is generated by the Elder-Spaces subsystem and the listener is the Event Listener subsystem developed by Cybion. The above mentioned user activities should not be confused with the activities functionality provided by the platform. These are internal messages that the system creates for use by the recommendation service.

We chose to use an event-based system because it allows applications to be updated in real time, keeping the coupling between the two subsystems low. Given the high amount of work that the Cognitive Social Recommendation system will have to manage, it is a fundamental requirement that the social platform is able to continue its job without slowdowns even if the semantic subsystem is experiencing some problems or a bottleneck. The solution is a dedicated module that can manage specific streams of events.

The **Activities and resources analyser** is the module which has the responsibility of analysing the resources creating metadata, keeping updated and storing them in a **graph DB** making them accessible to other architectural components.

The resources analyser is able to perform the following flow:

- takes as input an activity performed in the platform that involves resources to be analysed,
- executes all the needed profiling algorithms in a pipeline mechanism, and
- represents the profiling result in a defined model for each entity storing it in a Graph DB.

The Cognitive Social Recommendation subsystem architecture is composed by two main sub-modules: the Recommender subsystem and the Recommendation services. Each sub-module has a specific responsibility. The following sub-sections detail each module from an architectural point of view.

The Recommender sub-system has been designed as the module responsible of calculating resources recommendations, keeping them updated and making them available for consumption by other independent processes. The recommendations calculation is a background process and

each user has associated maximum one result containing a set of resources for each recommendation typology.

The Cognitive social recommendations will be accessible by the Elder-Spaces platform through a layer of web services, the Recommendation services that are specified in appendix file: API Specification. The web service layer answers to plain HTTP GET requests, received by the Elder-Spaces social platform.

5. Design Specifications

This chapter comprises of the UML diagrams which show the logical, implementation and deployment view of the system as well as the interconnection between different modules and components, along with the necessary communication protocols, where available.

5.1 Logical View

Logical system design is based on the functional requirements, respectively the functionality that users are expected to get. Based on that, a model emerges and the main objects of the system are identified.

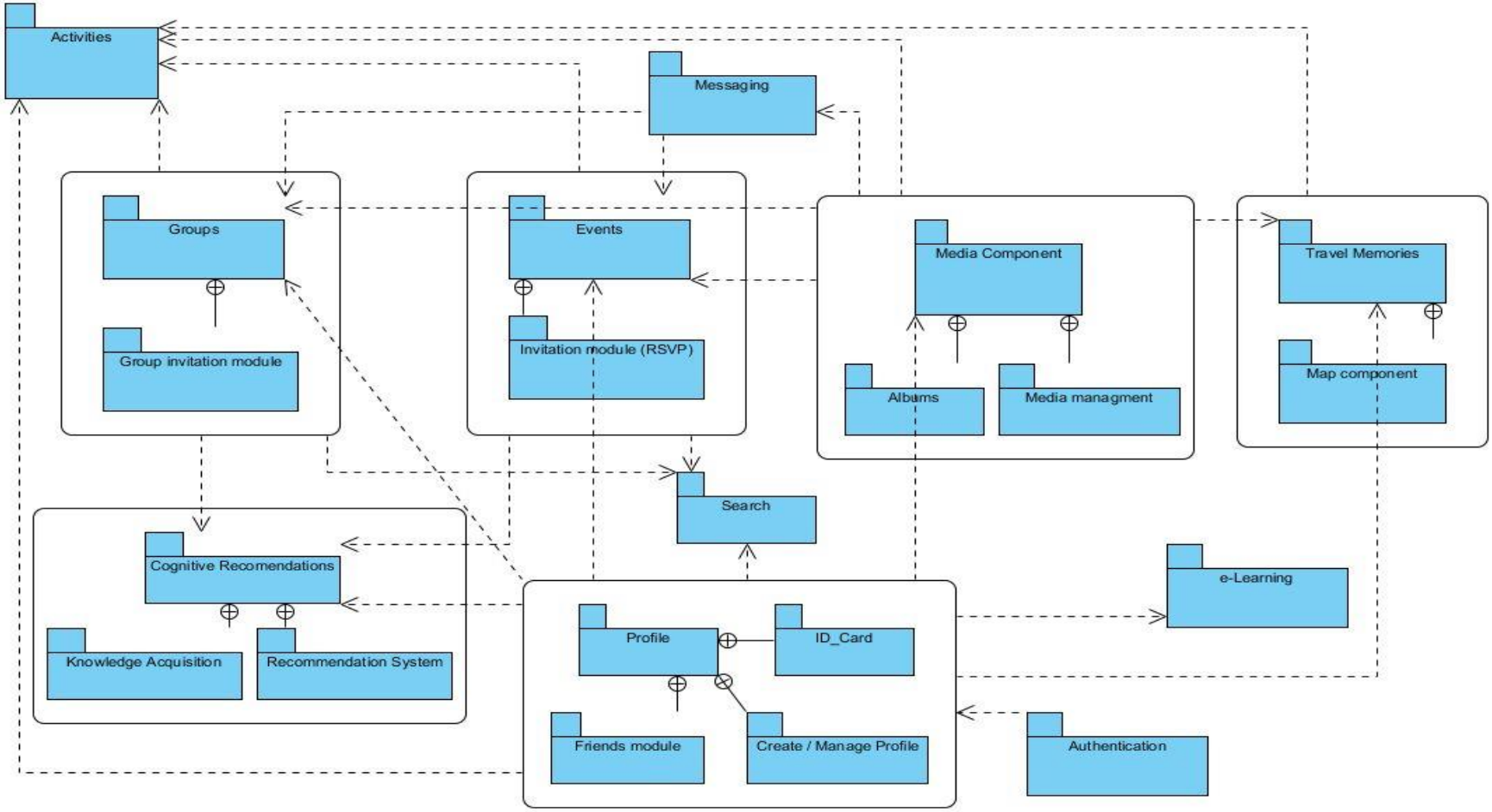

Figure 15: Logical view diagram

5.2 Component View UML

Component view focuses mainly on the software module organization in the platform. The different sub systems of the platform are defined along with all necessary interconnection.

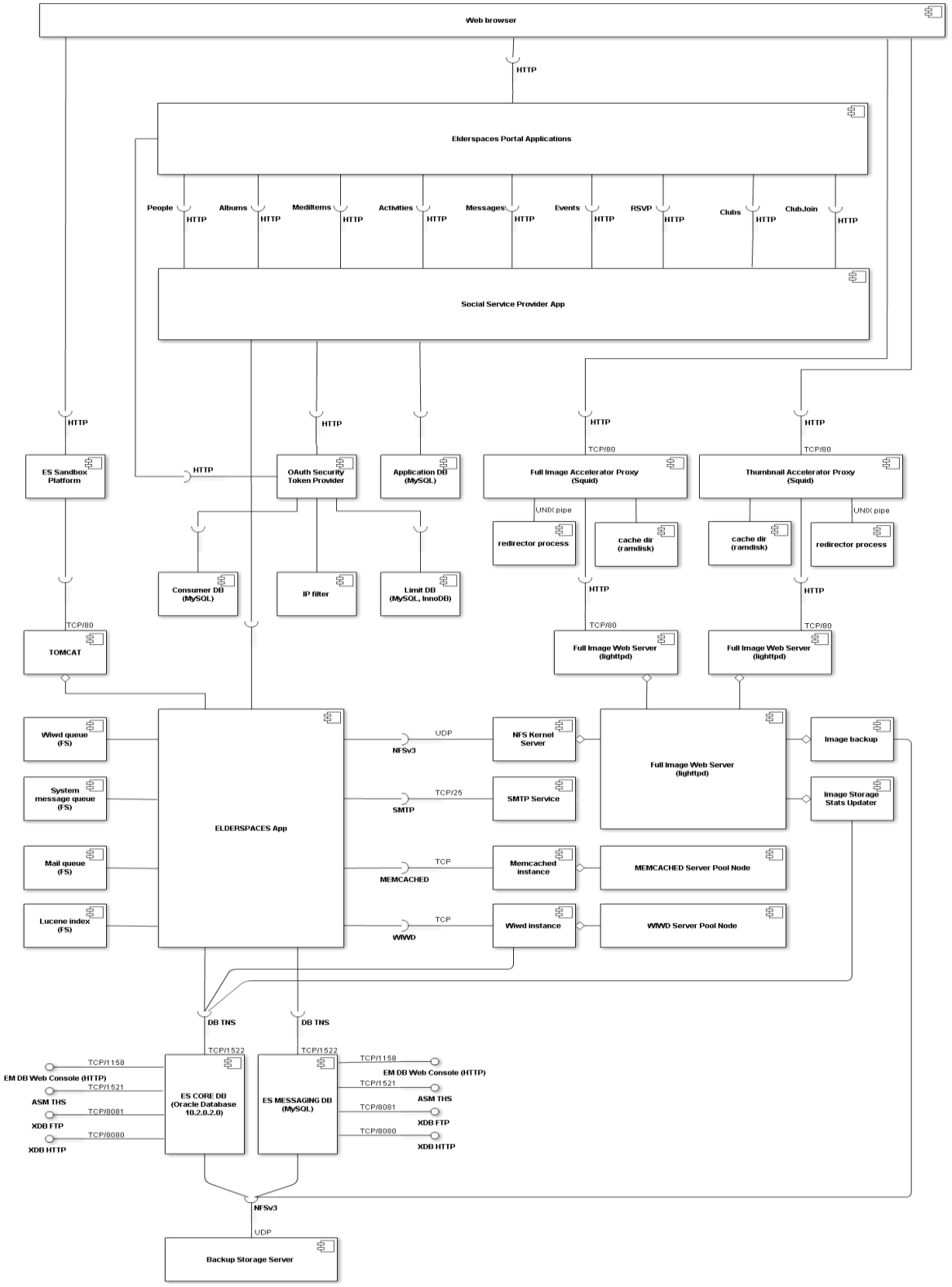

Figure 16: Implementation view diagram

5.3 Deployment View UML

This design diagram focuses on the actual physical layout where the components defined in the previous design are to be deployed.

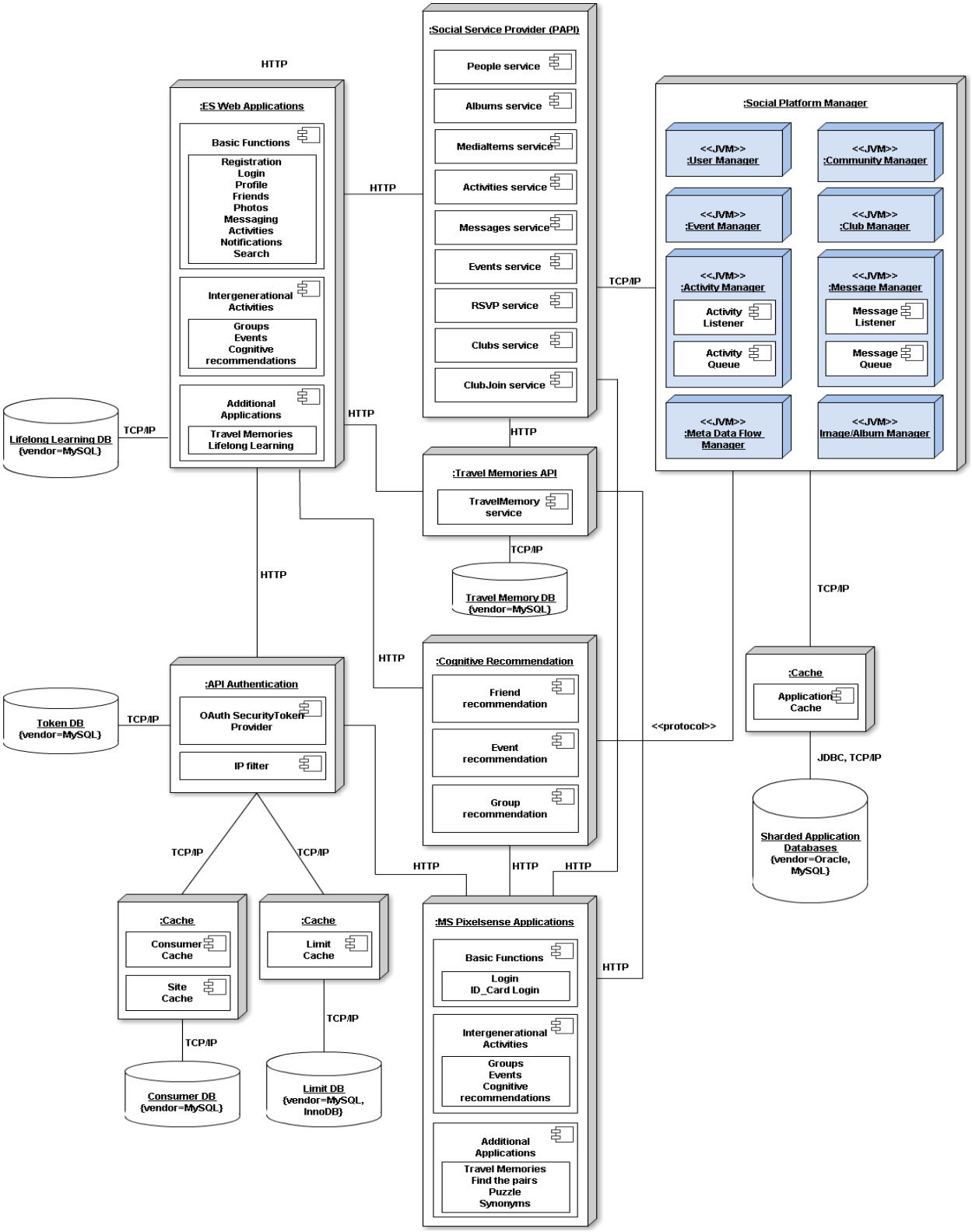

Figure 17: Deployment view diagram

6. SOA Model and RESTful Services

In this chapter we present an overview of the resources used by the available RESTful services. At first, the different entities are defined. Following that, a summary of the implemented REST services is provided.

6.1 Elder-Spaces Entities

The following assignment summarizes the available API entities. A short presentation of the contained information follows. The complete specification can be found in the accompanying appendix file "API Appendix". We present here a short version of the definitions in order to provide the necessary information without encumbering the reader with too many technical details.

Entities are represented in the system in the form of XML, JSON and ATOM. Applications that use these entities may choose the appropriate format, as the system supports all three of them.

Elder-Spaces Entities:

- The Person Object
- The Album Object
- The MediaItem Object
- The Activity Object
- The Message Object
- The Comment Object
- The Event Object
- The RSVP Object
- The Club Object
- The Join Club Object

6.1.1 The Person Object

The entity holding the data of persons present in the system. It includes personal information, contact information, images for the profile as well as processed information related to each call, like the relationship of the person to the viewer.

Field	Type	Comment
aboutMe	String	Free text introduction of this person.
activities	String[]	Hobby interests of this person
addresses	Custom data structure	Physical addresses of this Person.
age	Int	The age of this person.

Field	Type	Comment
birthday	Date	The birthday of this person.
books	String[]	The favourite books of this person.
currentLocation	Custom data structure	The current physical address of this person.
displayName	String	The name of this Person, suitable for display to end-users
emails	Custom data structure	E-mail address for this Person
gender	String	The gender of this person. Must be male or female.
interests	String[]	The favourite hobbies of this person.
id	String	Unique identifier for the Person.
jobInterests	String	Appropriate field of the Data Sheet
languagesSpoken	String[]	Languages spoken.
movies	String[]	The favourite movies of this person.
music	String[]	The favourite music of this person.
name	Custom data structure	User's full name
nickname	String	The casual way to address this Person in real life
pets	String	The pets of this person.
phoneNumbers	String[String[]]	Phone number for this Person.
profileUrl	String	The URL of this user's Elder-Spaces profile.
profileVideo	String	N/A
quotes	String[]	The favourite quotes of this person.
thumbnailUrl	String	The URL of the smaller thumbnail (64x64) of this user.
tvShows	String[]	The favourite TV shows of this person.
updated	DateTime	The most recent date the details of this Person were updated
utcOffset	DateTime	The offset from UTC of this Person's current time zone
lastLogin	Date;	The last login time.
yearOfBirth	Int	The year of birth of this person.
monthOfBirth	Int	The month of birth of this person.
dayOfBirth	Int	The day of birth of this person.
monthOfNameDay	Int	The month of name day of this person.
dayOfNameDay	Int	The date of name day of this person.
maidenName	String	Name of this person at birth.
friendsCount	int	The number of friends
relation	RelationType (self, friend, pendingIn, pendingOut)	The connection of the given Person to the viewer user initiating the query; it can be nil, if there is no connection at all
connectionPending Count	int	The number of dependent connections
unreadMessageCo	int	The number of unread messages (incoming).

Field	Type	Comment	
unt			
birthDayCount	int	The number of friends having birthday on the given day	
nameDayCount	int	The number of friends having name day on the given day	
aol	String	The AOL identifier of this person.	
blog	String	The Blog page URL of this person.	
icq	String	The ICQ identifier of this person.	
msn	String	The MSN identifier of this person.	
skype	String	The Skype identifier of this person.	
freetimeInterests	String	The appropriate field of the Data Sheet: “I do this when not working”.	
registrationDate	Date; UTC String format	Date of registration.	
settings	String	The user settings.	
		Key	Value
		image.commenter	EVERYBODY / FRIEND / NOBODY
thumbnail2Url	String	The URL of the bigger size thumbnail (128X128).	

6.1.2 The Album Object

Albums represent collections of MediaItems.

Field	Type	Comment
description	String	The description of this album.
id	Int or String	The identifier of the album. Basically Int, but there are two exceptions of String: @default – profile images @activity – news flow and mobile images
mediaItemCount	Int	The number of MediaItems in this album.
ownerId	String	The identifier of the owner user.
thumbnailUrl	String	The thumbnail URL of this album.
title	String	The title of this album.

6.1.3 The MediaItem Object

Entity carrying images, videos, voice recordings. By means of it media contents can be attached to also other entities

Field	Type	Comment
albumId	Int or String	The identifier of the album. Basically Int, but there are two exceptions of String: @default – profile images @activity – news flow and mobile images
created	Date; UTC String format	The date when this MedaItem was created.

Field	Type	Comment
description	String	The description of this MediaItem.
fileSize	Number	The size in bytes of this MediaItem.
id	String	The unique identifier of this MediaItem.
lastUpdated	Date; UTC String format	The date of the last update of this MediaItem.
mimeType	String	The mimeType of this MediaItem.
numComments	Int	The number of comments on of this MediaItem.
thumbnailUrl	String	The thumbnail URL of this MediaItem.
title	String	The title of this MediaItem.
type	String	The type of this MediaItem. (i.e. IMAGE)
url	String	The URL of this MediaItem.

6.1.4 The Activity Object

Entity representing the news flow elements, incidences. The Activity feed functionality is also realised through this

Field	Type	Comment
appId	String	Unique identifier of the activity generating application. It plays a role only in case of application activities.
body	String	The description of this activity.
bodyId	String	In case of using activity templates, the identifier of the concerning activity body template.
id	String	The unique identifier of this activity.
mediaItems	MediaItem[]	List of MediaItem Objects attached to this activity.
postedTime	Date	The date when this activity was posted.
templateParams	String[]	the passed key-value pairs to the concerning activity template.
title	String	The title of this activity.
titleId	String	In case of using activity templates, the identifier of the concerning activity title template.
userId	String	The unique identifier of the user corresponding to the activity.

6.1.5 The Messages Object

The entity used for private messages between users.

Field	Type	Comment
body	String	The body of this message
collectionIds	String	The identifier of the message container. Two special collectionId: @inbox; @outbox
id	String	The unique identifier of this message.
inReplyTo	String	The unique identifier of the replied user.
recipients	String[]	The unique identifiers of the recipient users.

Field	Type	Comment
senderId	String	The unique identifier of the sender user.
status	String	The status of this message: (new, unread, deleted)
timeSent	Date;	The date when this message was sent.
title	String	The title of this message
type	String	The type of this message. Only PRIVATE_MESSAGE.
postboxStatus	postboxStatus	Secondary mailbox status

6.1.6 The Comments Object

The entity used for representing user comments

Field	Type	Comment
Id	String	The unique identifier of the comment.
Text	String	The comment text.
Created	Date	The date of creation.
CreatorId	String	The unique identifier of the creating user.

6.1.7 The Event Object

Entity carrying the data of events introduced in the Events function

Field	Type	Comment
id	String	The unique identifier of this event.
name	String	The name of this event.
description	String	The description of this event.
shortDescription	String	The short description of this event.
startDate	String	Time of Event start
endDate	String	Time of Event end
category	String	Event category
location	String	The location of this event.
address	String	The physical address of this event.
addressLatitude	Float	The location coordinates of this event.
addressLongitude	Float	

6.1.8 The RSVP Object

Entity carrying information about the invitations to join groups.

Field	Type	Comment
personID	String	User identifier
eventide	String	Event identifier
Status	String	RSVP Status (Invited, Yes, No, Maybe)

6.1.9 The Club Object

Entity carrying the data of clubs introduced in the Clubs function. It is also named Groups with respect to user requirements and functionality description.

Field	Type	Comment
id	String	The unique identifier of this club.
name	String	The name of this club.
description	String	The description of this club.
shortDescription	String	The short description of this club.
category	String	Club category

6.1.10 The Join Club Object

Entity carrying the data of joining a user to a club

Field	Type	Comment
personId	String	The unique identifier of the user.
ClubId	String	The unique identifier of the club
Status	String	The join status. Possible values: INVITED, YES, NO

6.2 Elder-Spaces Services

The following table summarizes the available API services and also the main use cases with reference numbers to their detailed specifications in the API specification appendix.

Service	REST method	Use case
2.1 People Service	GET	2.1.1 Get user
		2.1.2 Get friends
		2.1.3 User search
		2.1.4 Get friend requests (= profile function notifications)
	POST / PUT	2.1.5 Add or modify user data
		2.1.6 Add friend
	DELETE	2.1.7 Deleting existing or dependent connection
		2.1.8 Delete user
2.2 Albums Service	GET	2.2.1 Get albums
		2.2.2 Get album comments
	POST / PUT	2.2.3 Create or modify album
		2.2.4 Create album comment
	DELETE	2.2.5 Delete album
		2.2.6 Delete album comment
2.3 MediaItems Service	GET	2.3.1 Get photos
		2.3.2 Get photo comments

Service	REST method	Use case
	POST / PUT	2.3.3 Upload or modify photo
		2.3.4 Create photo comment
	DELETE	2.3.5 Delete photo
		2.3.6 Delete photo comment
2.4 Activities Service	GET	2.4.1 Get activities
	POST / PUT	2.4.2 Create activity
	DELETE	2.4.3 Delete activity
2.5 Messages Service	GET	2.5.1 Get messages
	POST / PUT	2.5.2 Create and send message
	DELETE	2.5.3 Delete message
2.6 Events Service	GET	2.6.1 Get events (includes events notifications)
		2.6.2 Search events
	POST / PUT	2.6.3 Create or modify event
	DELETE	2.6.4 Delete event
2.7 RSVP Service	GET	2.7.1 Get user's RSVP status of an event
		2.7.2 Get RSVP statuses of an event
	POST / PUT	2.7.3 Invite, join, maybe attend or decline user to an event
2.8 Clubs Service	GET	2.8.1 Get clubs (includes groups function notifications)
		2.8.2 Search club
		2.8.3 Get club activities
	POST / PUT	2.8.4 Create or modify club
		2.8.5 Create club activity
	DELETE	2.8.6 Delete club
		2.8.7 Delete club activity
2.9 ClubJoin Service (Groups)	GET	2.9.1 Get the user's club join record (YES / INVITED)
		2.9.2 Get club members or the list of invited people
	POST / PUT	2.9.3 Invite or join user to a club
	DELETE	2.9.4 Delete user from a club
2.10 Cognitive Recommendation Services	GET	2.10.1 Recommendation of friends
		2.10.2 Recommendation of events
		2.10.3 Recommendation of Clubs – Groups of users
	POST	2.10.4 Event Listener Service
2.11 Authentication	GET	2.11.1 Get requestToken
		2.11.2 Authorization
		2.11.3 Get accessToken

7. User Interface and Accessibility

7.1 Site Template

Besides the information presented here, we introduced an appendix file: UI Appendix, which includes detailed specifications about elements layout, images, spacing and colours.

7.1.1 Site elements

Two different kinds of page structure could be found in the platform. The main page is different from any other Elder-Spaces page, because that's the main navigation screen.

Components:

- Header
- Main menu
- Activity feed
- Home tab
- Footer

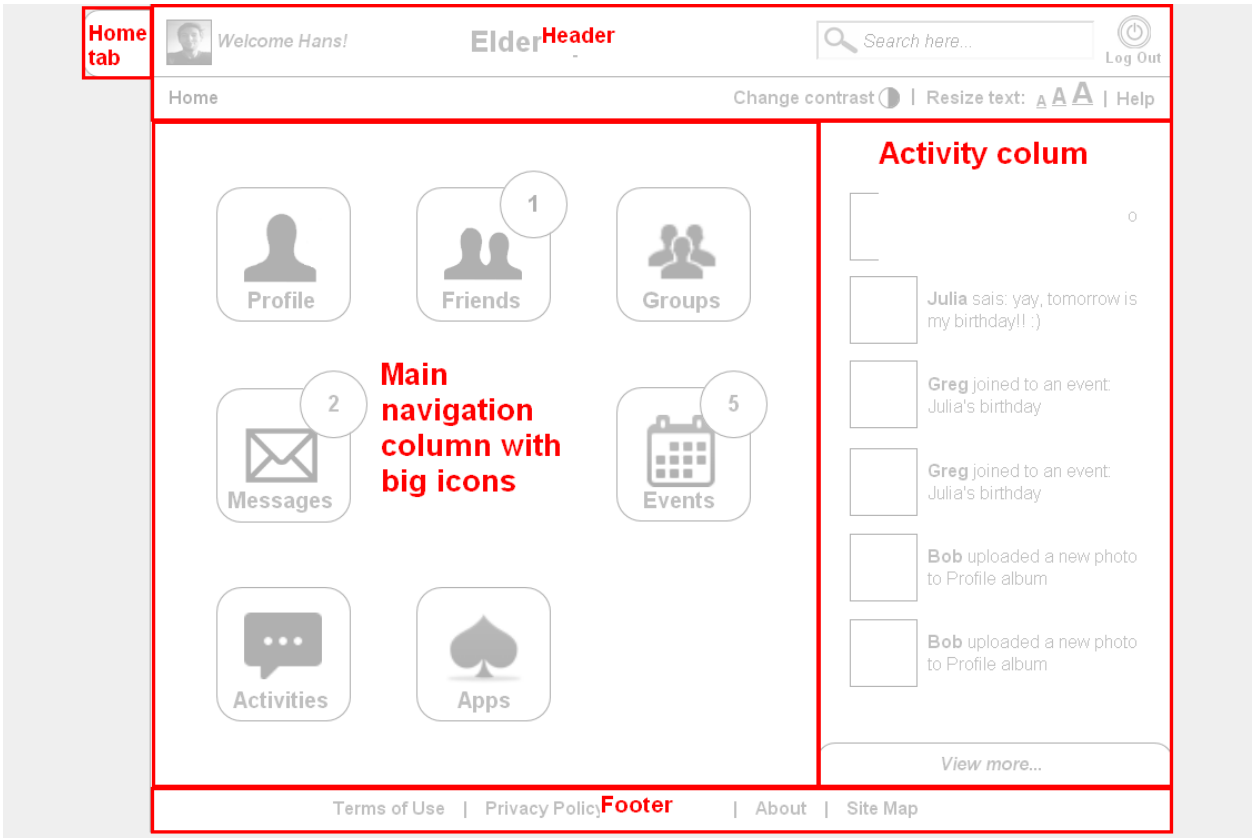

Figure 18: Main page UI

The subpages components:

- Header
- Local navigation
- Main content column
- Tab menu: global navigation
- Footer

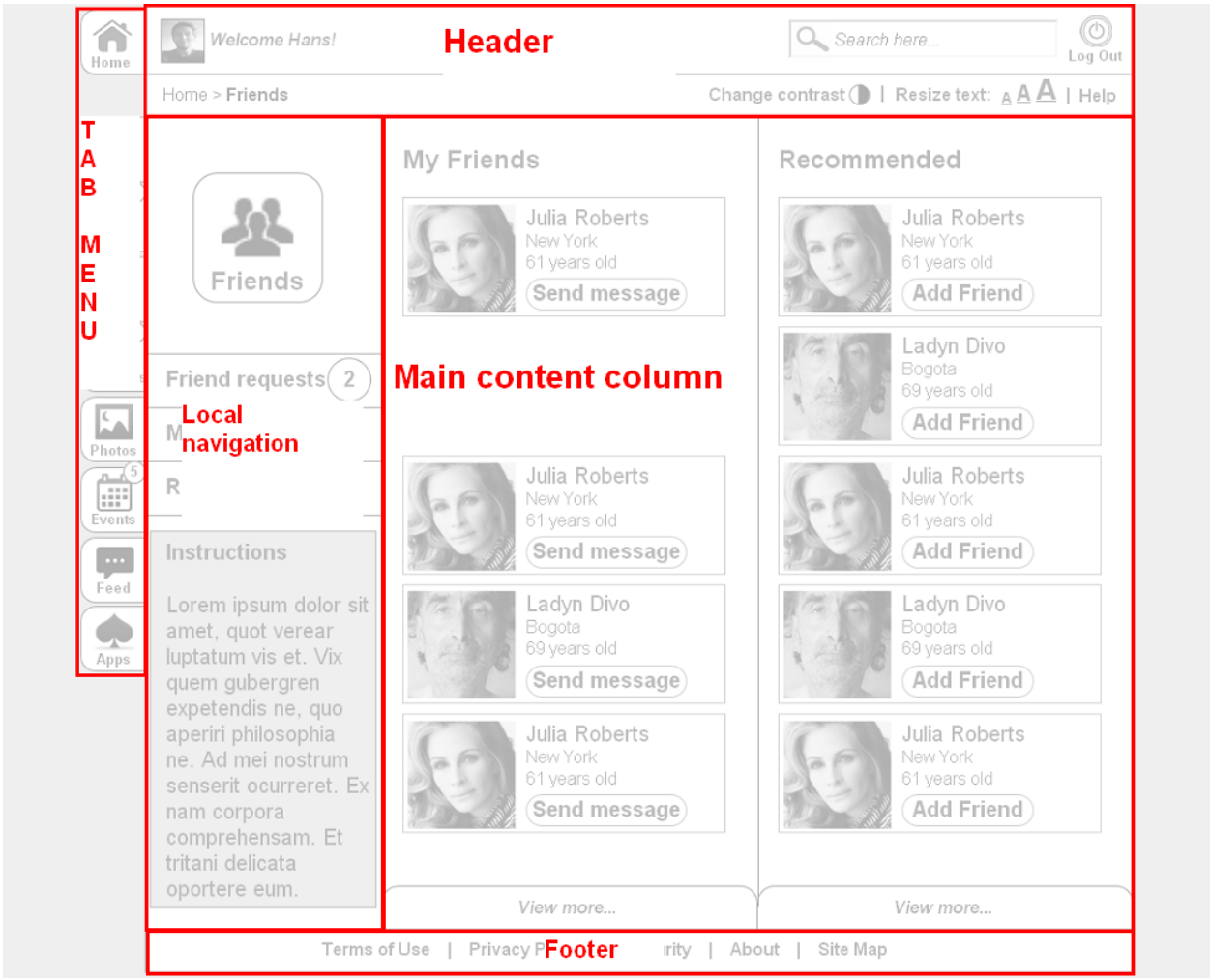

Figure 19: Subpages UI

7.1.1.1 Header wireframe

The header UI to be implemented in the frame that is available on any Elder-Spaces page

Figure 20: Header UI

Screen Name	Header
Description	Headers provide site identity, search, and welcome message with the thumbnail and log out function.
Components	Top ribbon: Logo, search filed with buttons, user thumbnail picture with welcome message and log out. Bottom ribbon: navigation path, Change contrast, resizes text and Help.
Functionality	Top ribbon: • Tap once into the Elder-Spaces logo in order to access the "Main page" • Search field with search button: user enter the text and push the button, the search list appears on a dropdown list. Possible to search for people, events and groups. If the user writes the text into the search field and clicks enter, the search panel appear above the actual page. • Thumbnail picture with the text "Welcome <user first name>!" links into the user "Profile page" • Log out icon, below the text "Log Out": if the user click on it, he/she log Out from Elder-Spaces. Bottom ribbon: • Navigation path: every element clickable, and links into the given page. • "Change contrast" text with the icon: changes the contrast of the page • "Resize text" text with the aA icon: 3 different text size available, with this button the user can change between the possibilities • Help: links into context sensitive help for the user.
Comments	

7.1.1.2 Main navigation column wireframe

A draft UI to be implemented in the frame that is available on the main page.

Figure 21: View Main navigation column

Screen Name	Main Navigation Column
Description	This is the main navigation screen. It displays all available functions.
Components	Buttons in icon format.

Functionality	Tap once an icon in order to access the function: • *Profile* icon, under "Profile" text will display the Profile main page. • *Friends* icon, under "Friends" text will display the Friends main page. In the right top corner of the icon there is a circle with the number of the new friends requests. • *Groups* icon, below the "Groups" text will display the Groups main page. In the right top corner of the icon there is a circle with the number of the new group invitations from the user friends. • *Messages* icon, below the "Messages" text will display the Message main page. In the right top corner of the icon there is a circle with the number of the new messages. • *Photos* icon, below the "Photos" text will display the Photos main page. • *Events* icon, below the "Events" text will display the Events main page. In the right top corner of the icon there is a circle with the number of the new events request from the friends. • Feed icon, below the text "Activities" will display the Activity main page. • Applications icon, below the text "Applications" will display the Applications main page.
Comments	

7.1.1.3 Activity column wireframe

UI to be implemented in the frame that is available on the main navigation page.

Figure 22: Activity column UI

Screen Name	Activity column
Description	This is the column where the friends' newest Elder-Spaces activities will appear. This short description about the activities called "activity".
Components	Title, bigger thumbnail picture about the friends whose about the activity, activity text, View more button.
Functionality	Click once into a component in order to access the functionality • Activity title will display the Activities main page. • Thumbnail & the friends name will display the given friends Profile page. • View more button will display the Activities main page.
Comments	

7.1.1.4 Footer wireframe

The UI to be implemented in the frame that is available on every Elder-Spaces page.

Figure 23: View Profile UI (sample)

Screen Name	Footer
Description	This is the footer. Mostly about housekeeping and legal matters.
Components	Links to secondary pages
Functionality	Click once a link in order to access the information • Terms of Use will display the Terms of Use page. • Privacy Policy will display the Privacy Policy Page. • Security will display the Security Page. • About will display the About page. • Site Map will display the Site Map.
Comments	

7.1.1.5 Local navigation wireframe

The UI to be implemented in the frame that is available on mostly every page of the platform except the main page.

Figure 24: Local navigation UI

Screen Name	Local navigation column
Description	This is the local navigation bar, contains the given functionality's features, it works like a local navigation bar within the given function.
Components	Image, local navigation items, introduction.
Functionality	Click once an item in order to access the function: • Image: icon or picture: - Icon: to be consistent use the same function icon like in the Elder-Spaces main page. It will display the given functions main page (Profile, Friends, Groups, Messages, Photos, Events, Feed, Applications) - Picture: if it is a user profile page, or a given event, given group, with the picture the given page is more specified. It will display the given functions main page (Profile, Friends, Groups, Messages, etc) • Local navigation items will display the given sub function's page, form or layer. Detailed in the functions UI. • Introductions will not display anything. • Introduction
Comments	

7.1.1.6 Main content column wireframe

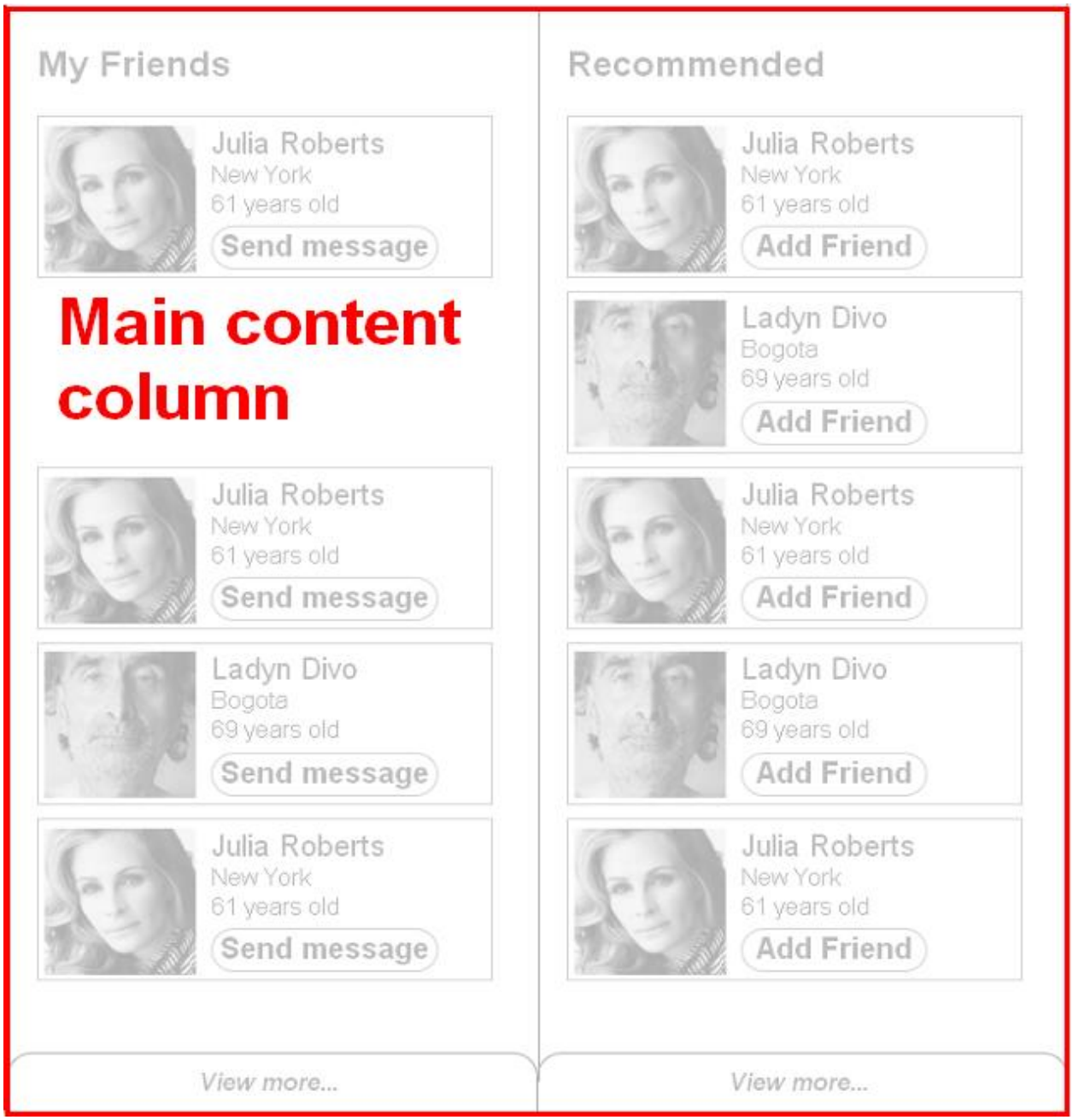

Figure 25: Main content column UI

Screen Name	Main Content column
Description	This is the screen where the given function's content will appear.
Components	Different in any function.
Functionality	Detailed in the given function UI.
Comments	

7.1.1.7 Tab menu wireframe

Figure 26: Tab menu UI

Screen Name	Tab menu
Description	This is the global navigation menu. It displays all available functions.
Components	Tabs with icons
Functionality	The functionality of the tab menu is the same like the main page's big main navigation icons. It appears on any page of the Elder-Spaces platform except the main page. (where the big icons appear) We use the same icons just in a smaller size. In the main page just the Home tab menu appears.
Comments	

7.2 Web pages specifications

In the following paragraphs, we present the detailed specifications of the web pages that Elder-Spaces will be comprised of. They are grouped by functionality, in the same manner as they are divided by in main navigation.

In this section, we emphasize:

- in the wireframe description of all pages
- the provided functionality to the user
- the technical specification of the functionality in the form of sequence diagrams.

The Elder-Spaces site map provides an overview of the different pages of the site. The complete functional wireframes user interface is available online, to demonstrate both layout and functionality (http://dl.dropbox.com/u/8871316/elderspaces/wireframe/Login_page.html)

Site map

- Registration page
- Login page
- Main page
- Profile page
    - Detailed profile page
- Friends page
    - User's friends page
    - Recommended friends page
    - Friend requests page
- Groups page
    - User's groups page
    - Recommended groups page
    - Group invitations page
    - Create group page
    - Detailed group page
        - Group members page
- Messages page = Inbox
    - Sent messages page
    - Write message page – Standard mode
    - Write message pages – Wizard mode
- Photos page

    - User's albums page
    - Album page
    - Photo page
- Events page
    - User's events page
    - Recommended events page
    - Event invitations page
    - Create event page
    - Detailed event page
        - Event participants page
- Feed page
- Apps page
    - Travel Memories application
    - Lifelong Learning application
- Help page
- Terms of Use page
- Privacy Policy page
- Security page
- About page
- Site Map page

7.2.1 Eder-Spaces front page intro

7.2.1.1 UI wireframe

A draft UI to be implemented is the main navigation page.

Figure 27: Wireframe - Front page

7.2.1.2 Functionality Description

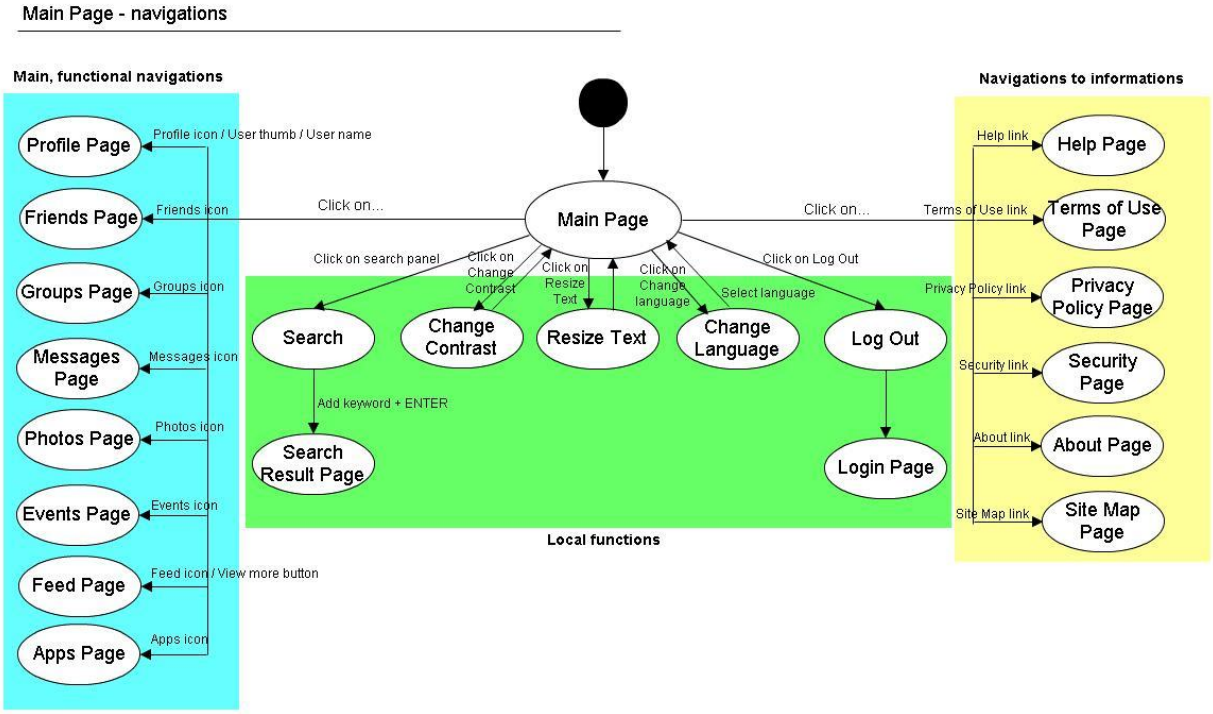

Figure 28: Main page functionality diagram

Screen Name	Main page
Description	This is the main navigation screen. It displays all available functions.
Components	Header Main navigation column Activity column Footer Home tab Main menu Activity feed Home tab Footer
Functionality	It's already described in the site template section.
Comments	

7.2.1.3 Sequence Diagram

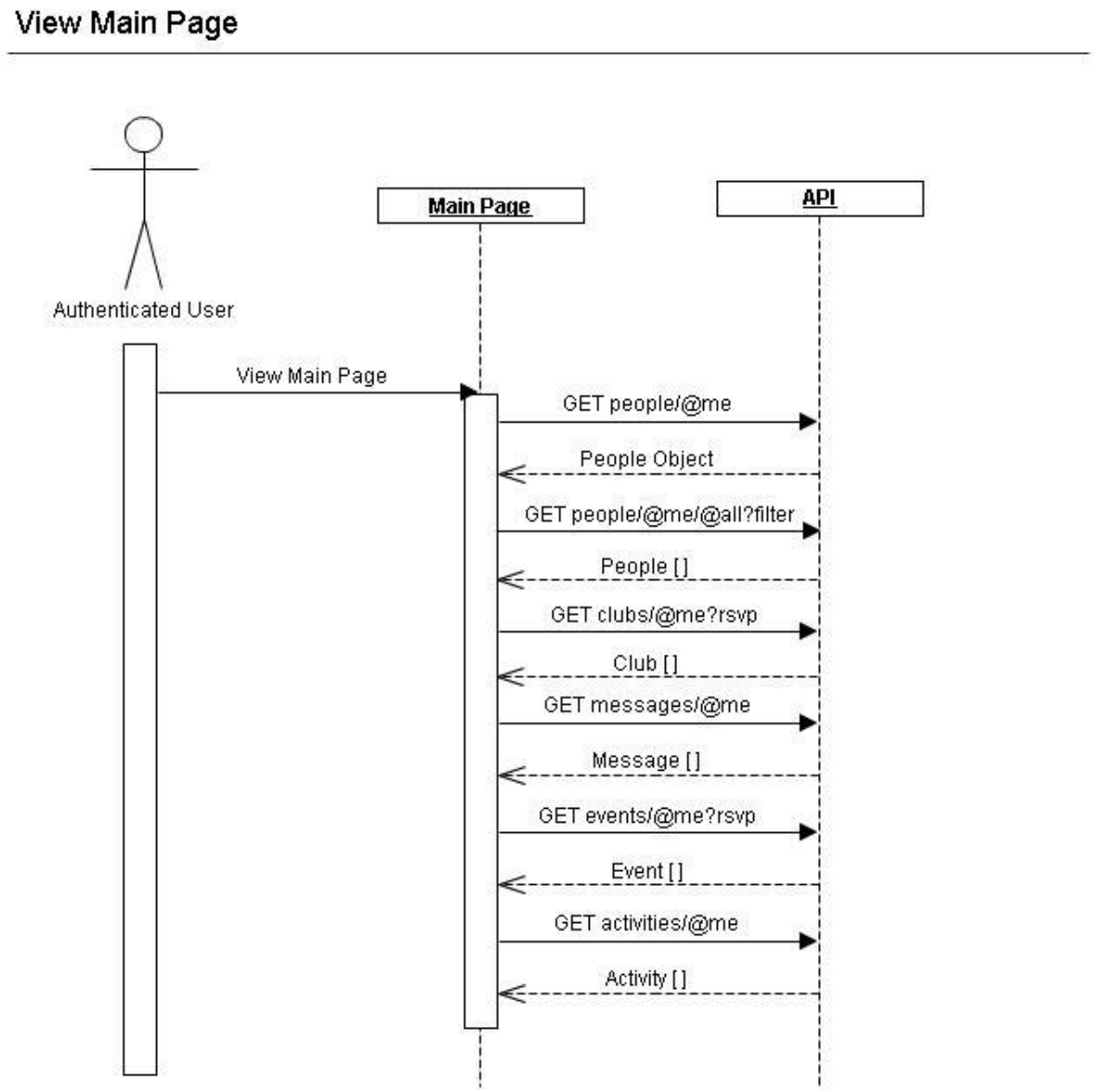

Figure 29: Sequence Diagram Main page

7.2.2 Profile

7.2.2.1 Profile UI wireframe

This is the main page, used for the profile functionality. For the complete reference of these wireframes, consult the accompanying appendix file: "UI Appendix"

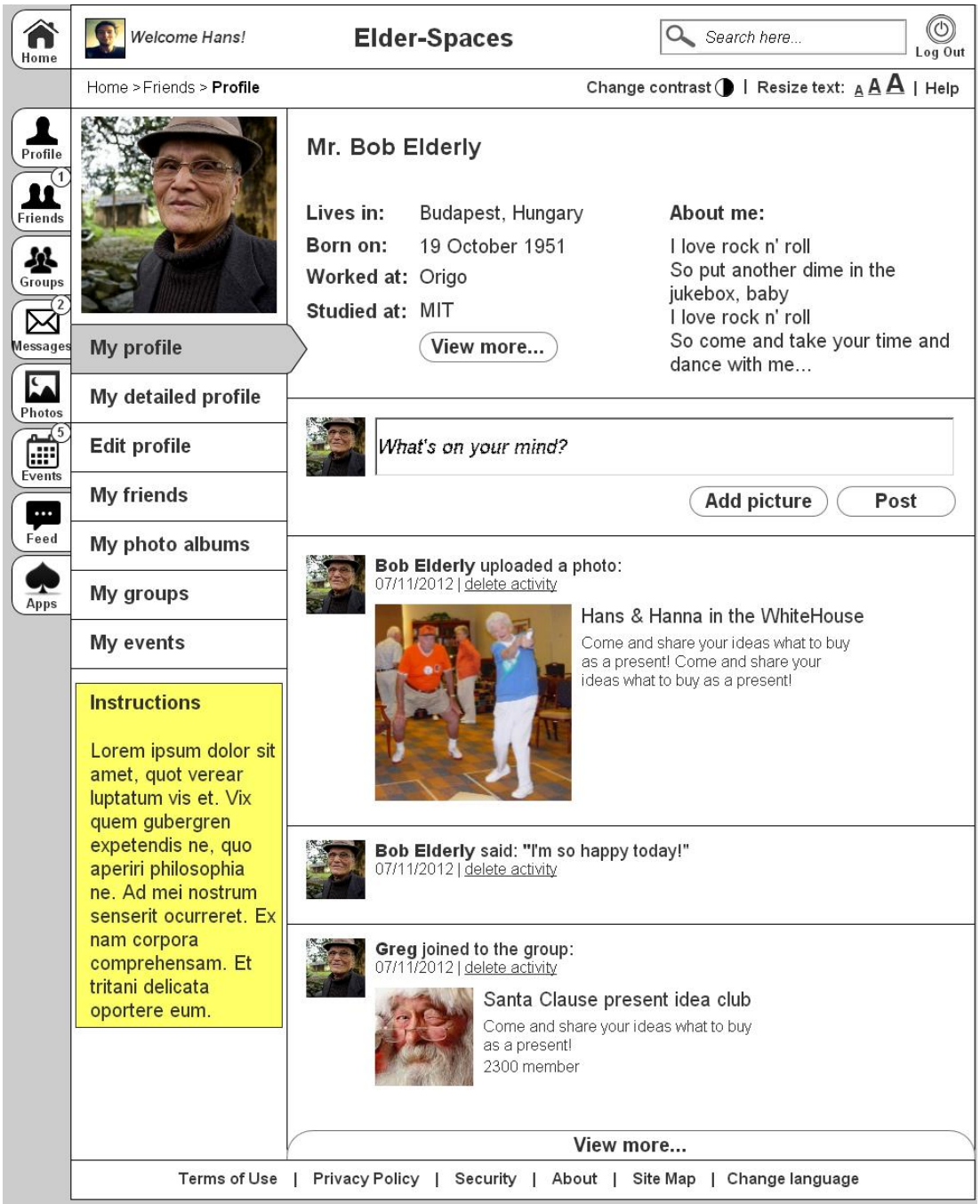

Figure 30: Wireframe -View Profile

7.2.2.2 Functionality Description

Profile functionality encloses all actions related to creation and management of a user's profile.

- Profile management
  - View
  - Edit
  - Delete
  - Change profile photo
  - Change password

Besides providing profile information, in the view profile web page, a collection of information related to each user is also displayed. This view strives to present links to the social footprint of the user. It presents user's activities in the form of a feed, links to the user's photos and friends, as well as links to the user's groups and events.

That way, a visitor to the user's profile page has a reference point to start looking for information related to the user displayed.

In case the viewer is also the user whose profile is displayed (denoted as "self" in the following table), then certain actions are not available. These will be the "Sent Message" and "Add Friend" functionalities.

In cases where the user whose profile is displayed is already a friend to the viewer, then the "Add Friend" functionality will not be displayed.

The following table summarizes differences according to relation between the viewer of a profile and the user displayed.

Table 5: Available actions depending on viewer's relation to displayed profile user

Action	self	is friend	no relation
View profile	■	■	■
View activities	■	■	□
View Notifications	■		
View friend list	■	■	□
View album list	■	■	□
View group list	■	■	□
View events list	■	■	□
Send message	■	■	□
Send Friend Request	■		■
Edit profile	■		

In the following diagram, we present flow diagrams showing the actions available to the profile functionality. Note that some actions are part of other functionalities (view friends, albums, groups, events, send friend invitation and send message). They are mentioned here as part of the flow diagrams that is intended to be use in the profile UI wireframes that follow.

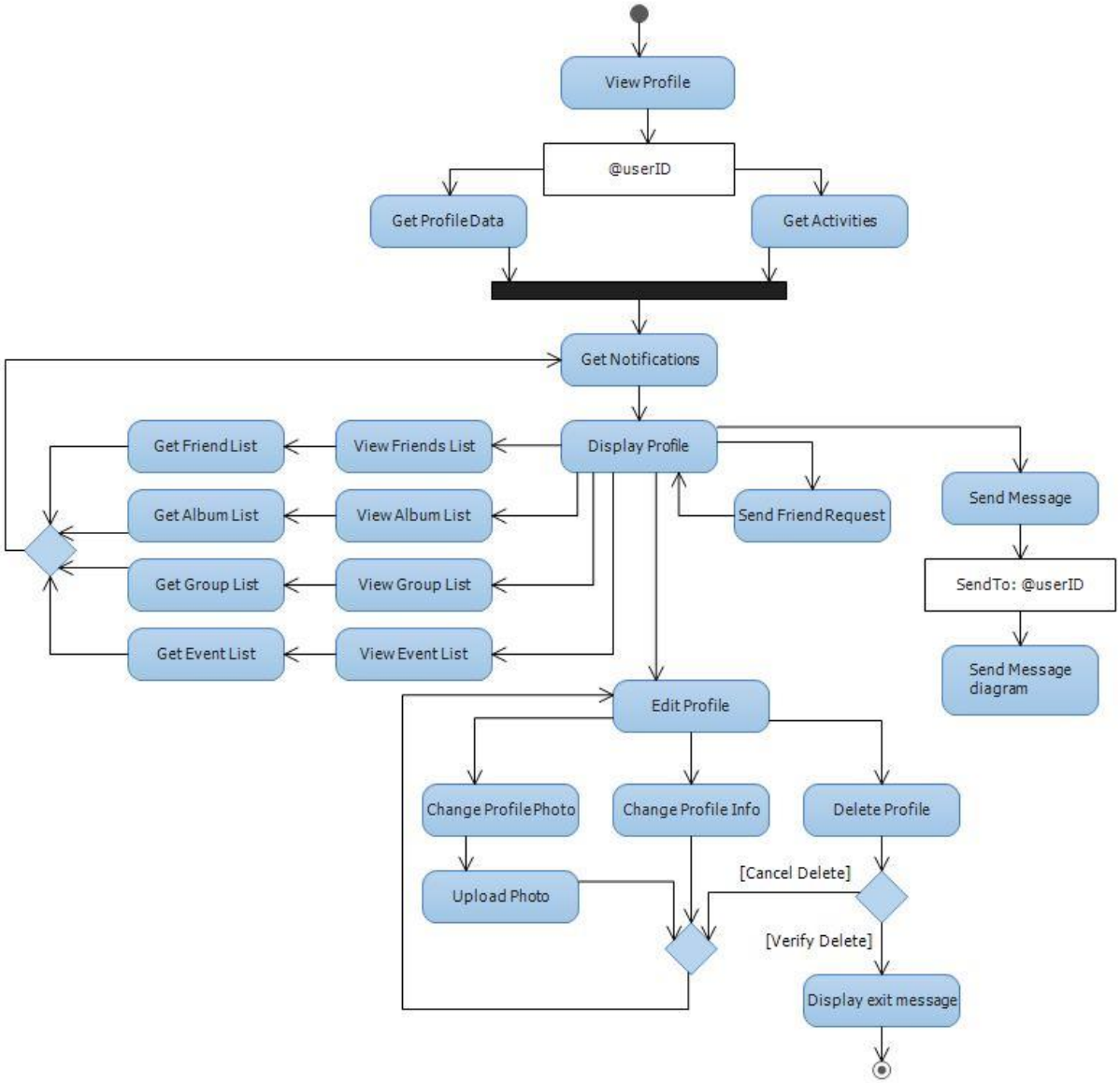

Figure 31: Flow Diagram for Profile pages

7.2.2.3 Sequence Diagram

In the following figures, we present the sequence diagrams for all mentioned functionalities. In order to reduce complexity in the diagrams, error handling is not included.

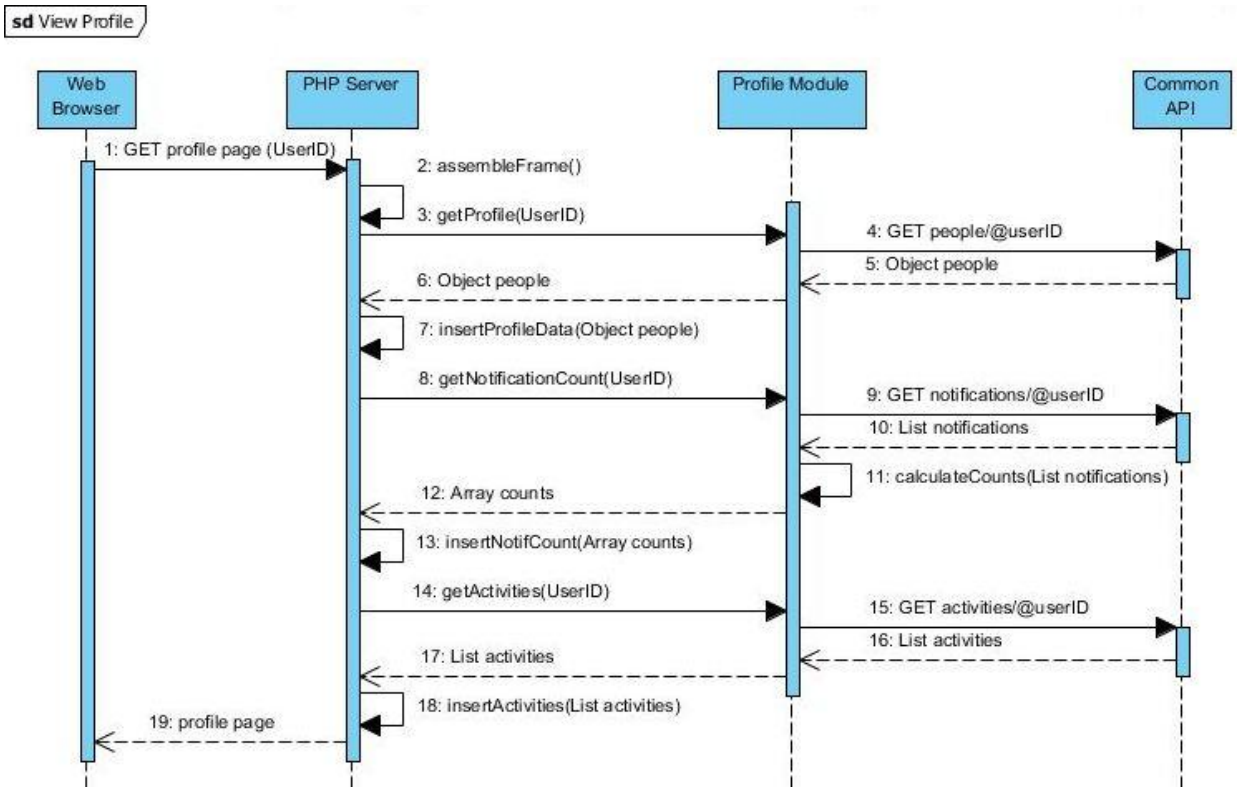

Figure 32: Sequence Diagram for viewing profile

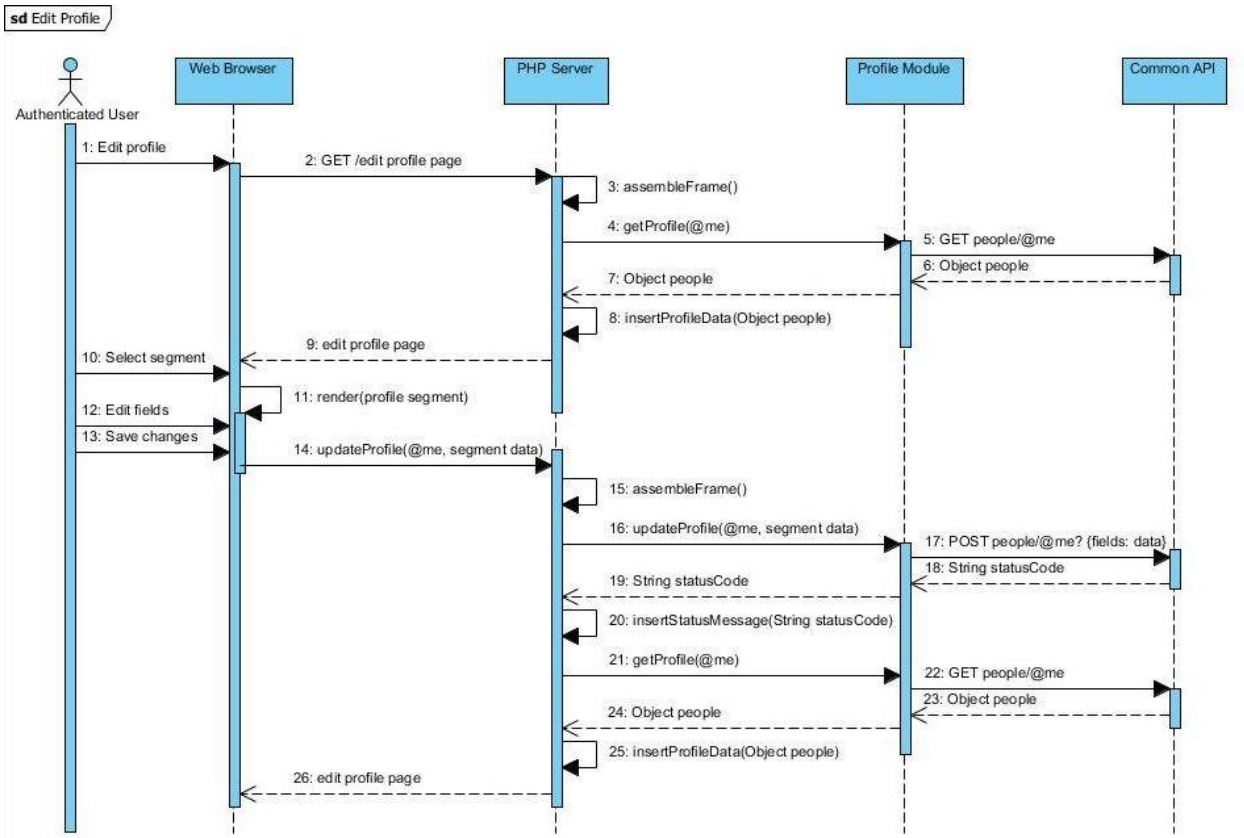

Figure 33: Sequence Diagram for editing profile information

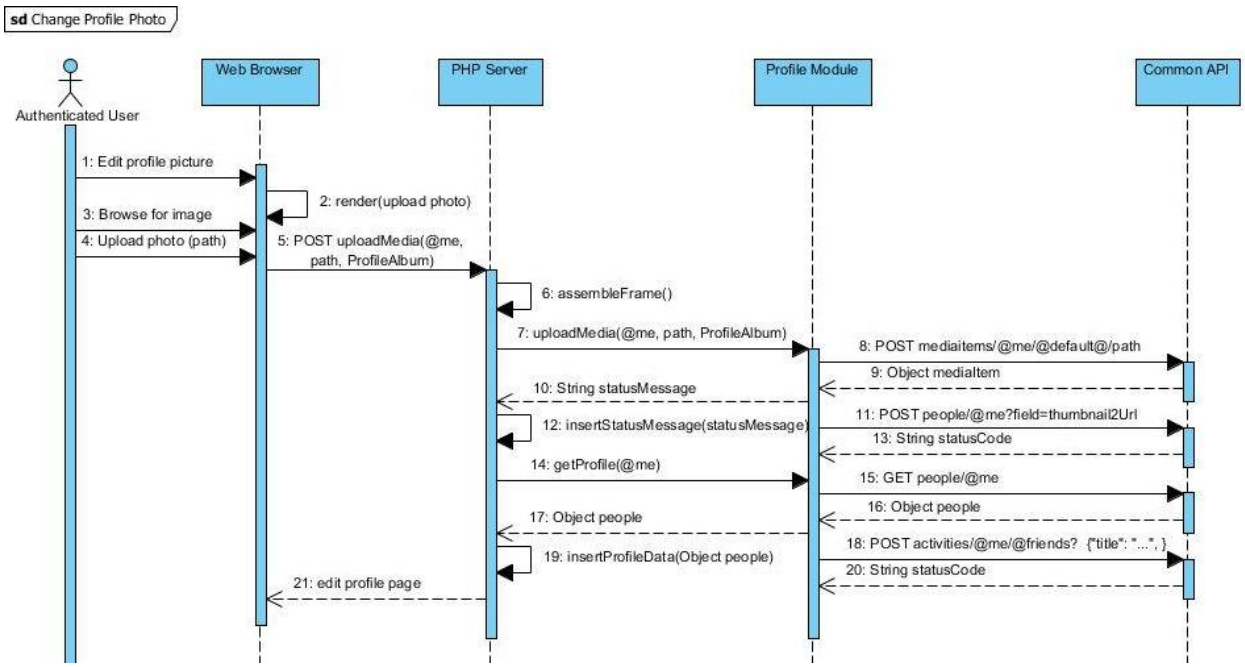

Figure 34: Sequence Diagram for changing profile photo

Note that changing the profile photo generates an activity entry visible to all of the user's friends.

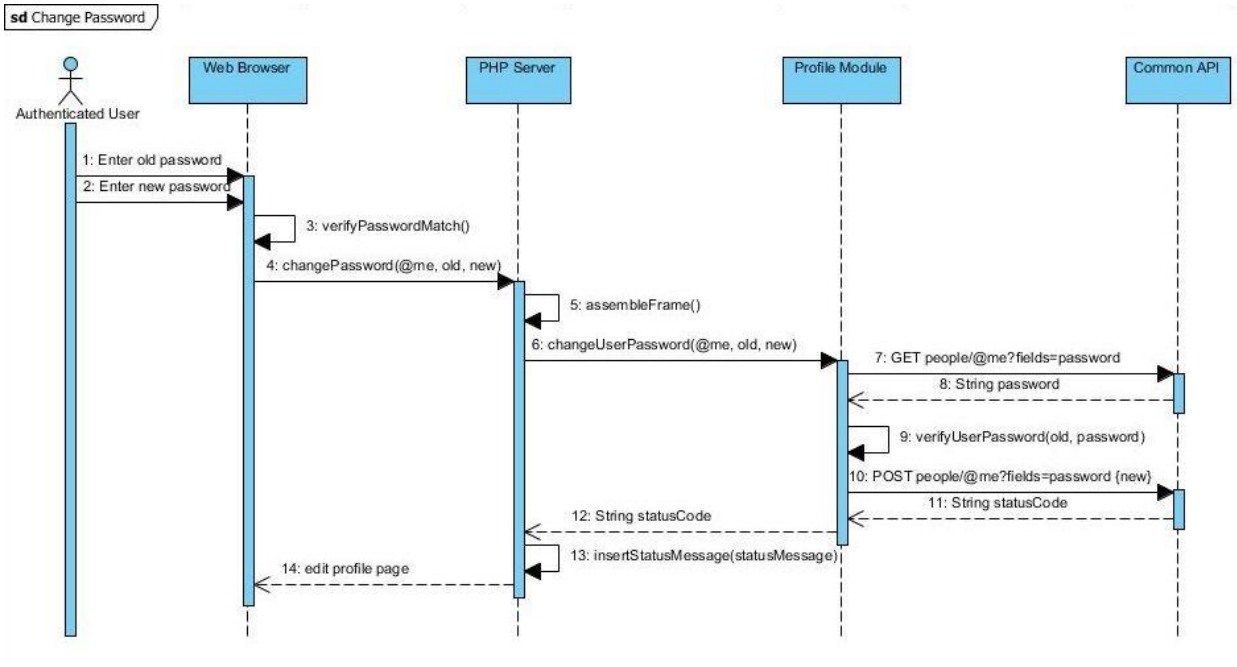

Figure 35: Sequence Diagram for changing password

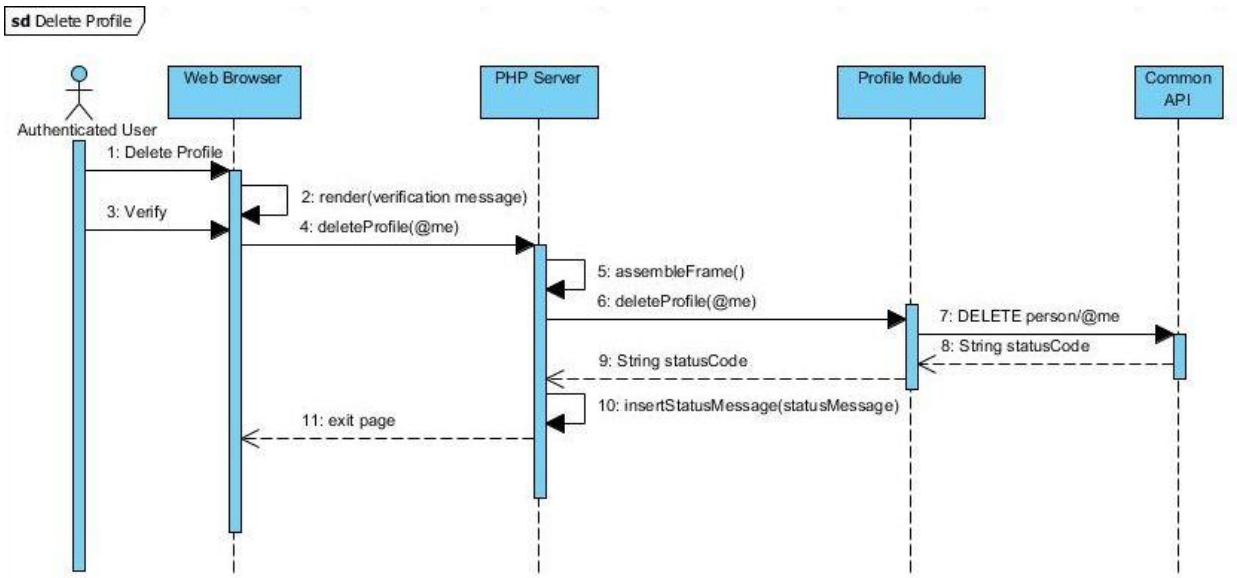

Figure 36: Sequence Diagram for deleting profile

7.2.3 Friends

7.2.3.1 Friends UI wireframe

Figure 37: Friends main page UI

7.2.3.2 Functionality Description

Friends module, manages the relations between users. Functionality of the "friends" web pages is related to managing friends. Additionally, this is the place where communication between friends is encouraged as well as adding new ones through the recommendations module results.

Available functionality includes:

- View fiends (list of friends or individual profile)
- Managing friend requests
    - Accept
    - Decline
- View recommended friend profiles and send friend request

There are other functionalities available, like sending messages to friends, which are going to be specified in the appropriate chapters.

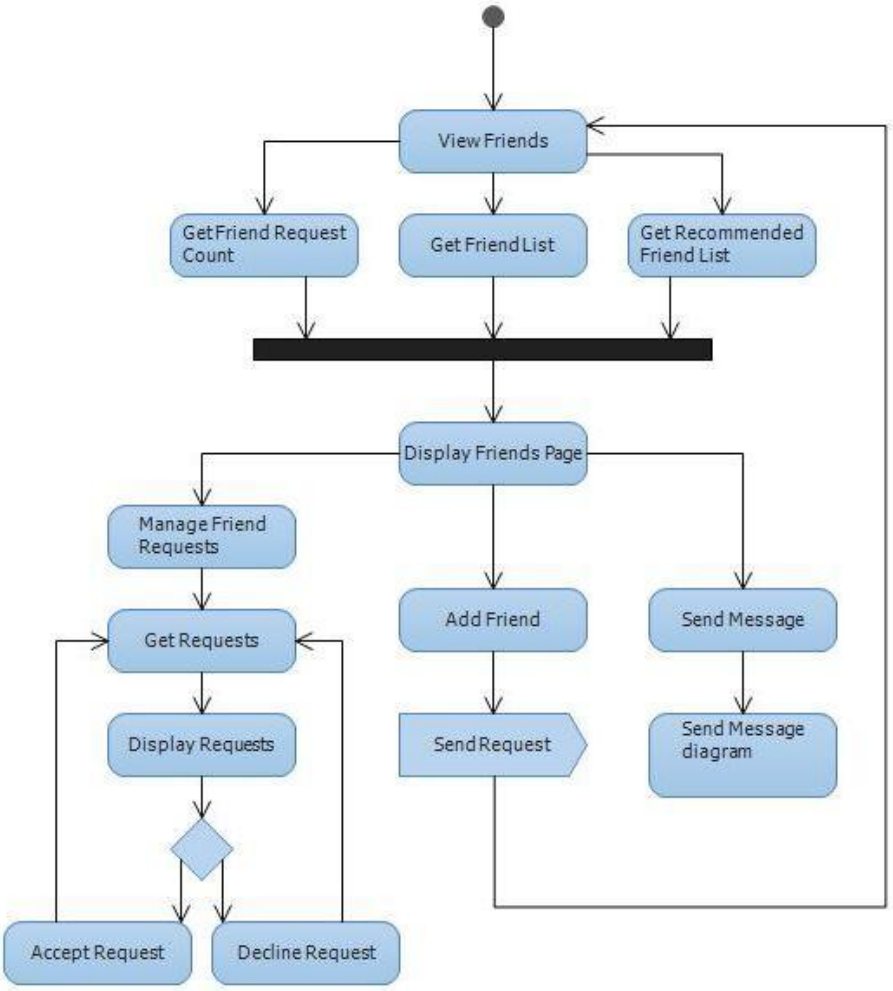

Figure 38: Flow Diagram for friends UI pages

7.2.3.3 Sequence Diagrams

In the following figures, we present the sequence diagrams related to friends' web page actions. We have isolated some diagrams from the user interaction when not necessary, as there are more than one ways to invoke them.

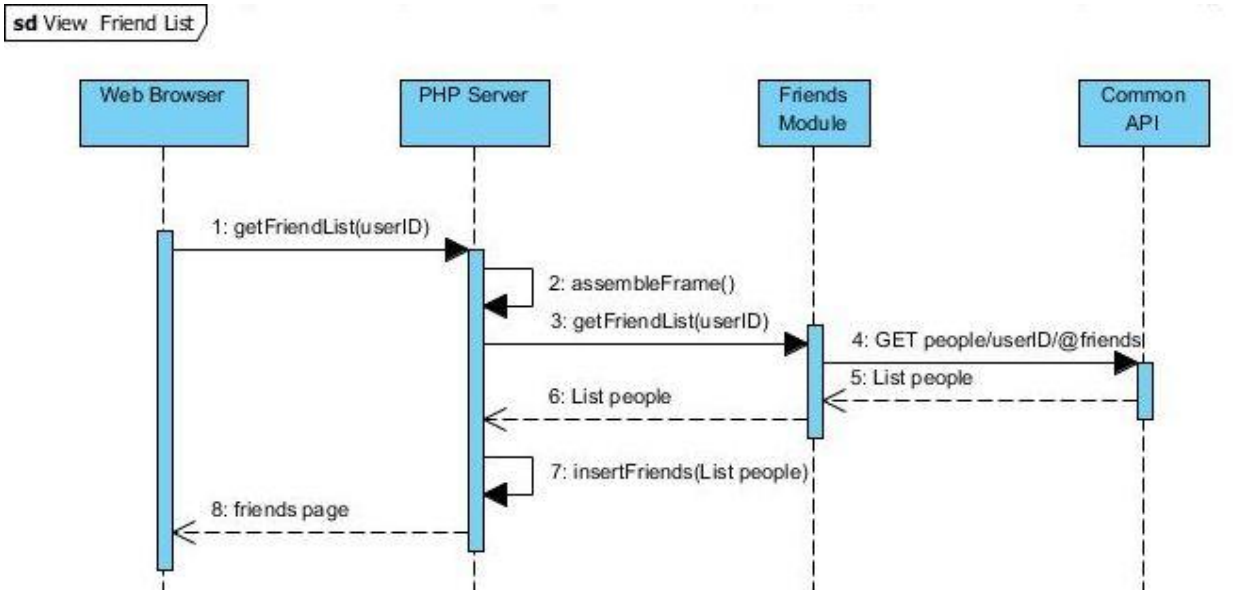

Figure 39: Sequence Diagram for viewing friends list

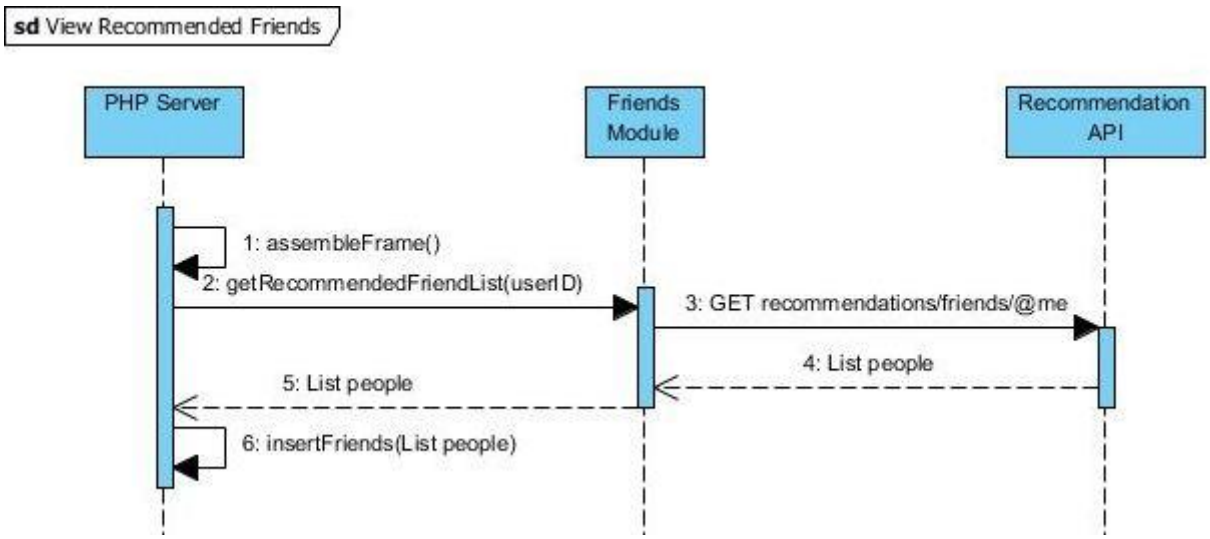

Figure 40: Sequence Diagram for viewing friends list

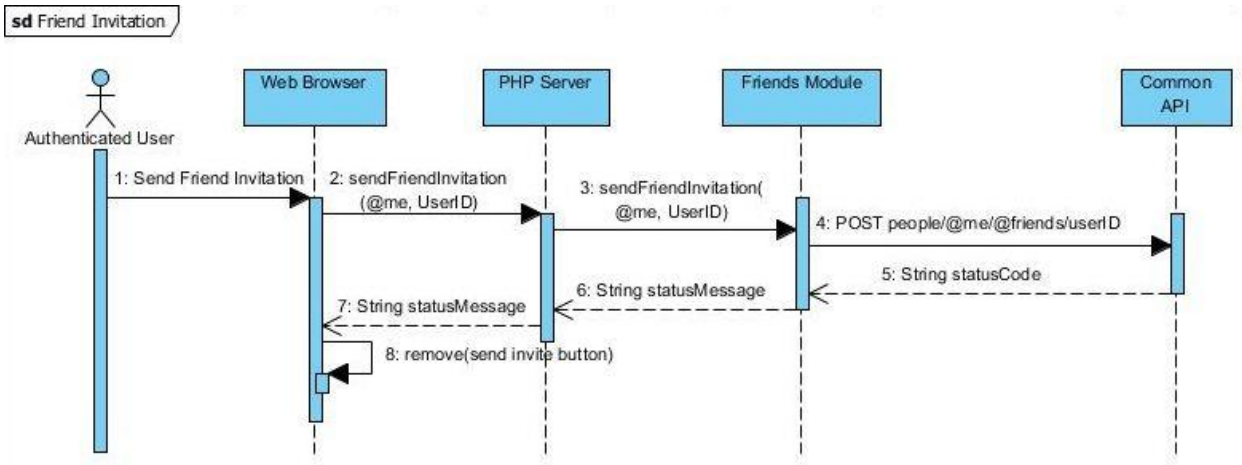

Figure 41: Sequence Diagram for Sending Friend Invitations

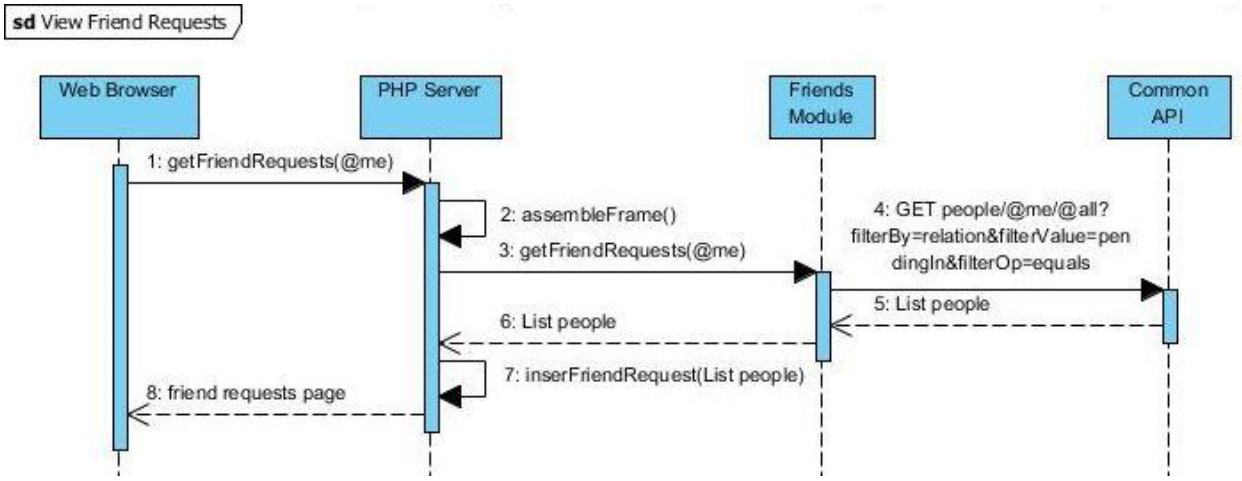

Figure 42: Sequence Diagram for Viewing the Friend Request list

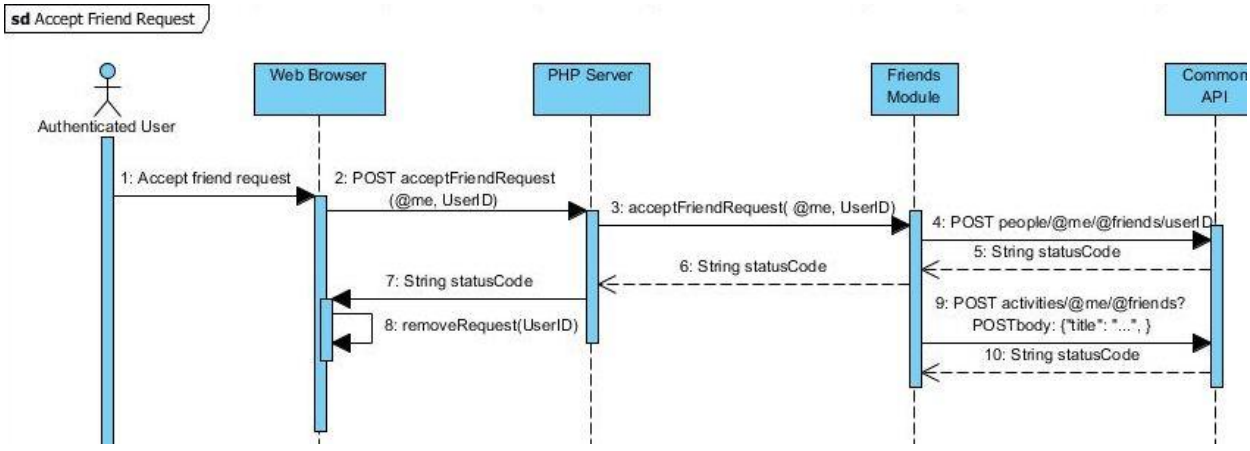

Figure 43: Sequence Diagram for Accepting a Friend Request

Note that accepting a friend request also creates an activity that will be visible to the user's friends.

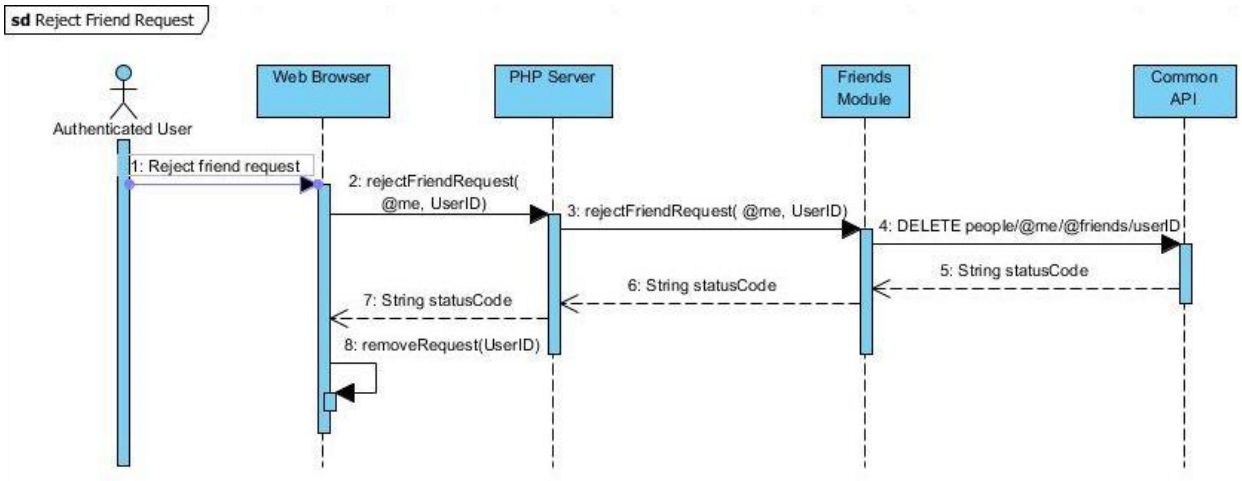

Figure 44: Sequence Diagram for Declining a Friend Request

7.2.4 Messages

7.2.4.1 Messages UI wireframe

Figure 45: Messages main page UI

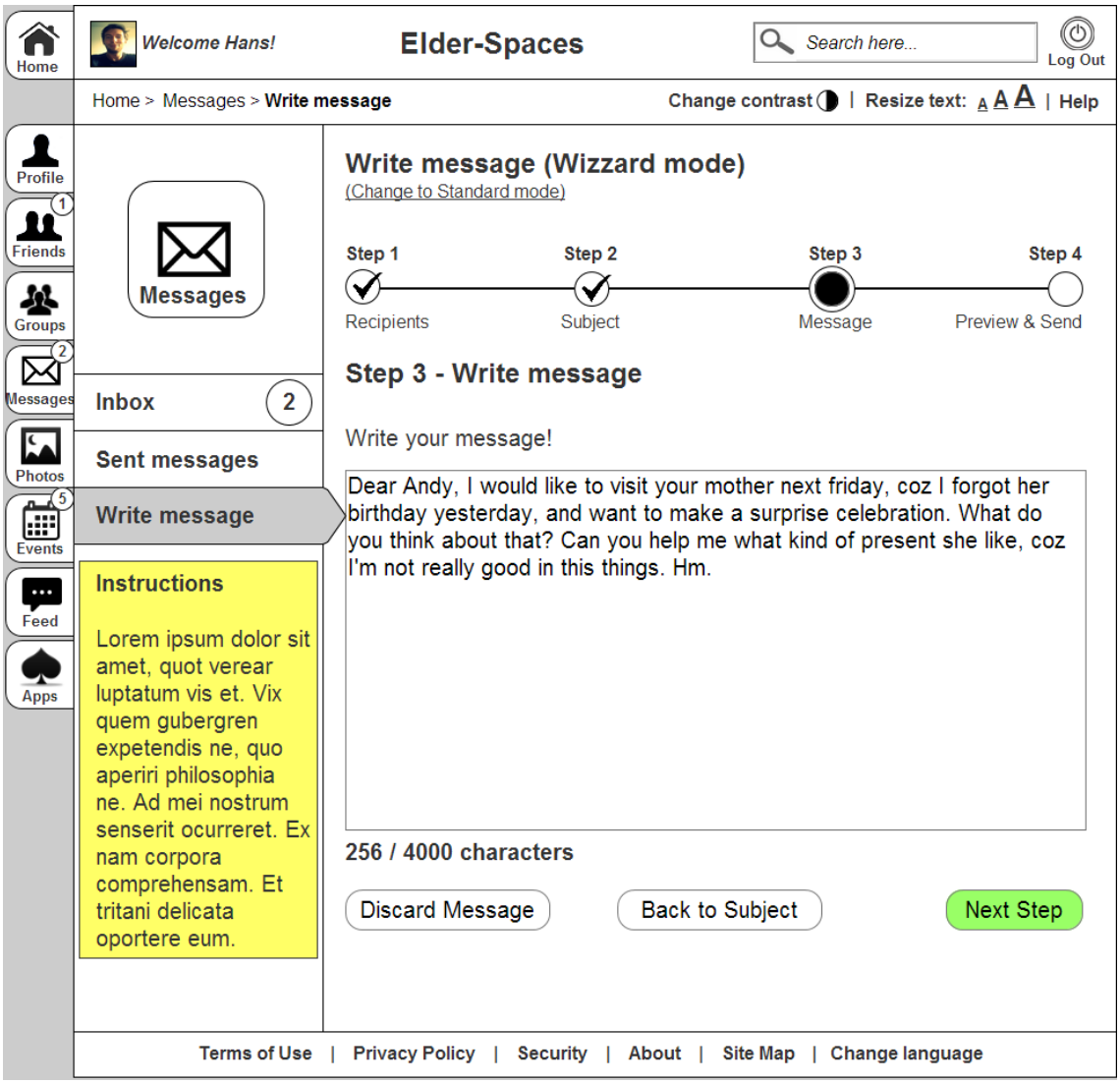

Figure 46: Send message (wizard mode) UI

7.2.4.2 Functionality Description

Messages contain all functionality relevant to private messages between friends. They are structures in the resemblance of standard emails, in order to benefit from any previous experience of the users.

There are two types of messages:

- Inbox messages, received by the user
- Outbox messages, sent by the user.

Functionality related to messaging:

- Read
- Write. Compose a message from an empty template
- Forward. Use the subject and body of an existing message to populate the forwarded one
- Reply. User recipient list, title and body of existing message to create the reply message

- Delete. Logical delete of a message

In the following diagram, we present the flow diagram of the available messages pages.

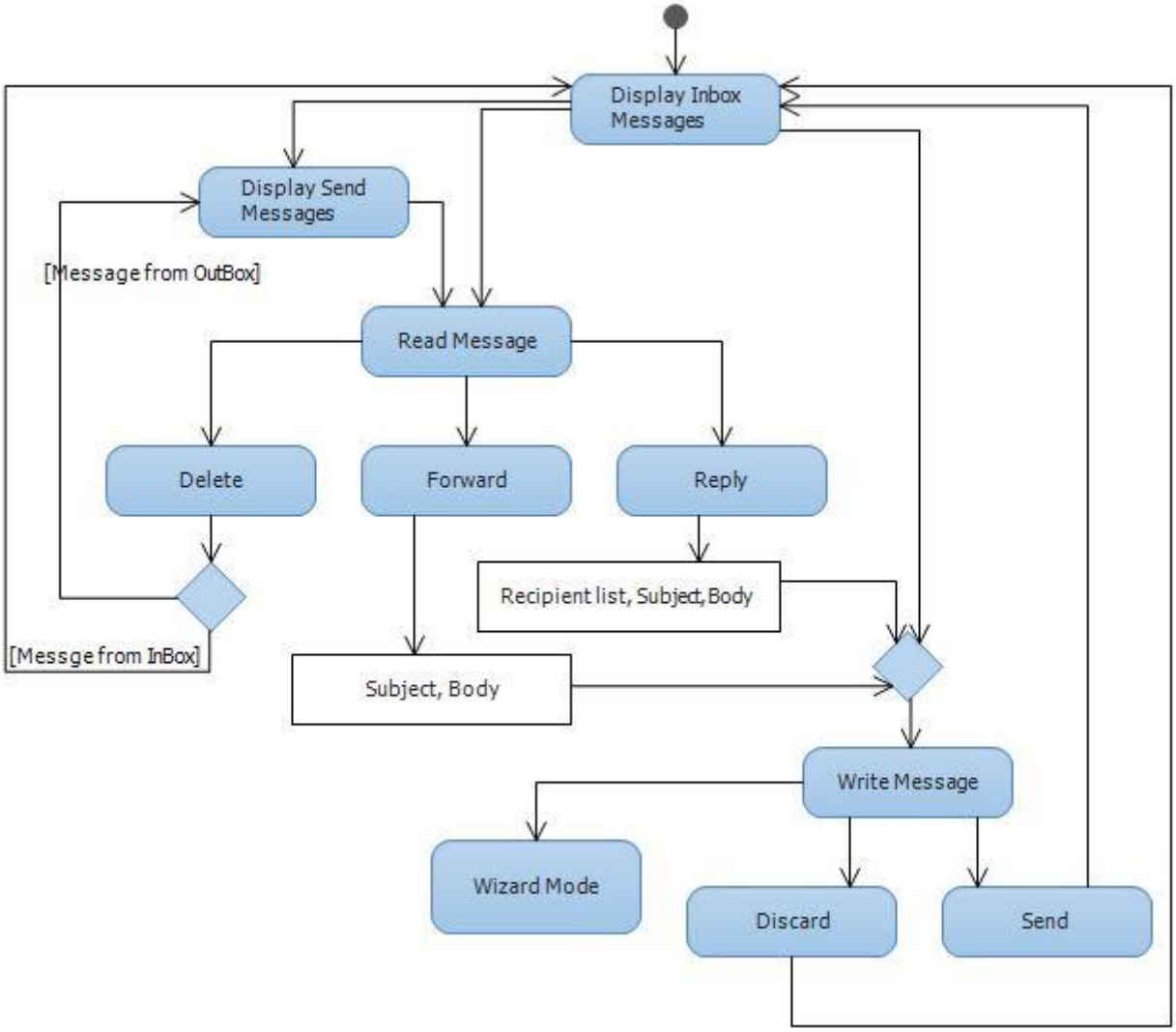

Figure 47: Flow Diagram for Messages pages

There is a variation of the write message functionality, provided in the form of a wizard, to assist users who are less familiar with sending emails. As presented in the following diagram, the user gets a step-by-step guidance in filling all required elements of the message with the ability to move back and forth at the wizard sequence.

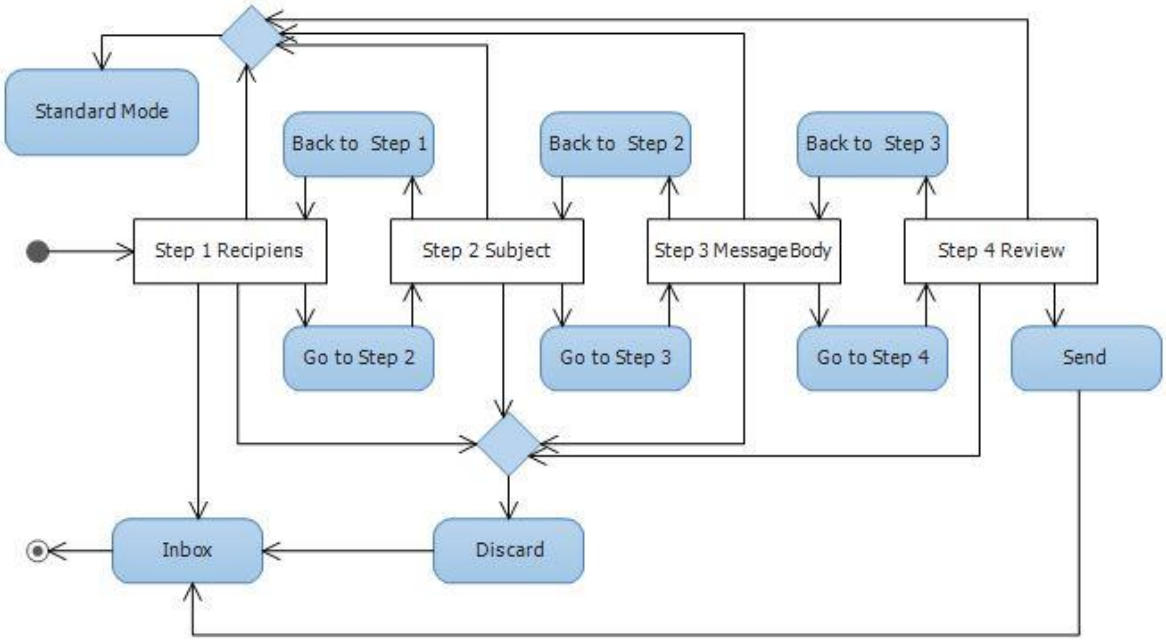

Figure 48: Flow Diagram for Write Message Wizard

7.2.4.3 Sequence Diagrams

The following diagrams specify the necessary messages exchange between the different layers of the system.

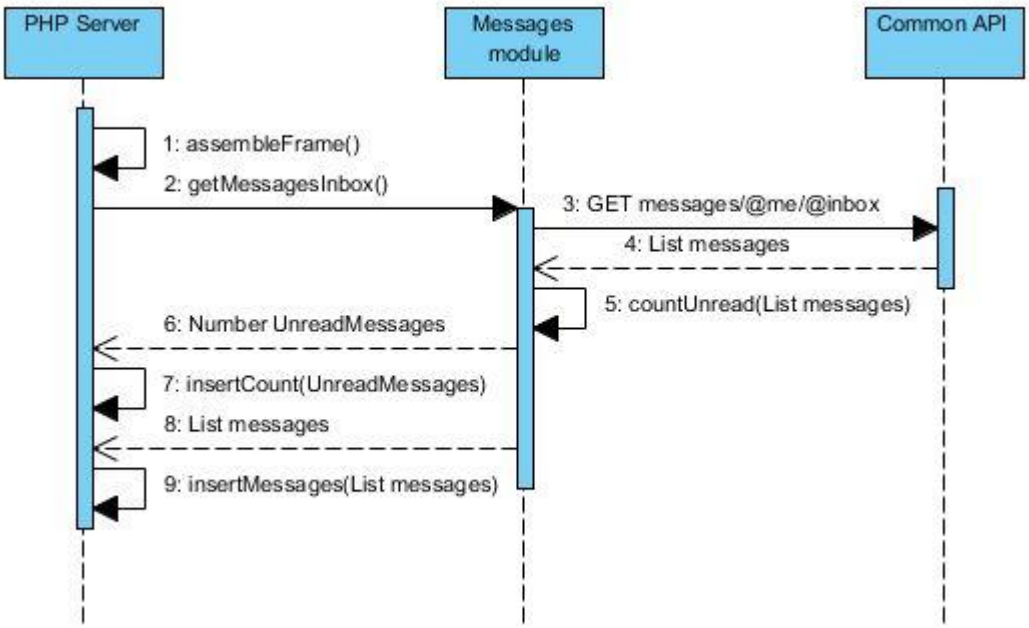

Figure 49: Sequence Diagram for Messages Inbox

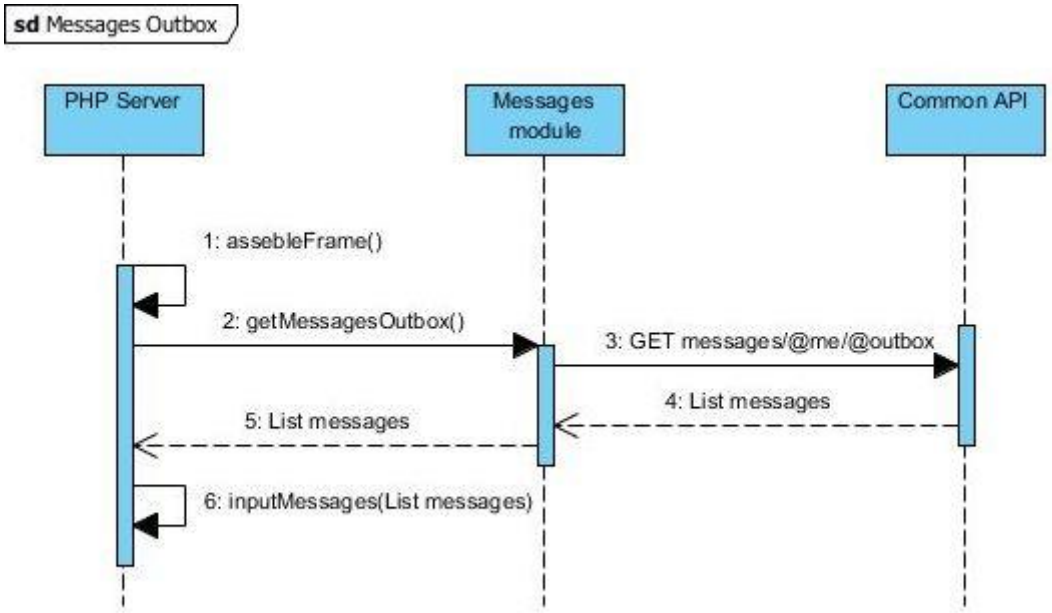

Figure 50: Sequence Diagram for Messages Outbox

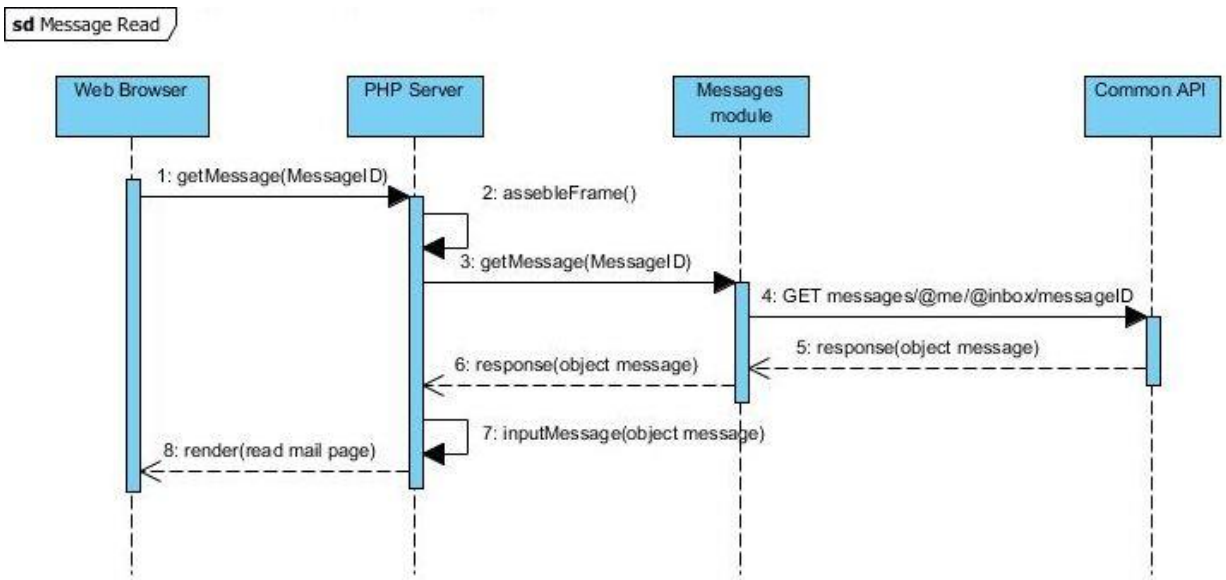

Figure 51: Sequence Diagram for Reading Messages

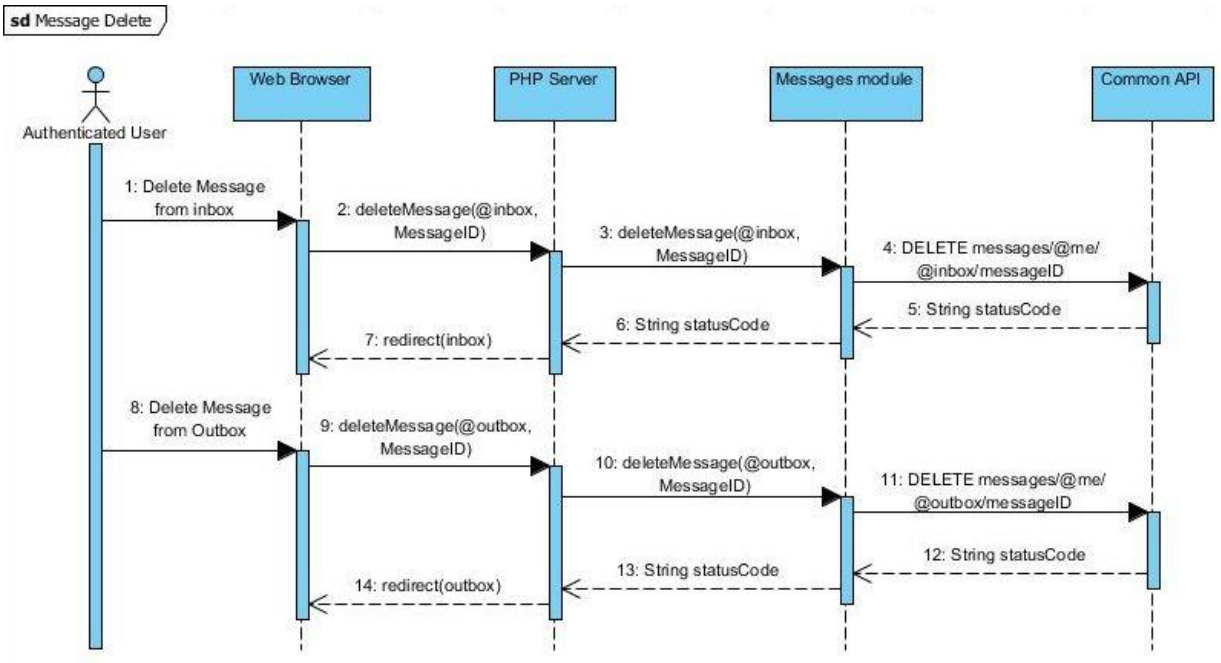

Figure 52: Sequence Diagram for Deleting a Message from Inbox and Outbox

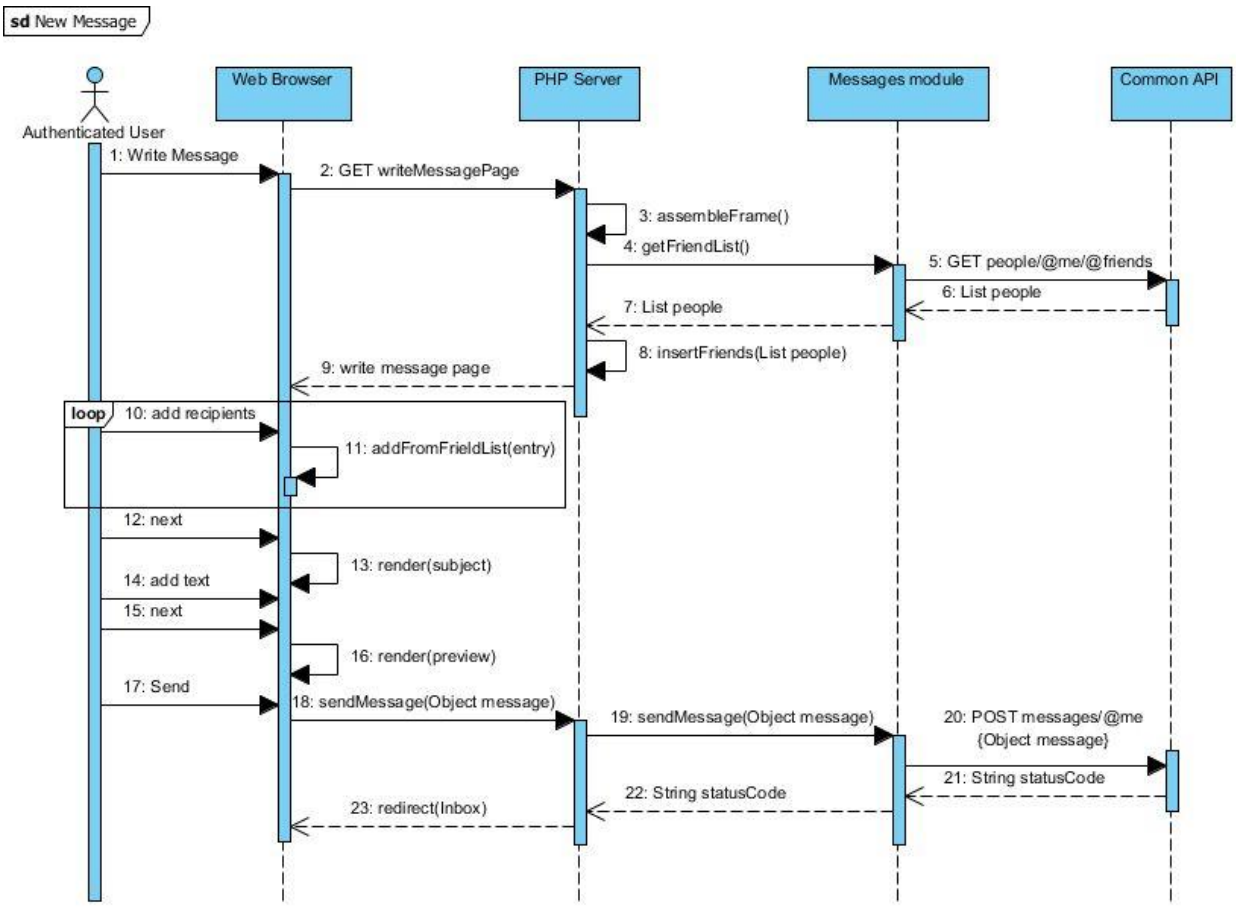

Figure 53: Sequence Diagram for Sending a Message

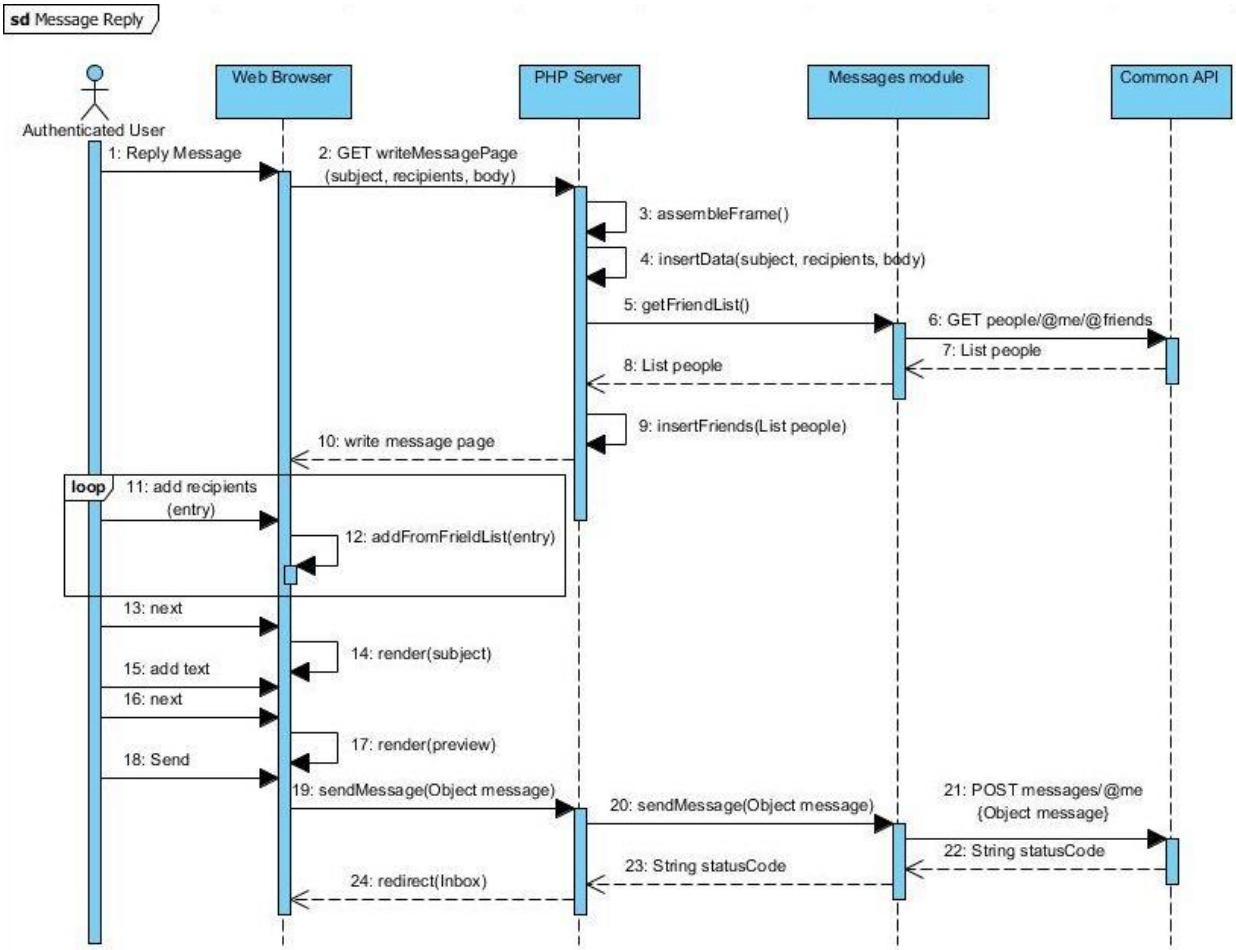

Figure 54: Sequence Diagram for Replying a Message

Note that forwarding a message follows the same sequence as "reply" with the differentiation that the items copied from the original message do not include the recipient list.

7.2.5 Albums and Media

7.2.5.1 My photo albums UI wireframe

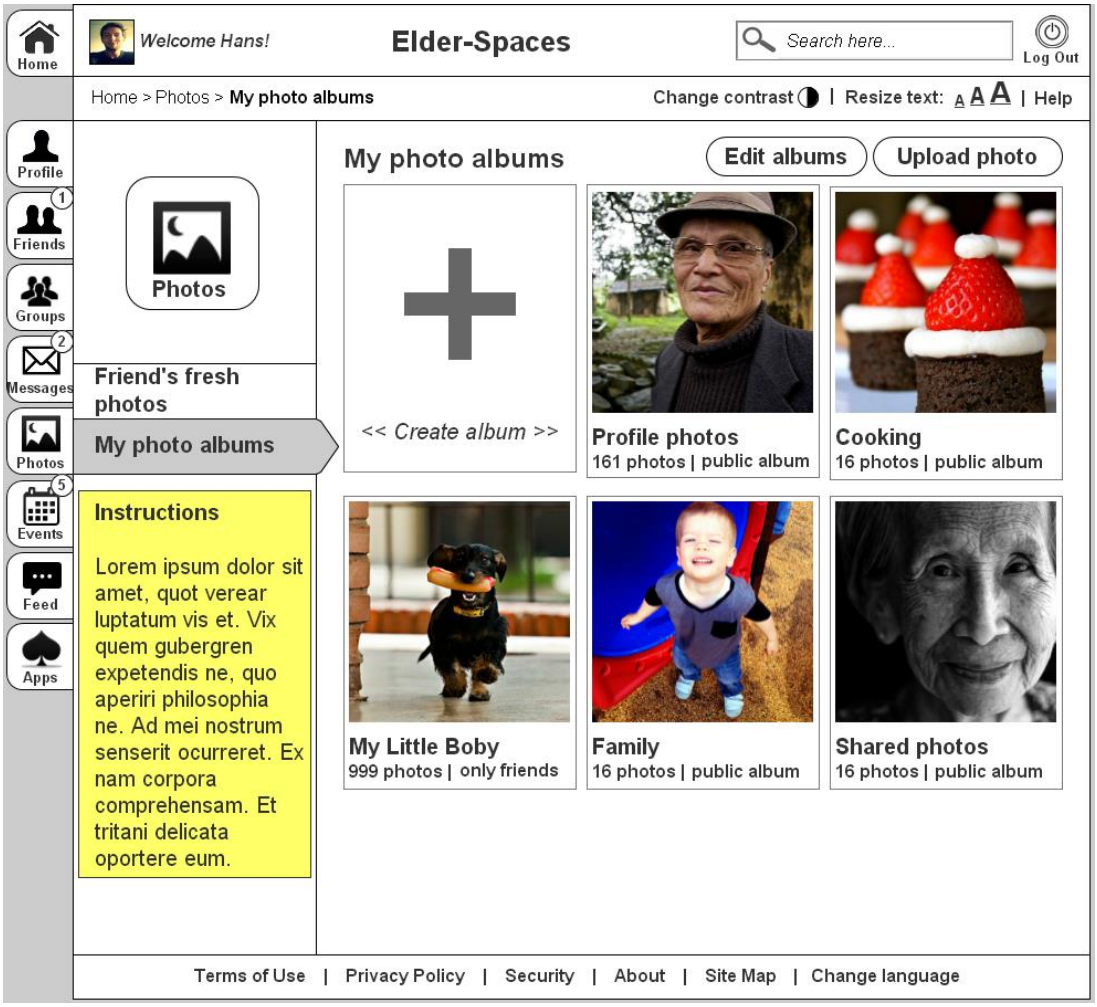

Figure 55: My Photo Albums page UI

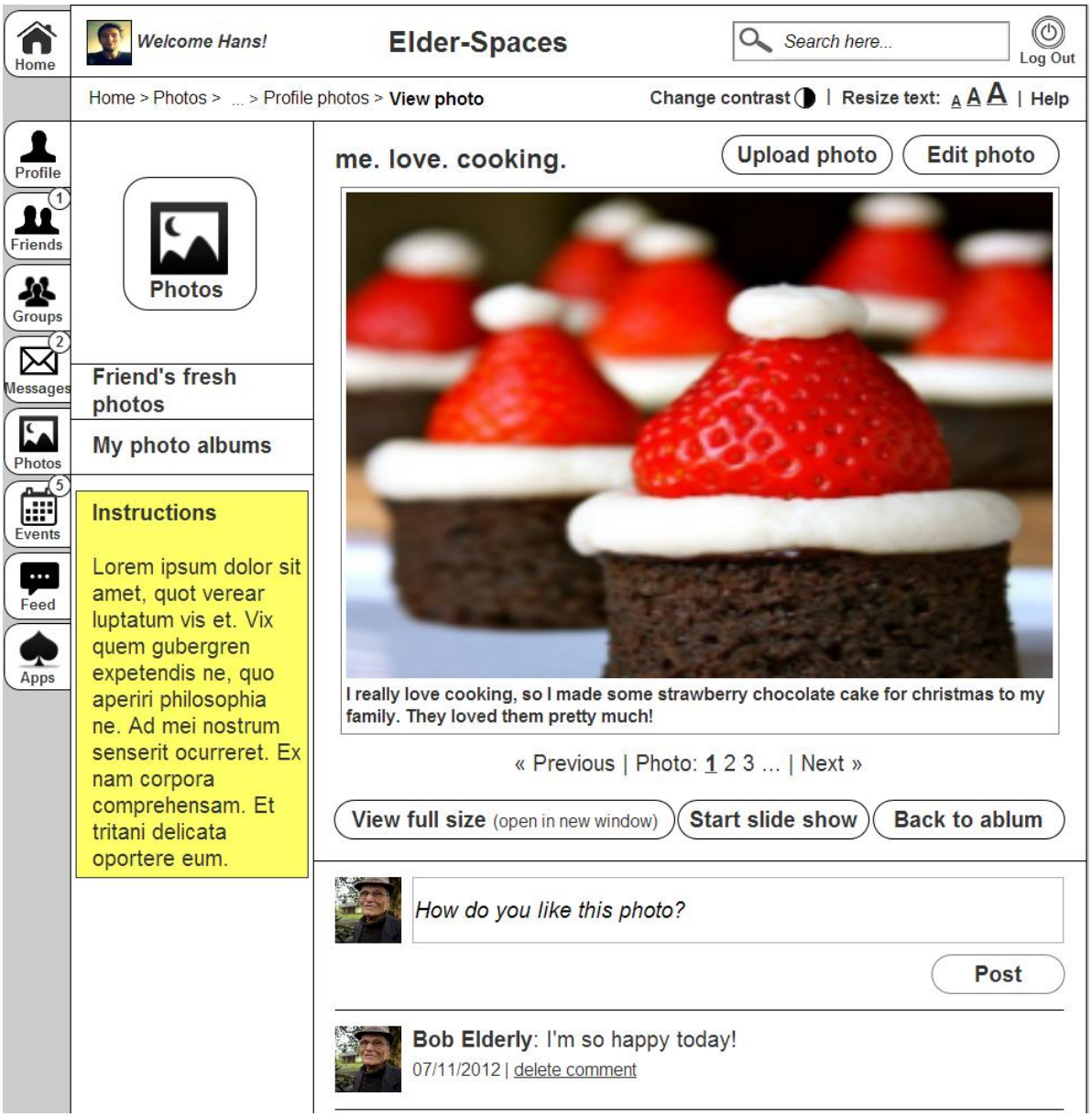

Figure 56: View photo with comments UI

7.2.5.2 Functionality Description

Albums provide the functionality for grouping media items. Media items may be images or videos. For all uploaded media, thumbnails are automatically created.

Another feature of albums and MediaItems is the ability to add comments. Comments may contain text and up to one media item.

The available functionality in the Photos web pages is:

- Albums
    - View user albums
    - View single album

  - Create album
  - Edit album details (Title, description, cover image)
  - Delete album
- Media Items
  - View
    - View media page with comments
    - View slideshow (images only)
    - View full size
  - Edit details (Title, description)
  - Upload
  - Delete
- Comments (for albums and media items)
  - View
  - Add comment
  - Delete

In the following diagram, we present the available flows in the album/photo pages.

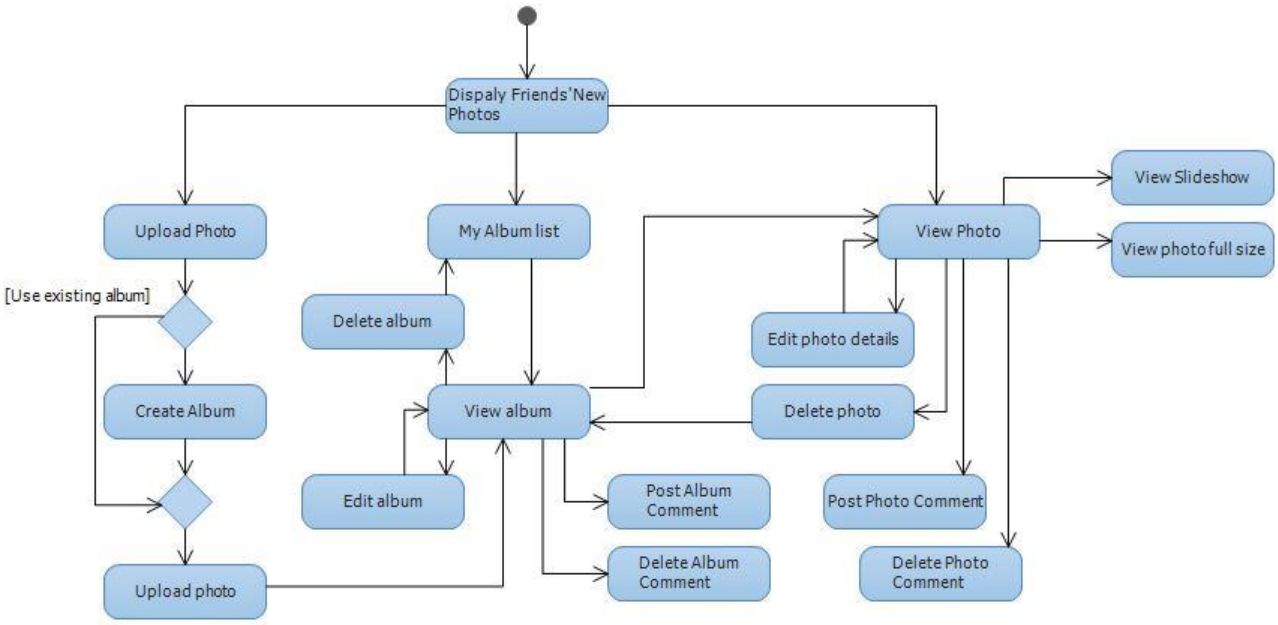

Figure 57: Flow Diagram for Album and photo functionality

7.2.5.3 Sequence Diagrams

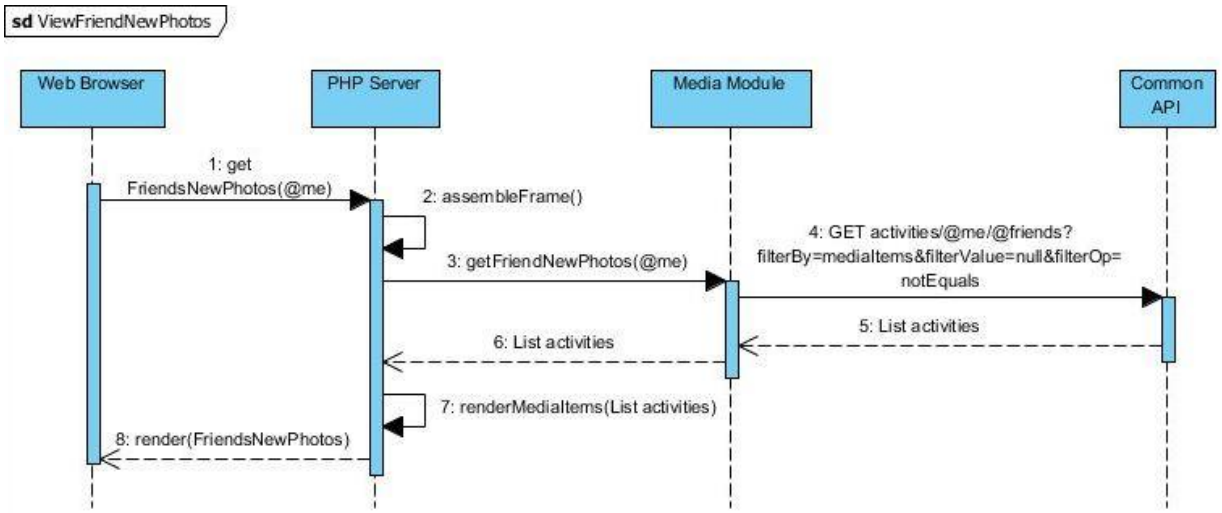

Figure 58: Sequence Diagram for viewing the new friends' photos

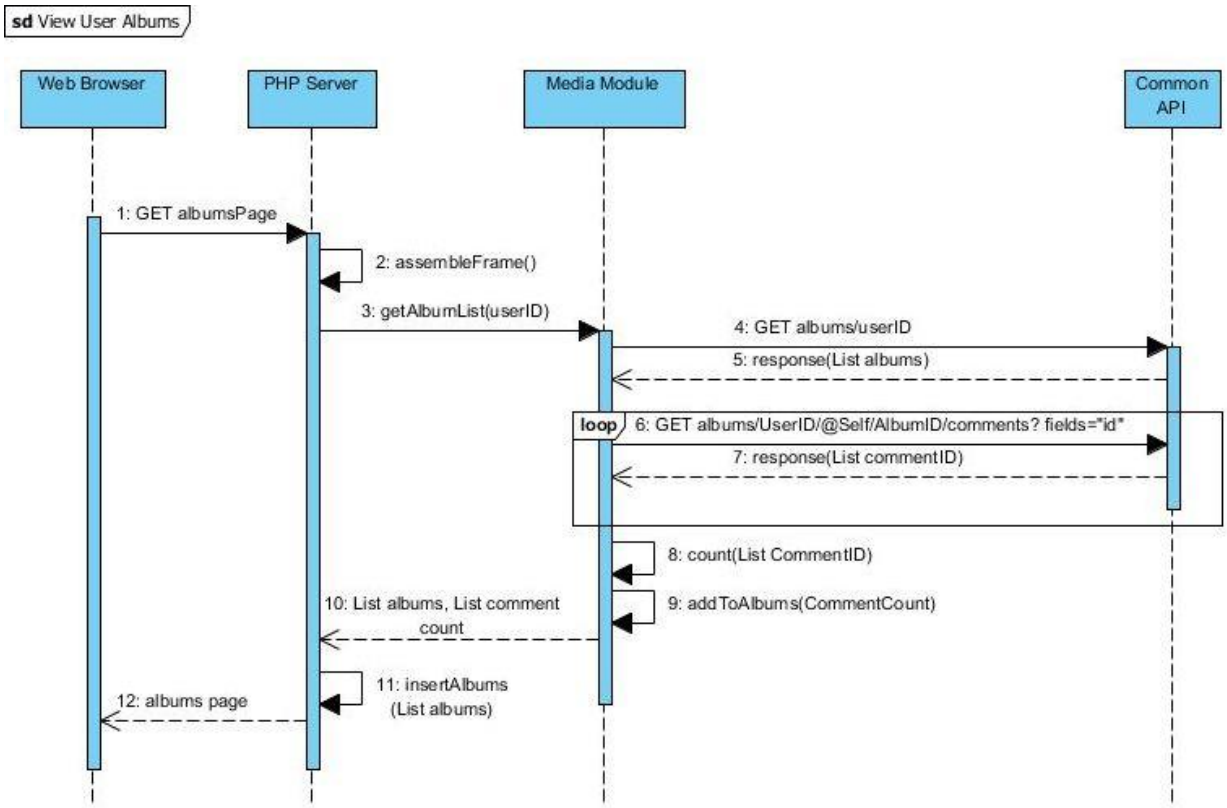

Figure 59: Sequence Diagram for viewing user's albums

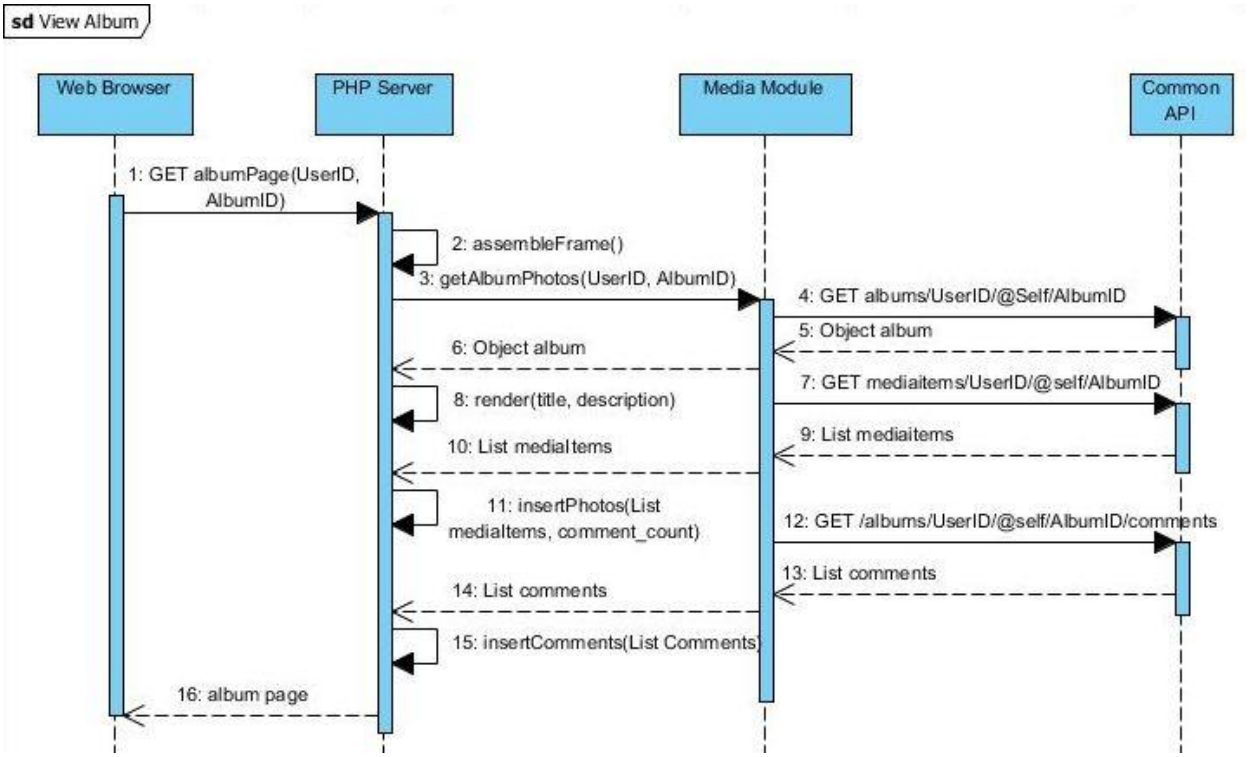

Figure 60: Sequence Diagram for viewing one album

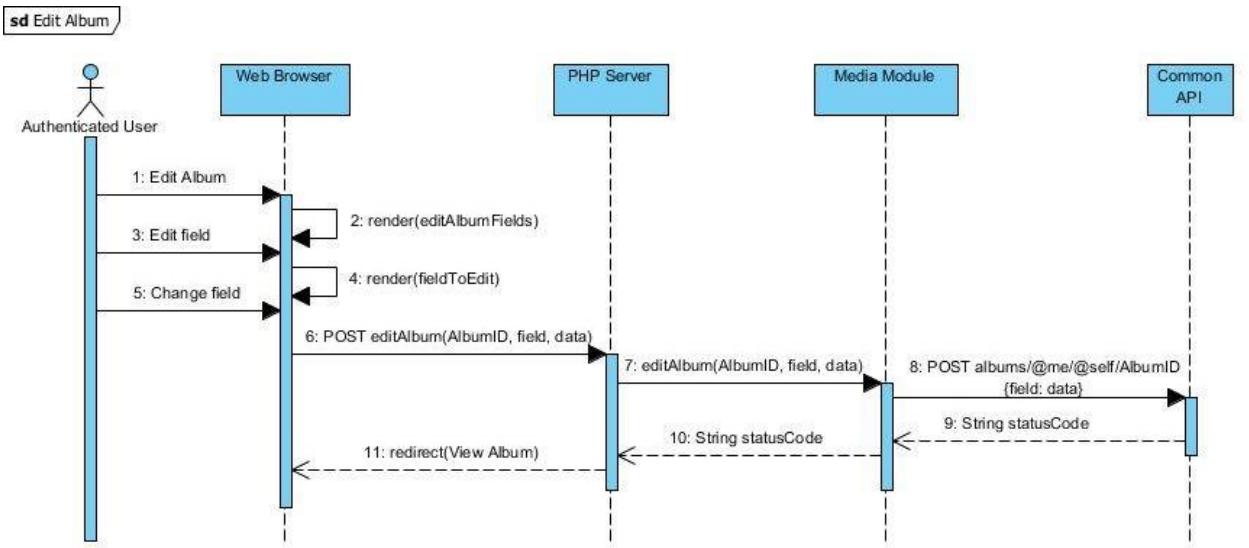

Figure 61: Sequence Diagram for editing the information on a user album

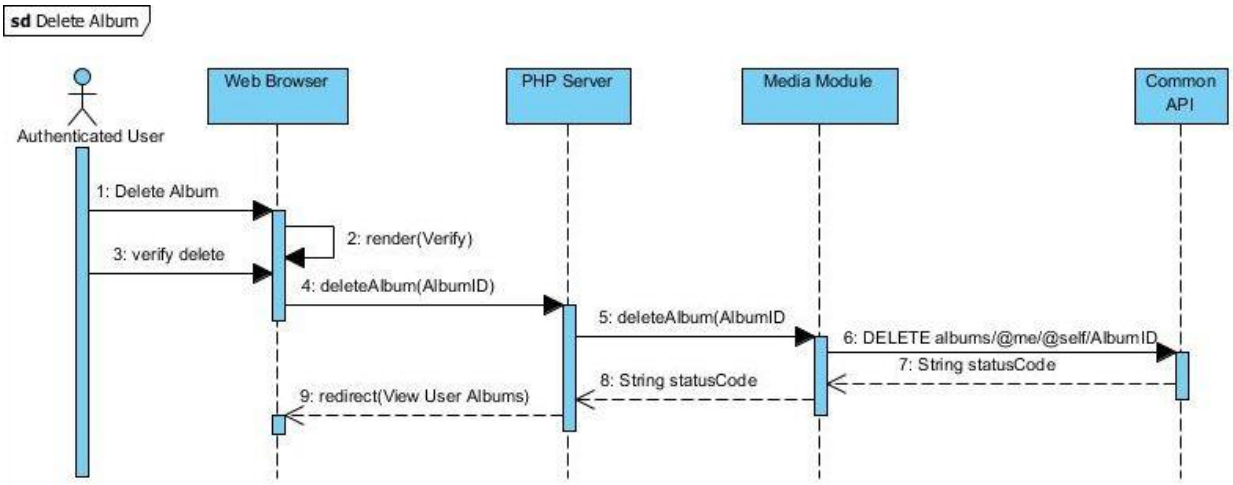

Figure 62: Sequence Diagram for deleting a user album

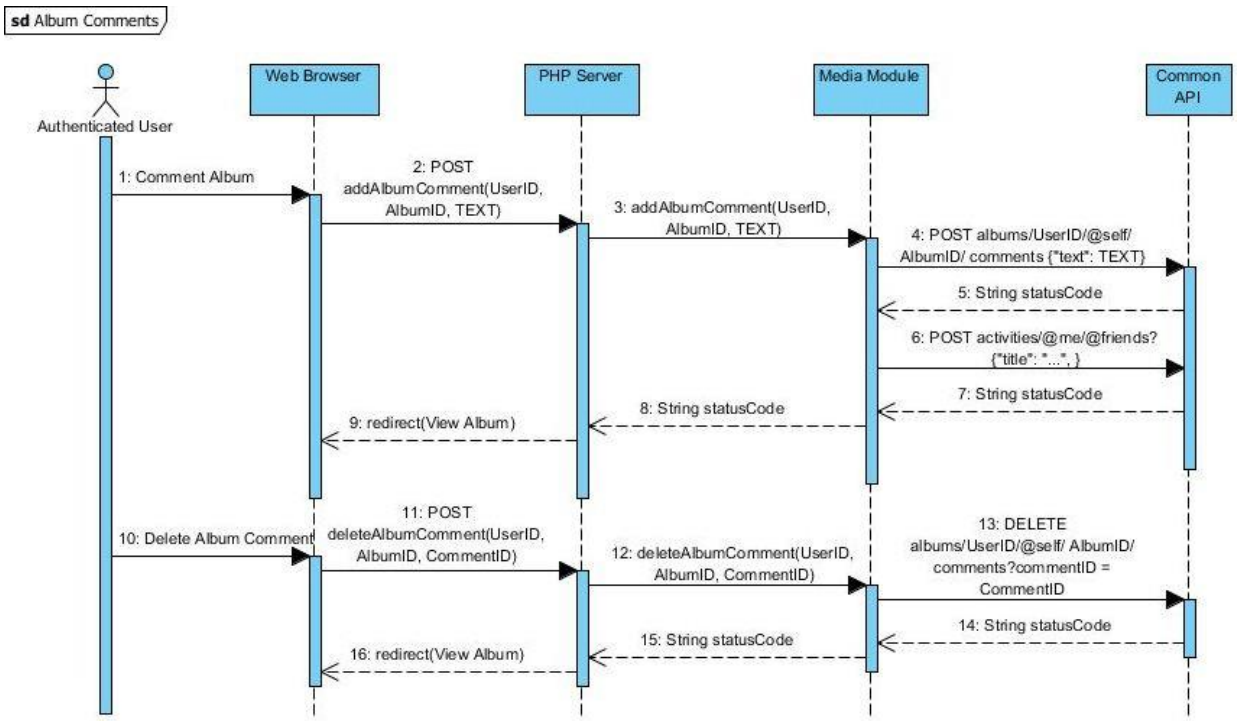

Figure 63: Sequence Diagram for adding and deleting album comments

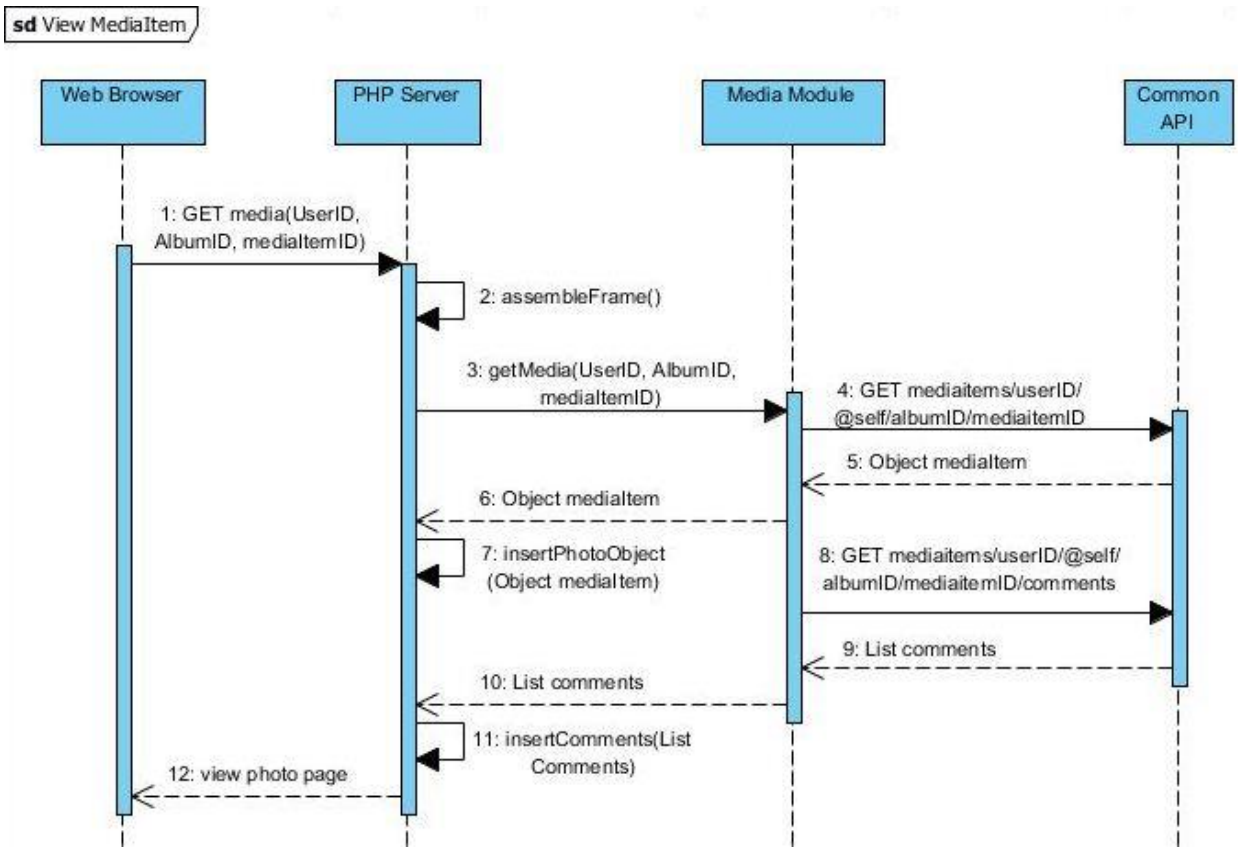

Figure 64: Sequence Diagram for viewing one media item with its comments

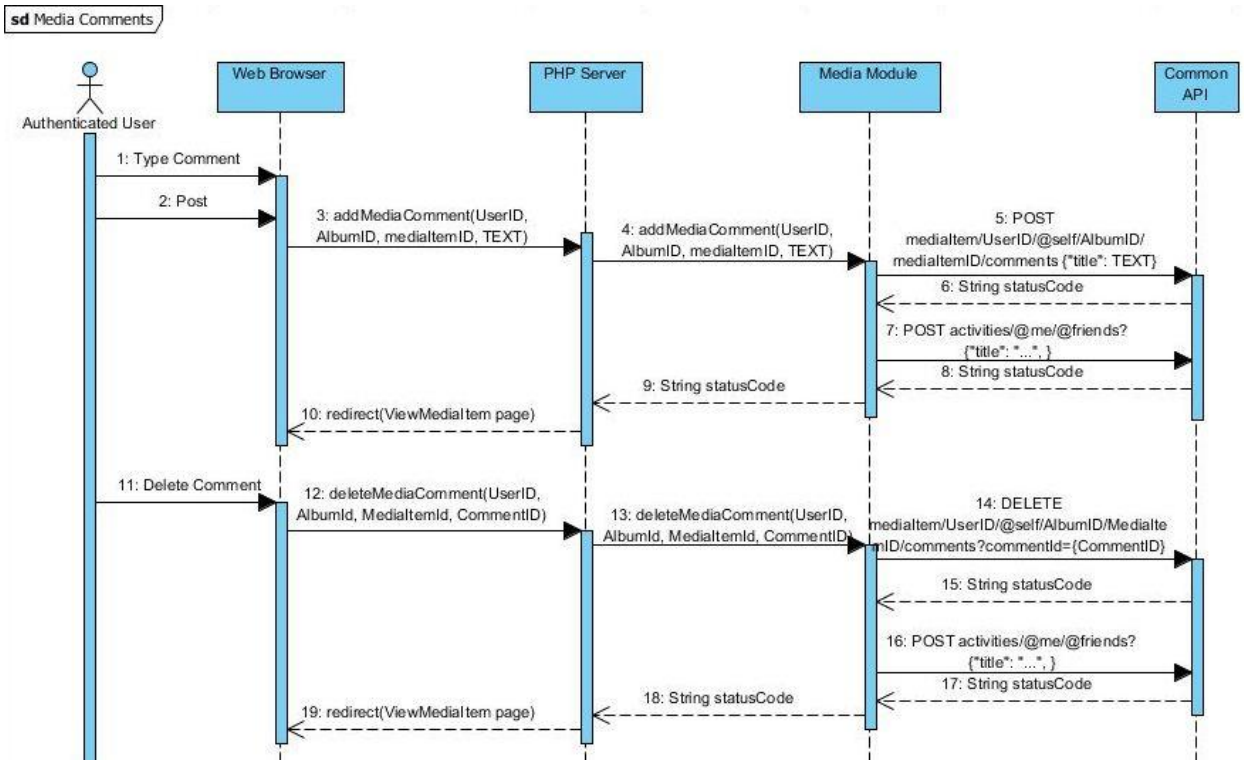

Figure 65: Sequence Diagram for adding and deleting comments in media item

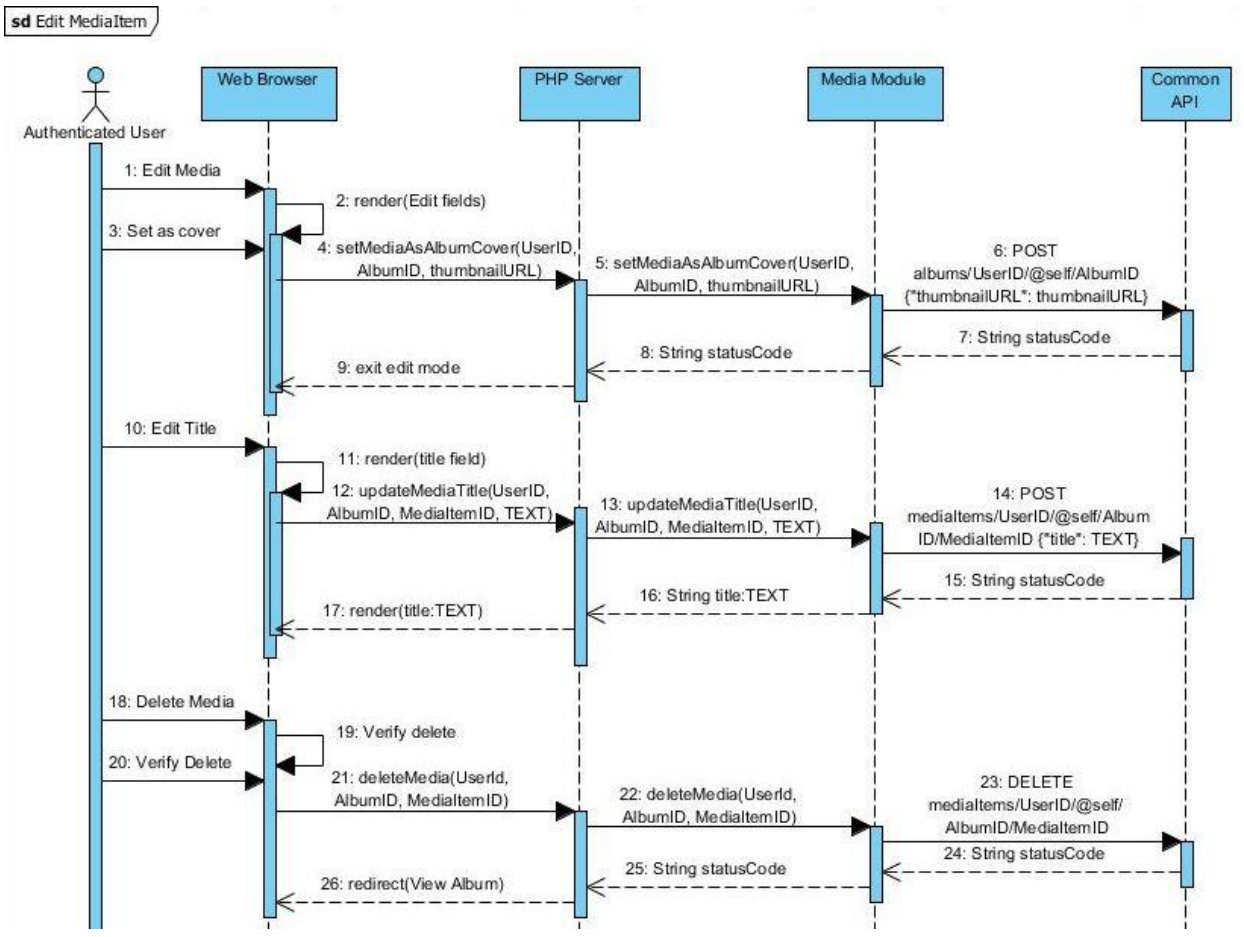

Figure 66: Sequence Diagram for editing and deleting a media item

7.2.6 Search

7.2.6.1 Search results pages UI wireframe

Figure 67: People search result page UI

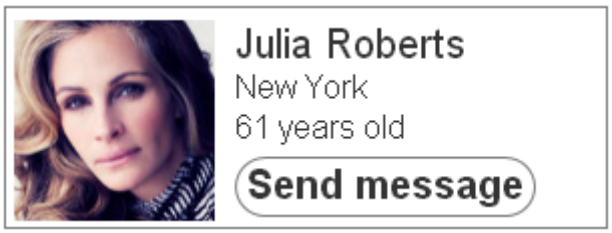

Figure 68: User mini UI

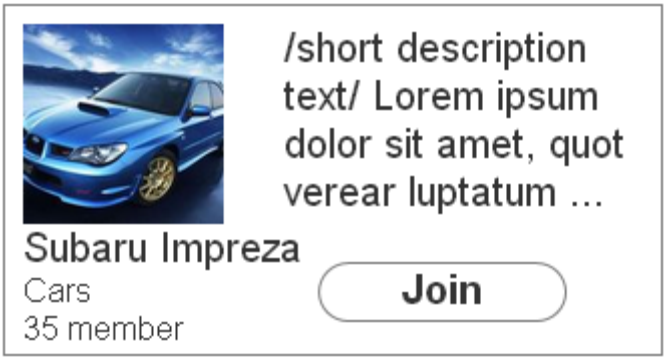

Figure 69: Group mini UI

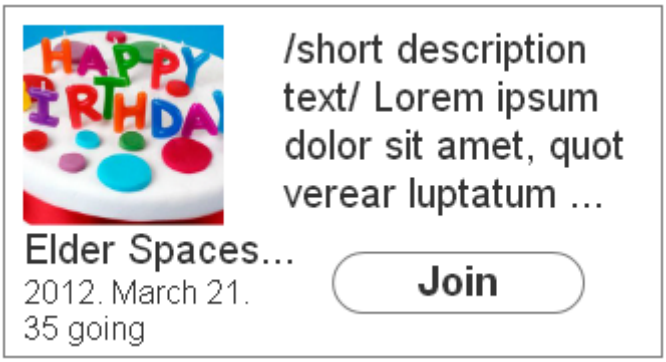

Figure 70: Event mini UI

7.2.6.2 Search results pages Functionality Description

This is the search results page. Users may enter a keyword in the search bar at the header frame of any page and the result is presented in this page.

Results may be categorized according to functionality (friends, Groups or Events).

Local navigation column:

- icon: links into the given search results page
- People search menu item, links into the People search results page
- Group search menu item, links into the Group search result page
- Event search menu item, links into the Events search result page
- Introduction with explanatory text

Content:

- title on the left corner of the column: Given search results page (people, group, event)
- Pagination:
    - in the right top corner of the column, next to the title

- middle in the bottom of the column

People results: 5-5 result appears in 2 columns, in user mini format

- profile page on the left, user name, user town, links into the given person profile page
- Button: if it is a friend, the buttons text: “Send message”, if it’s not a friend, the button text: “Add as a friend”.

Group results: 5-5 result appears in 2 columns, in group mini format

- group picture on the left, group name, group type and members number below the pic
- next to the pic is the recommendation text
- Join button

Event results: 5-5 result appears in 2 columns, in group mini format

- event picture on the left, event date and number of the attending people below the pic
- next to the pic is the recommendation text
- Join button

7.2.6.3 Search Result Page Sequence Diagrams

Sequence diagram for searching through the main menu from any page (in this instance: it’s the Main page):

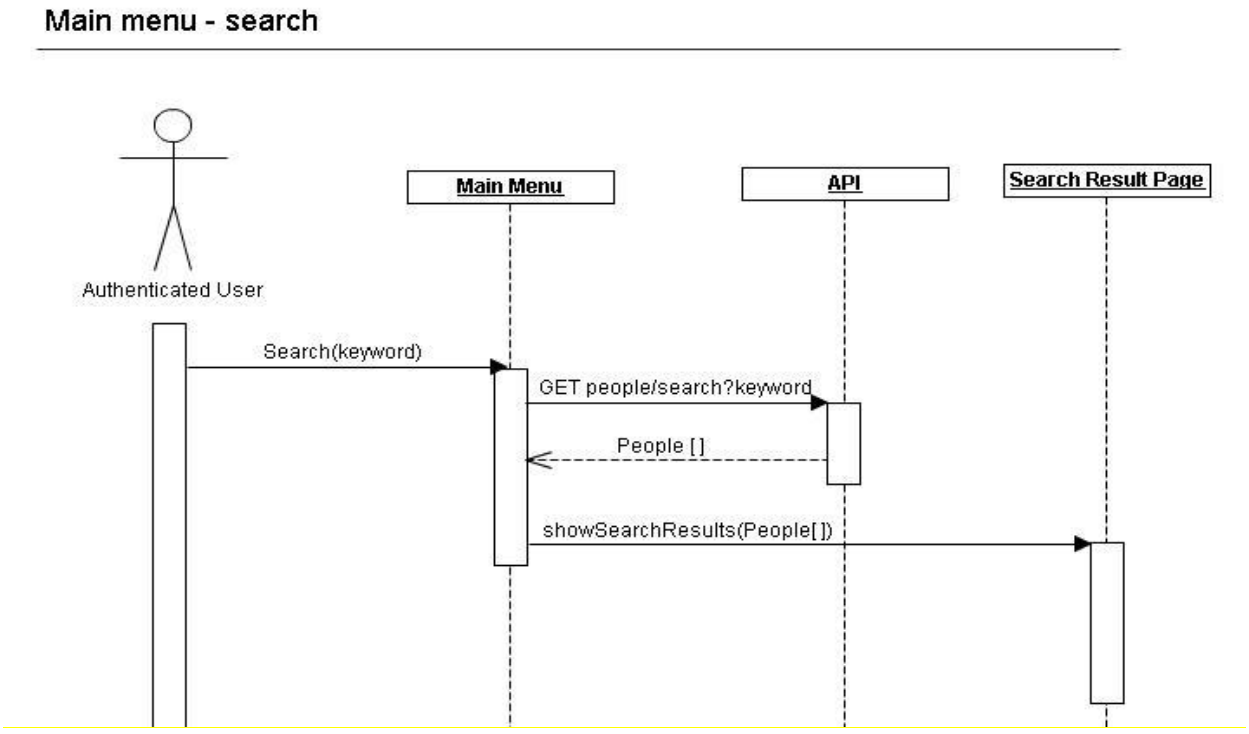

Figure 71: Sequence Diagram for Search through the main menu

Sequence diagram for navigating on the search result pages:

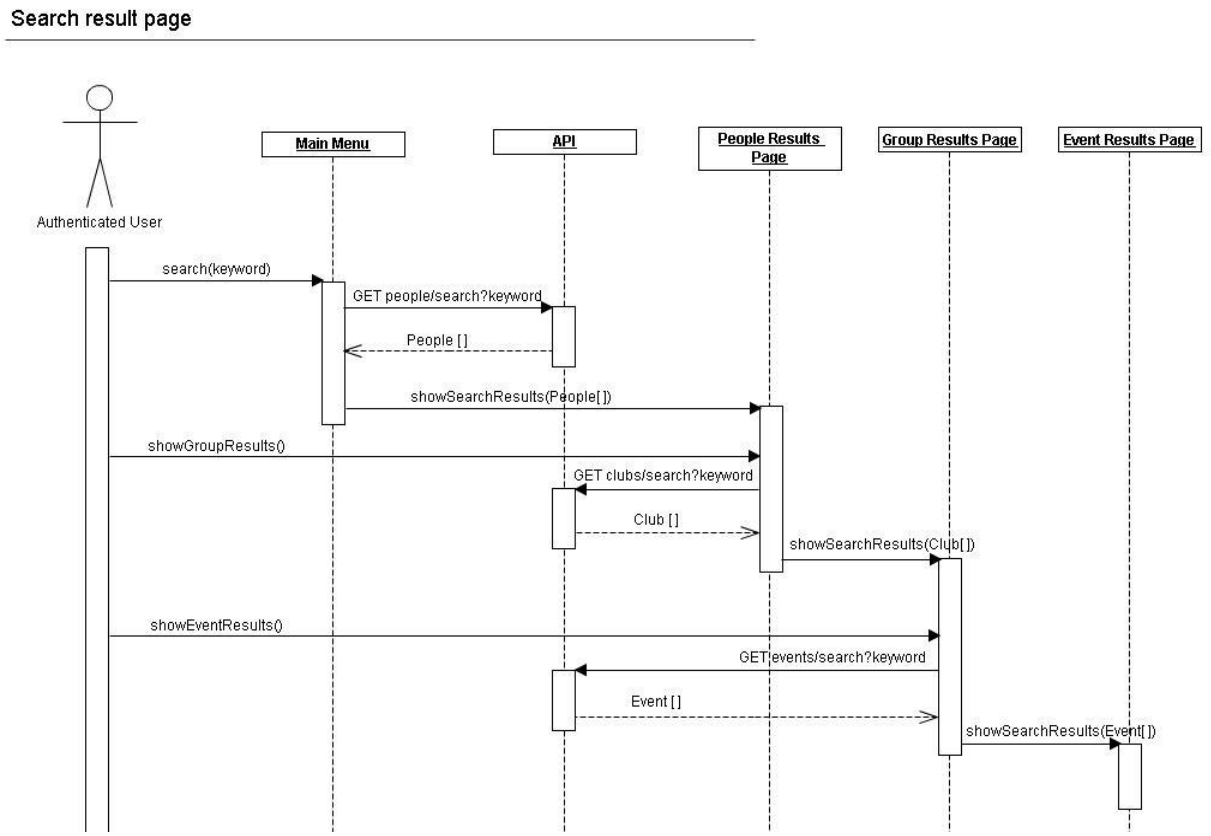

Figure 72: Sequence Diagram for Search result page

7.2.7 Authentication

7.2.7.1 Login UI wireframe

This is the first web page presented to users when they reach Elder-Spaces.

Figure 73: Login UI

7.2.7.2 Login Functionality Description

Functionality is divided per frame in the page

- Login header: Elder-Spaces logo in the left side
- promo picture: in the middle of the white field there an image which can make the possible users enthusiastic to register or use the platform
- promo text: ES mission, which inform the users about the goal of the ES platform
- login box:
    - "Join Elder-Spaces button": nonregistered users should click on it, it will display the Registration form
    - “Sign in”: the registered user writes his/her e-mail address into the 1st part, and write the ES password into the 2nd part.
    - Keep me signed in checkbox: more comfortable to use the "Keep me signed in" feature if it is not a shared computer. If the users navigate to the eldercspaces.com, he/she automatically signed in.
    - can't access my account: if the users cant access the account, and need help, should click on these links below. It will display the FAQ.

- Footer: links to secondary pages.

7.2.7.3 Login Sequence Diagrams

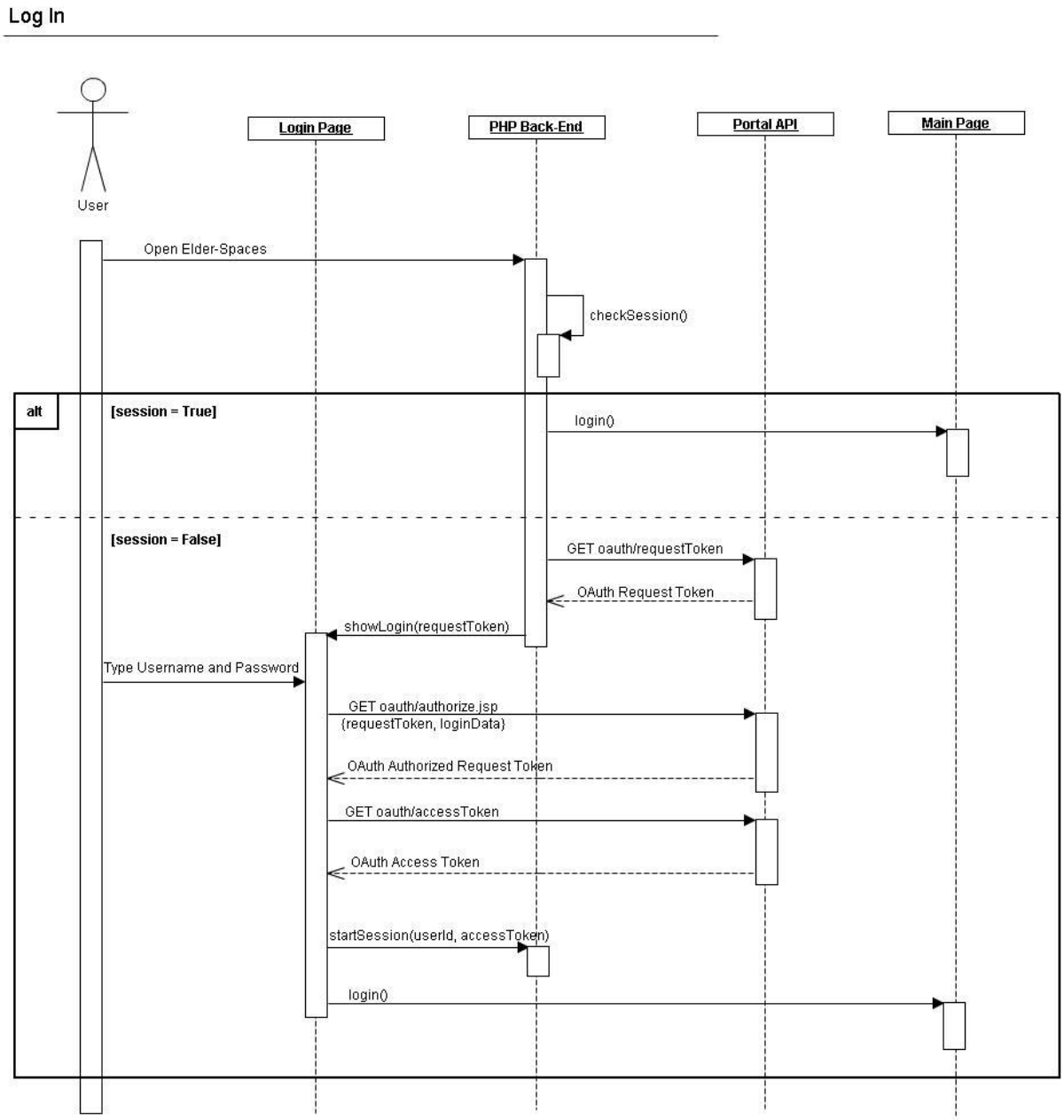

Figure 74: Sequence Diagram for Login sequence

7.2.7.4 Registration UI wireframe

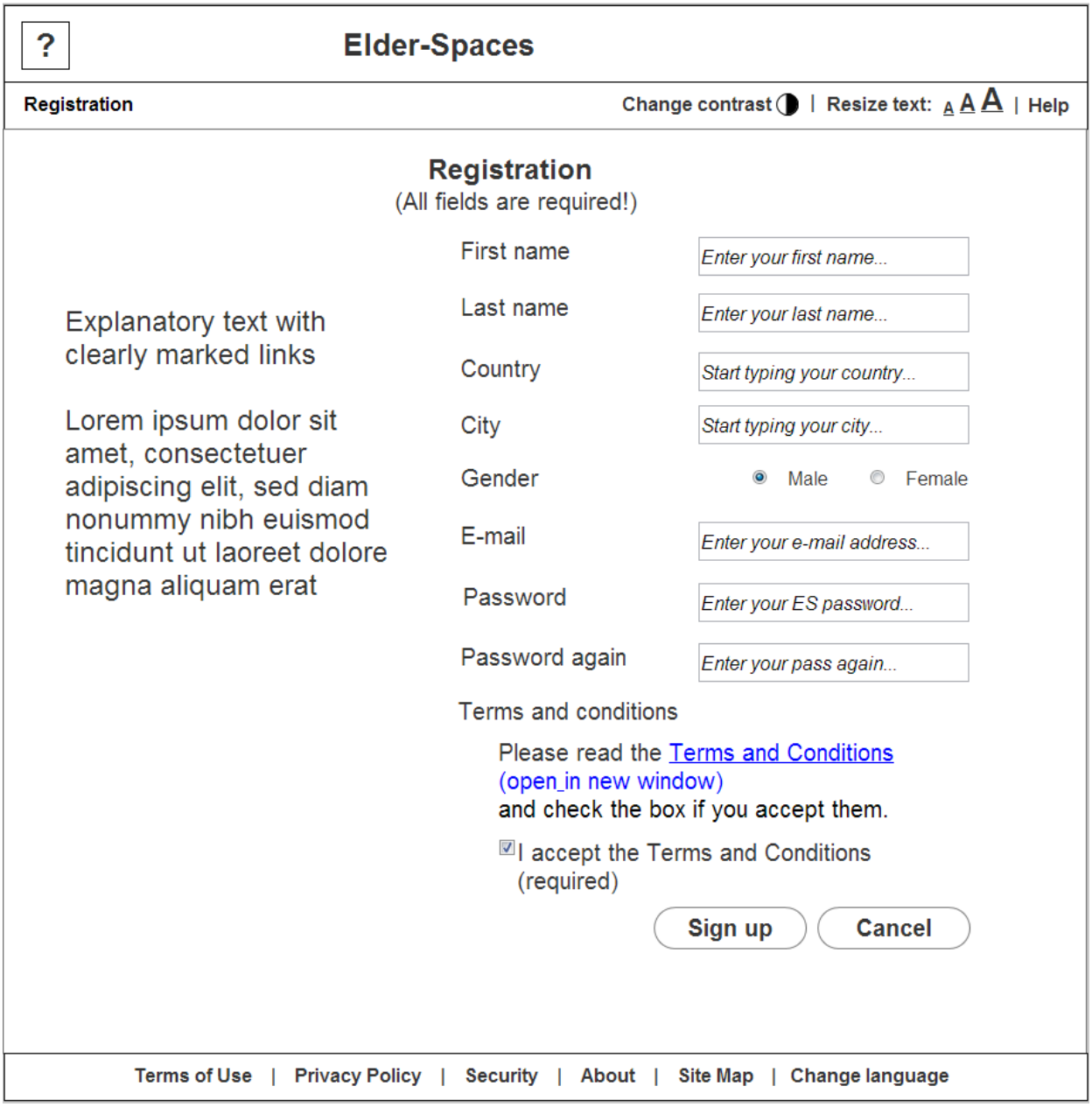

Figure 75: Registration UI

7.2.7.5 Registration Functionality Description

New users may join Elder-Spaces by registering through this page. The basic information of each user is gathered, the terms and conditions of the site are accepted and via email verification, a new profile can be created.

Registration form:

- title: Registration, below the "All fields are required!"
- first name: text field format
- last name: text field format

- country: droplist format
- city: droplist format
- gender: radio button format (male or female)
- e-mail address: text filed format
- Elder-Spaces password: text field format
- Re-Password: text field format
- terms&conditions: the Terms and conditions link links to the page which contains the terms & conditions.
- "I accept the terms&conditions": checkbox format

Users should fill every text field, and push the "Sign up button". It will display the elder spaces main page.

7.2.7.6 Registration Sequence Diagrams

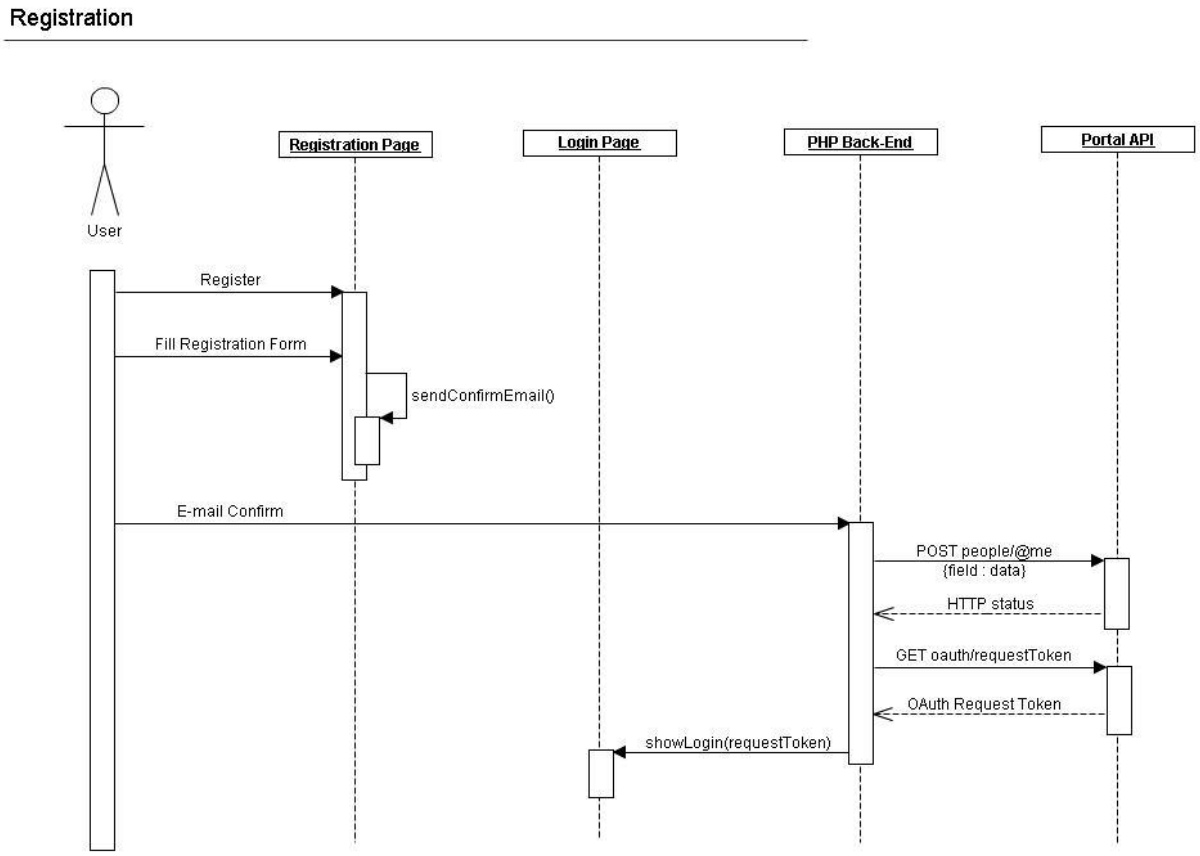

Figure 76: Sequence Diagram for Registration sequence

7.2.8 Activities Feed

7.2.8.1 Activities UI wireframe

Figure 77: Activities main page UI

7.2.8.2 Activity Functionality Description

In the feed page user can see what kind of actions happened with the friends. The status messages and the activities are all in this page.

Content column:

- text field: user able to share content in the text field, and clicking the "Post" button. The content will appear in the following pages.
    - in the user's feed below in the user Activity main page
    - in the friends Activities main page
    - in the friends main page in the right column, in the Activity column
- shareable content:
    - Short messages, for example: "I'm so happy today!"
    - Article link: for example: http://vallalkozoi.negyed.hu/vnegyed/20121122-tve-a-kereskedok-jarnak-jol-a-pontgyujto-kartyakkal.html
    - Video link: http://www.youtube.com/watch?v=X-kgc65FB9k&feature=g-all-u

Upload picture with the Upload photo button. It will display the Upload photo layer. The user the picture(s) and share it.

7.2.8.3 Sequence Diagrams

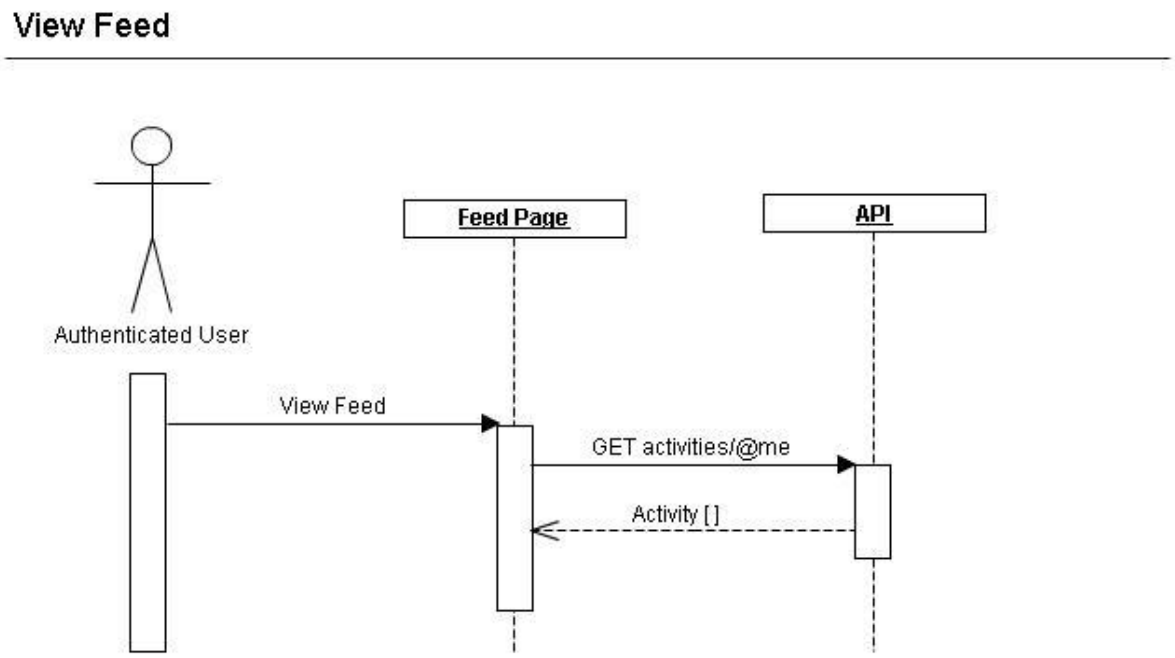

Figure 78: Sequence Diagram for View Feed

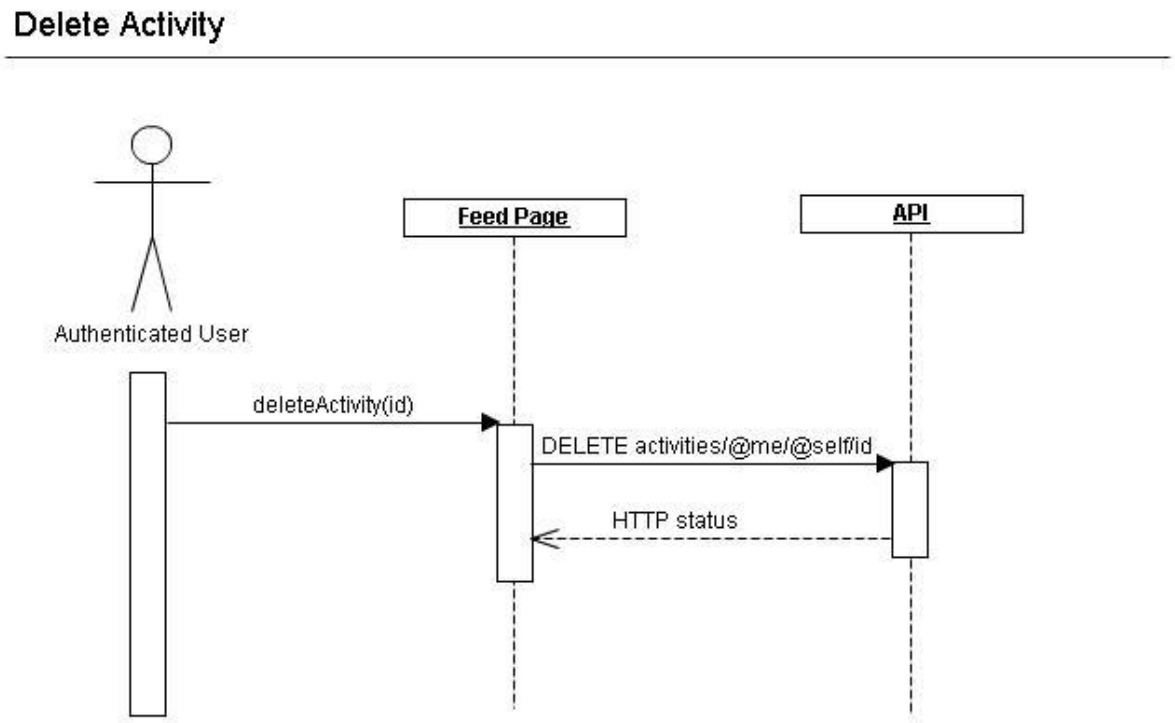

Figure 79: Sequence Diagram for deleting activity from the Feed

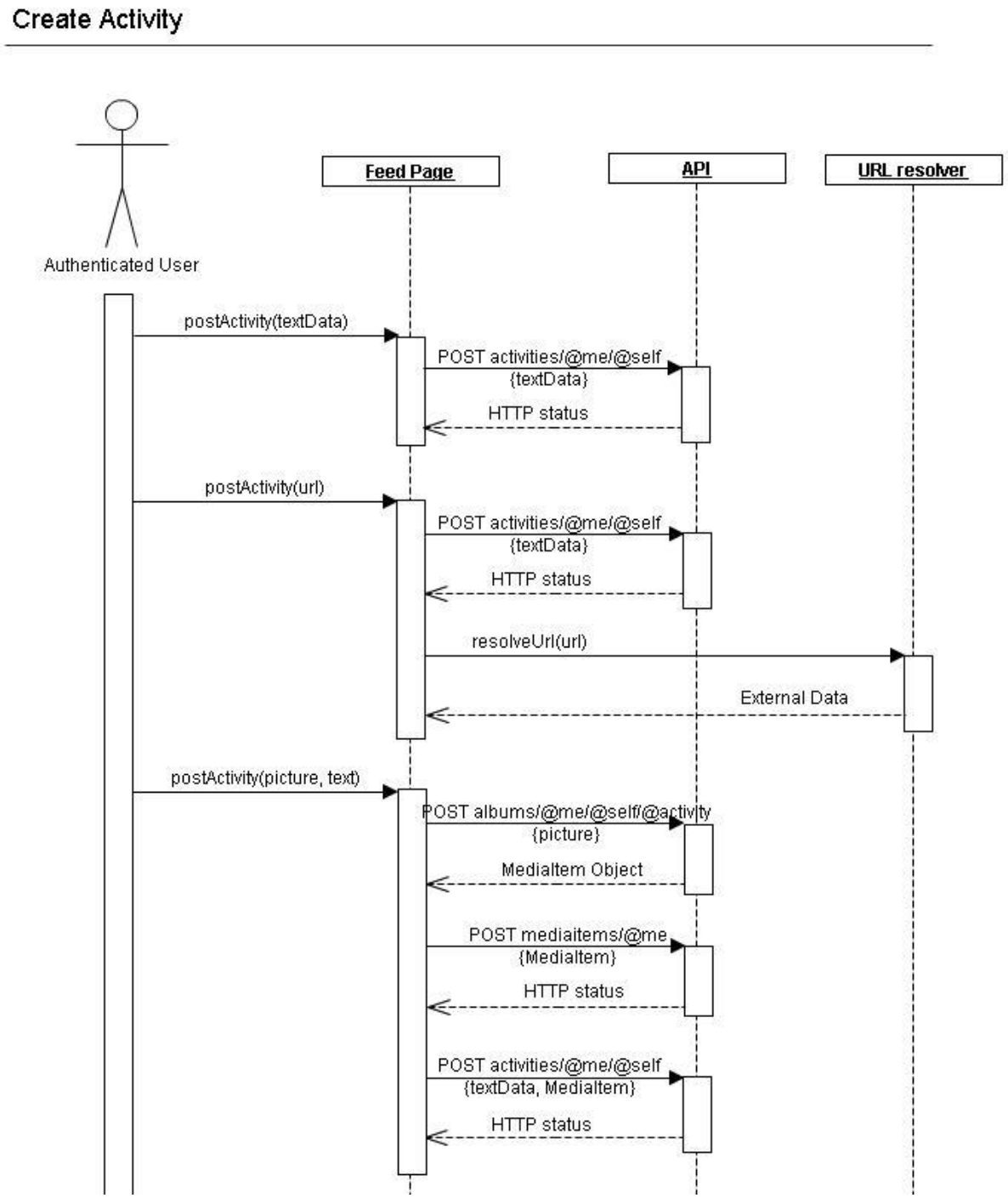

Figure 80: Sequence Diagram for posting activity into the Feed

7.2.9 Notifications

7.2.9.1 Notifications UI wireframes

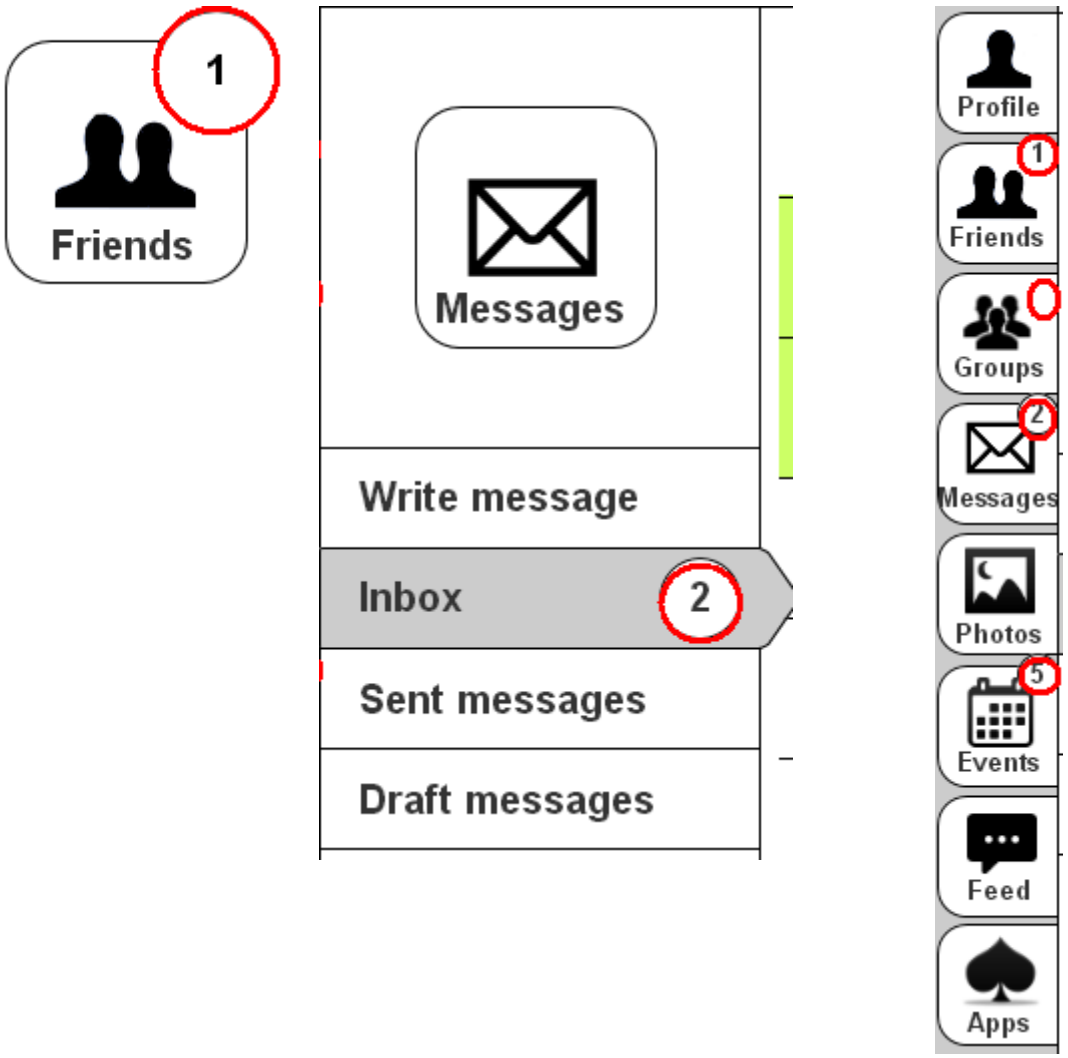

Figure 81: Notification main page UI

7.2.9.1 Notification Functionality Description

There are three possibilities where the notifications can appear:

- main page: main navigation icons top right corner
- tab menu top right corner
- next to the local menus

The following functions have notifications:

- Friends: means the number of the dependent friends, by clicking on it will display the Friends request page.

- Groups: dependent group invitations from the friends, by clicking on it will display the Group invitations page.
- Messages: unread messages. By clicking on it will display the Inbox.
- Events: dependent events requests from the friends. By clicking on it will display the Events invitations page

7.2.9.2 Sequence Diagrams

Sequence diagram for view Notifications:

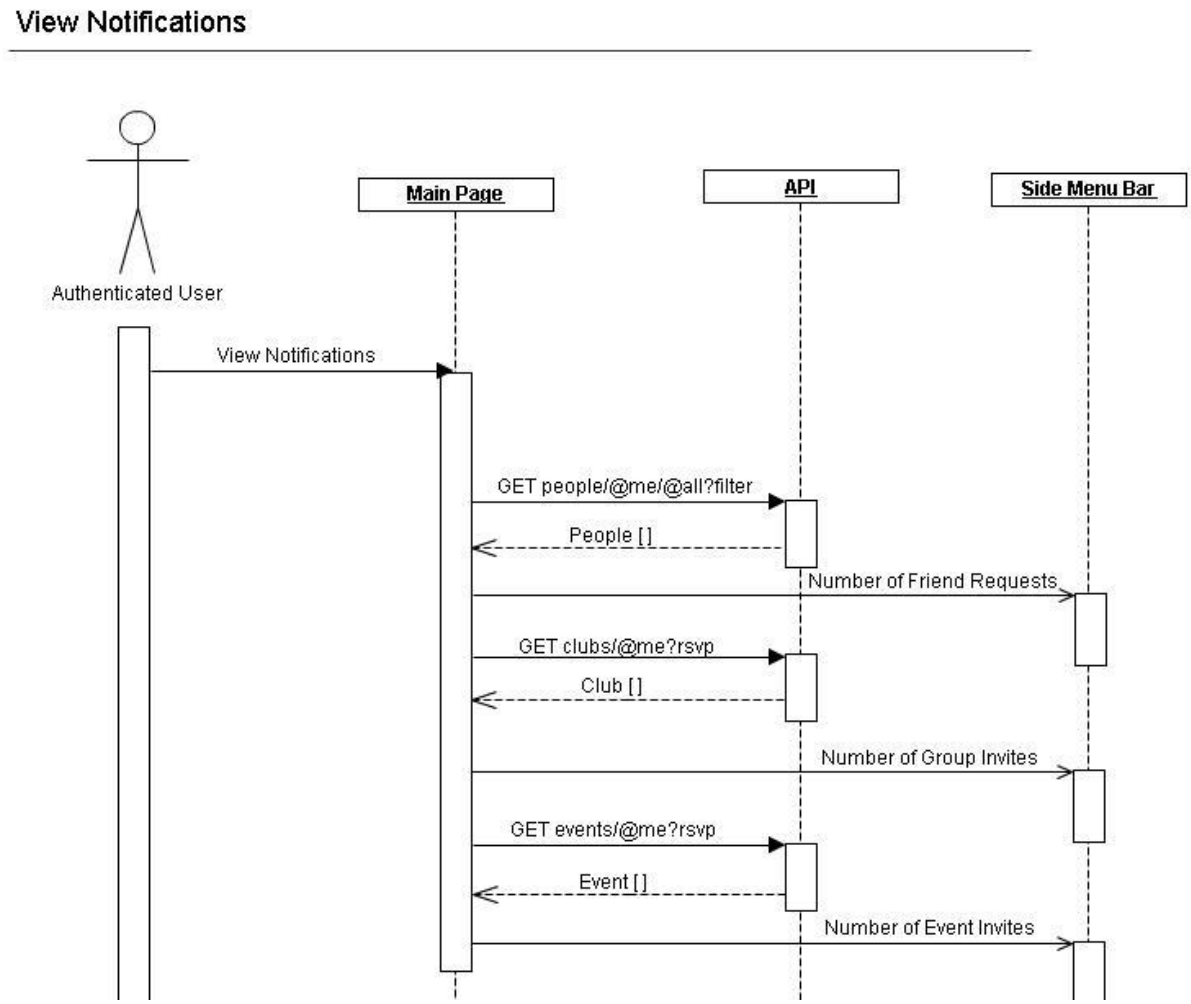

Figure 82: Sequence Diagram for viewing Notifications

7.2.10 Events

7.2.10.1 Events UI wireframe

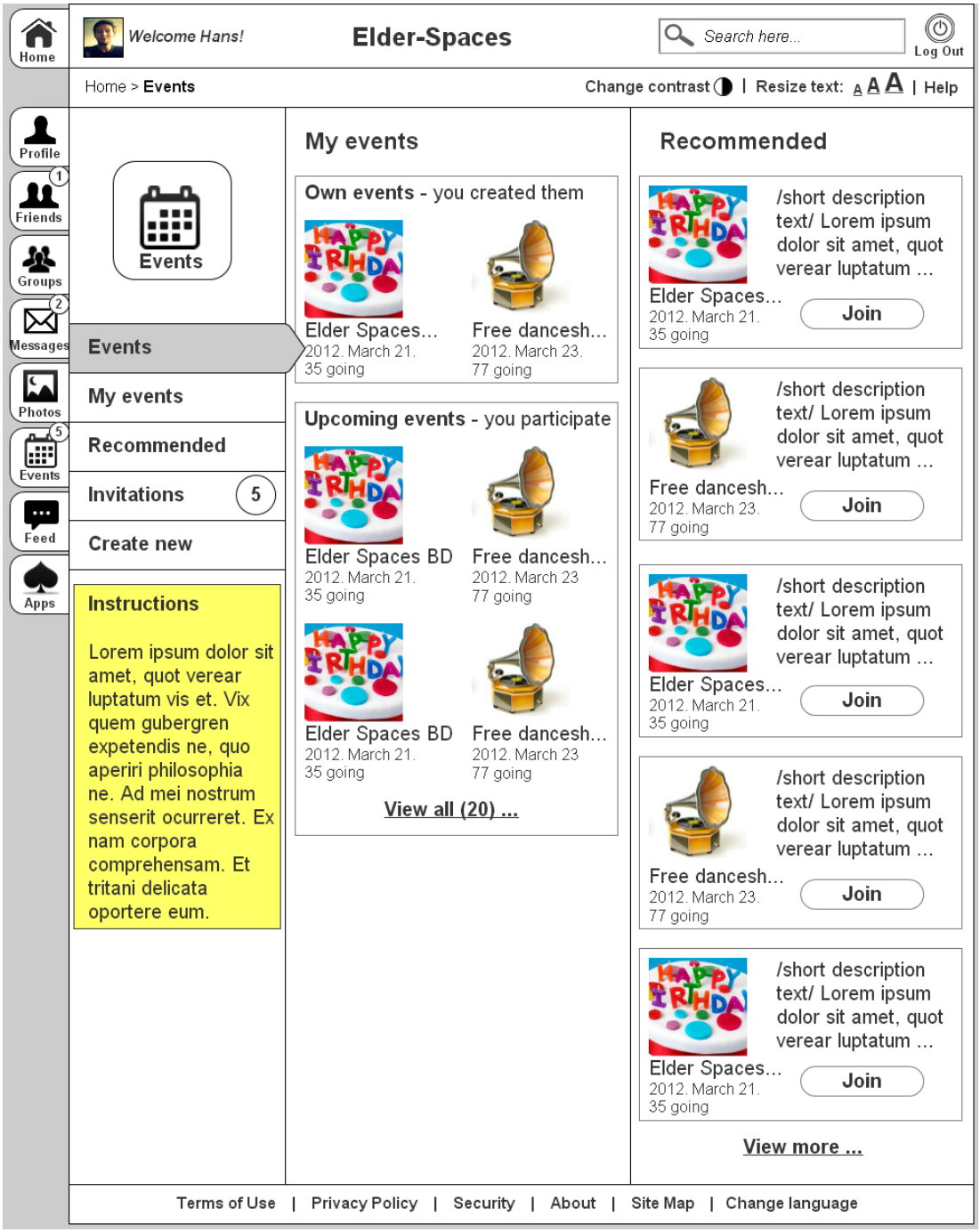

Figure 83: Events main page UI

Screen Name	Notification
Description	The notifications appear in a circle in the main functions icons with a number in the middle.
Components	A circle with a number.

Functionality	There are 3 possibilities where the notifications can appear: • main page: main navigation icons top right corner • tab menu top right corner • next to the local menus The following functions have notifications: • Friends: means the number of the dependent friends, by clicking on it will display the Friends request page. • Groups: dependent group invitations from the friends, by clicking on it will display the Group invitations page. • Messages: unread messages. By clicking on it will display the Inbox. • Events: dependent events requests from the friends. By clicking on it will display the Events invitations page.
Comments	

7.2.10.2 Functionality Description

Events are a very important feature of the Elder-Spaces platform. Users are able to generate offline relations with each other through the function.

Following sub functions available in the Events:

- Create new event.
- Join to an already existing event.
- Share thoughts in the given event feed, ask questions about the event.
- Invite friends to an event.

The platform will recommend events to the user, which events could be interesting for the viewer.

7.2.10.3 Sequence Diagrams

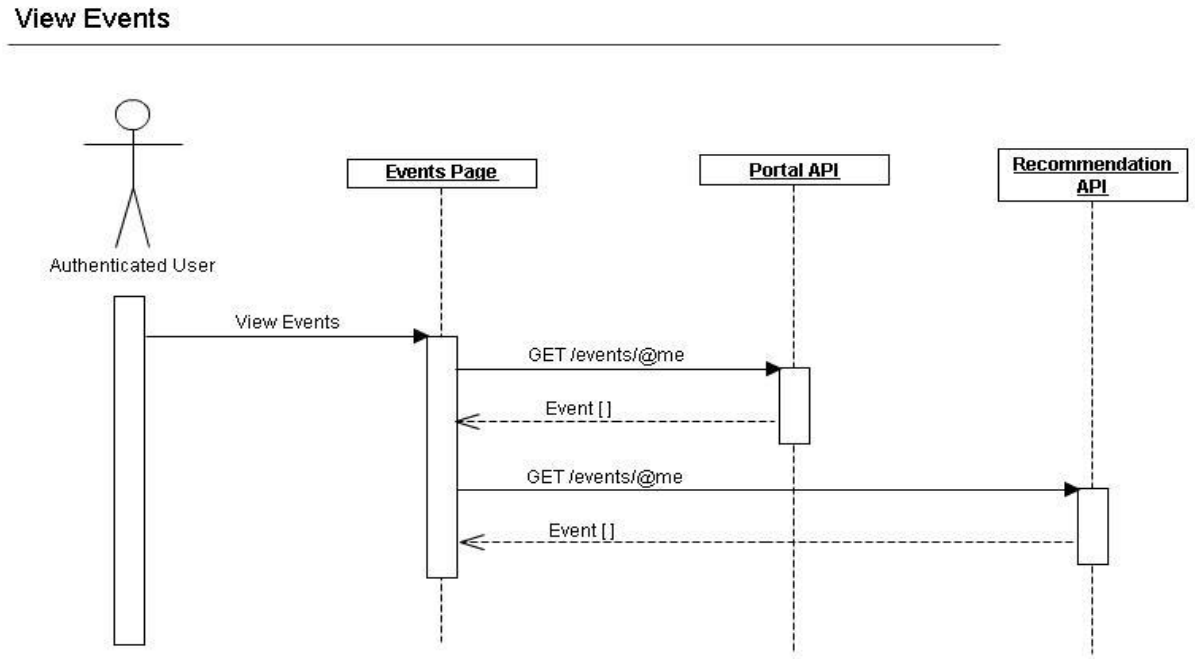

Figure 84: Sequence Diagram for View Events

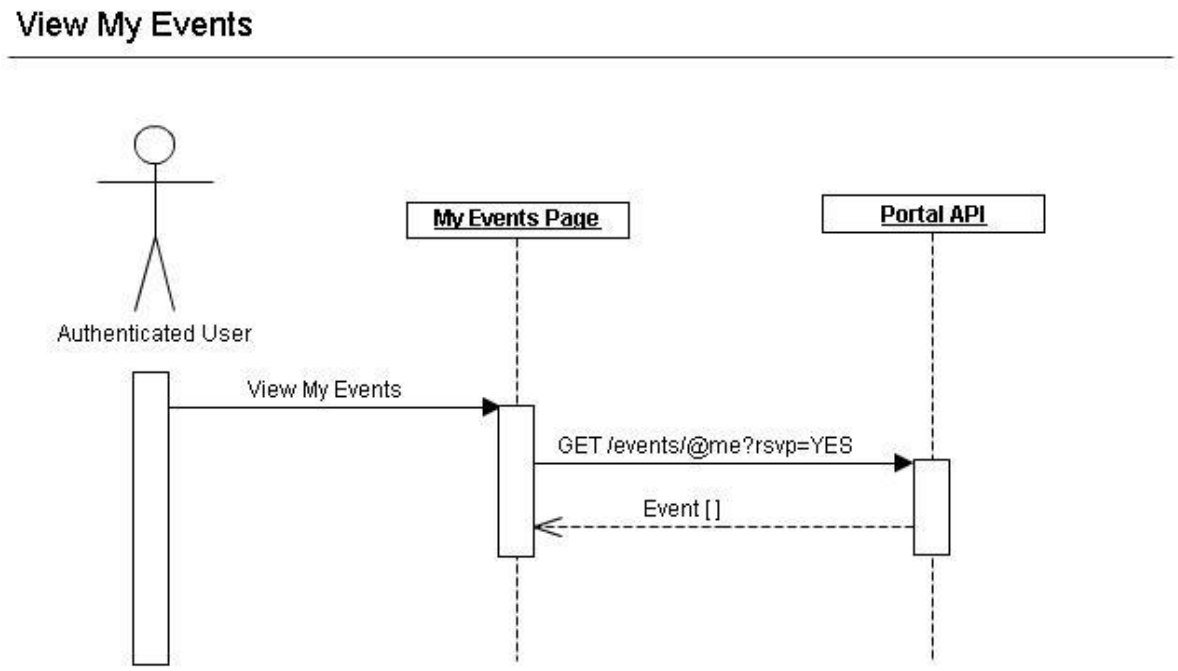

Figure 85: Sequence Diagram for Viewing My Events

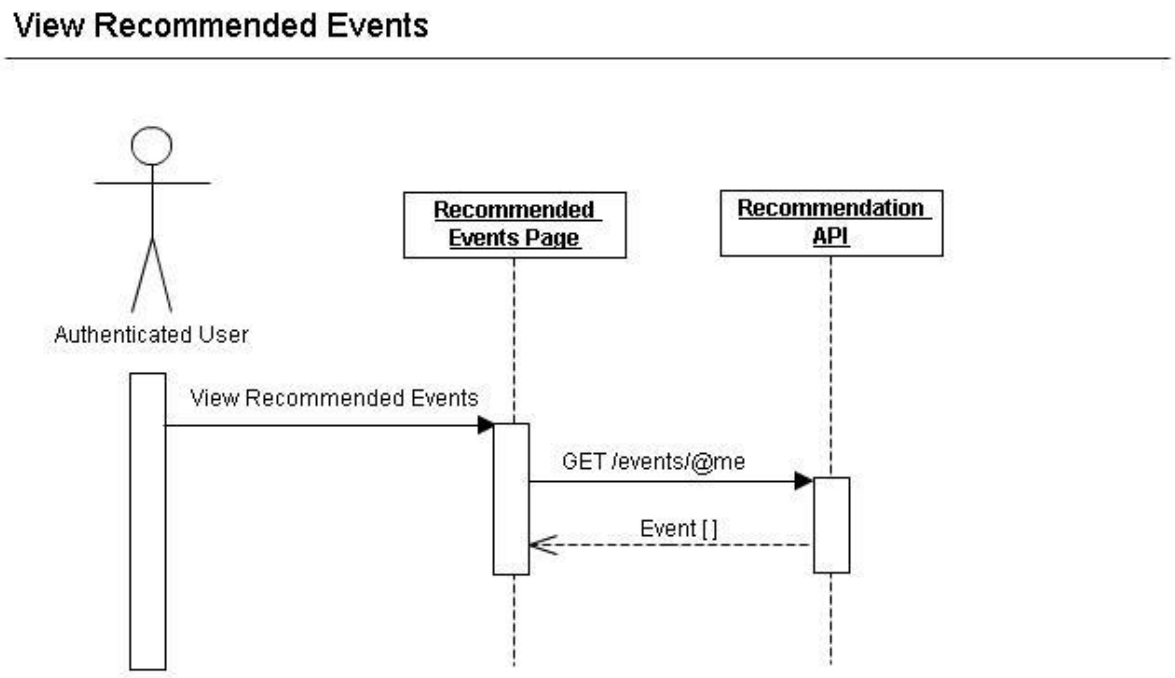

Figure 86: Sequence Diagram for Viewing Recommended Events

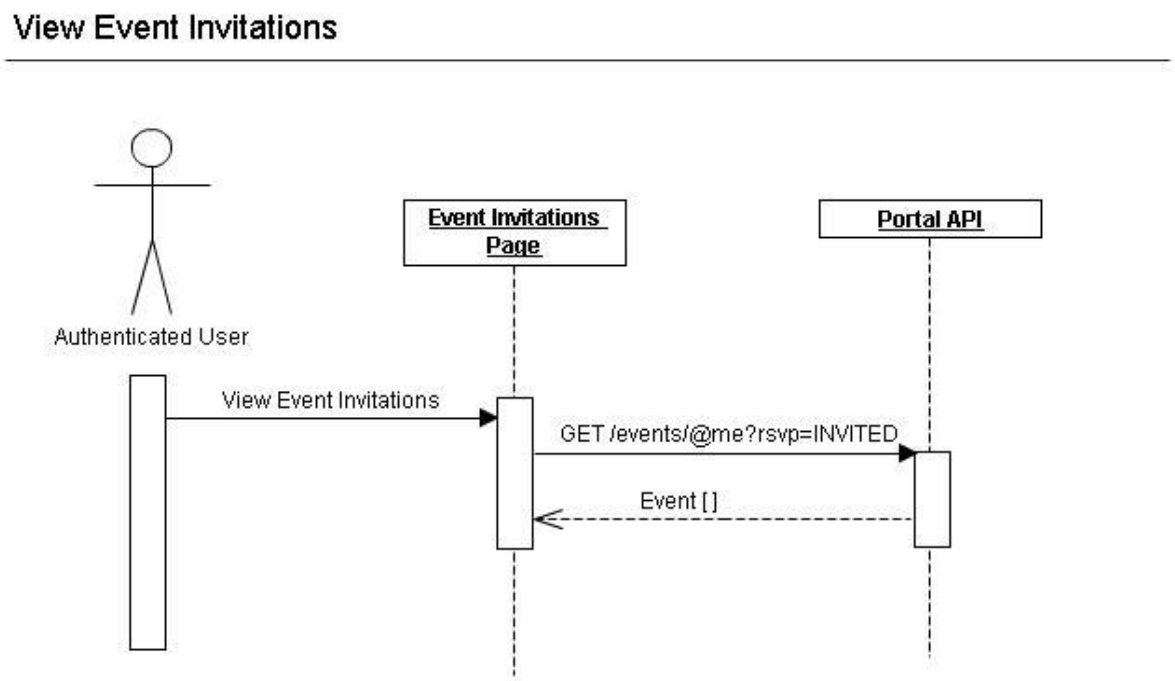

Figure 87: Sequence Diagram for Viewing Event Invitations

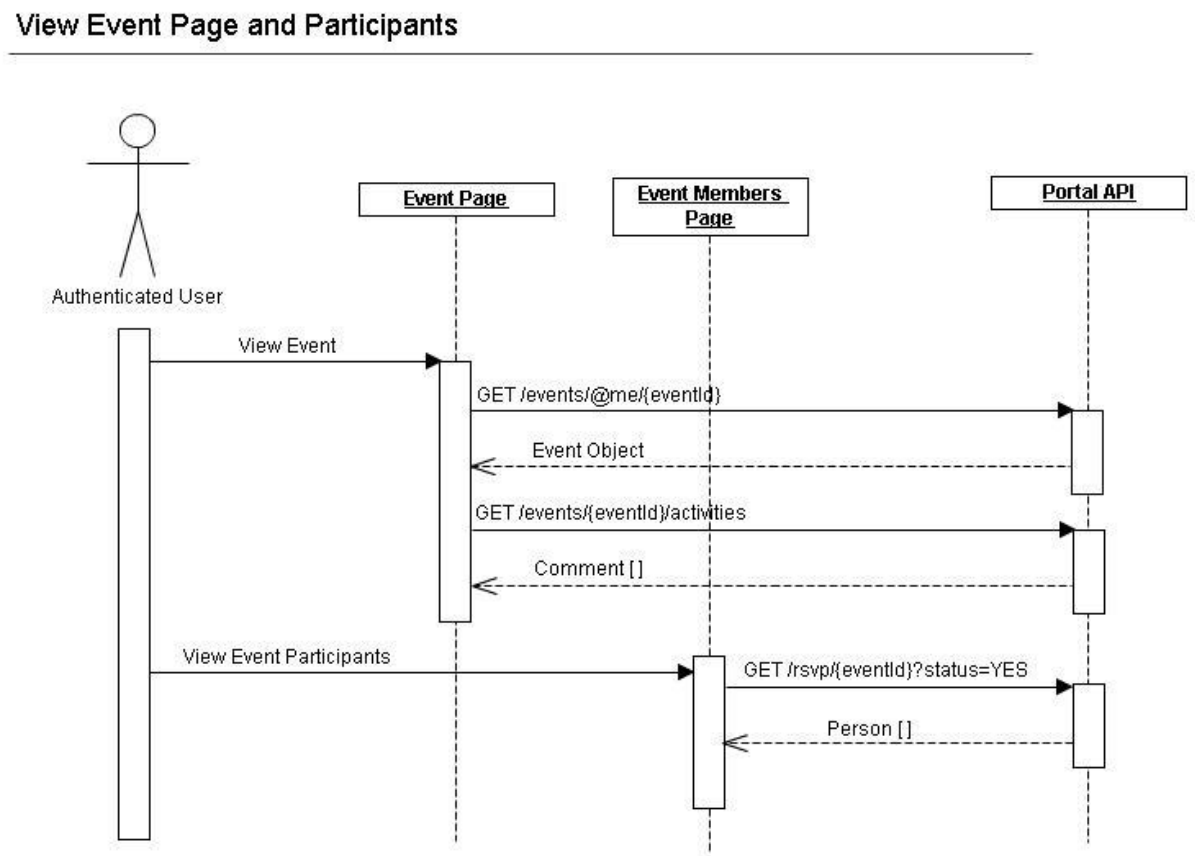

Figure 88: Sequence Diagram for Viewing Event and Participants

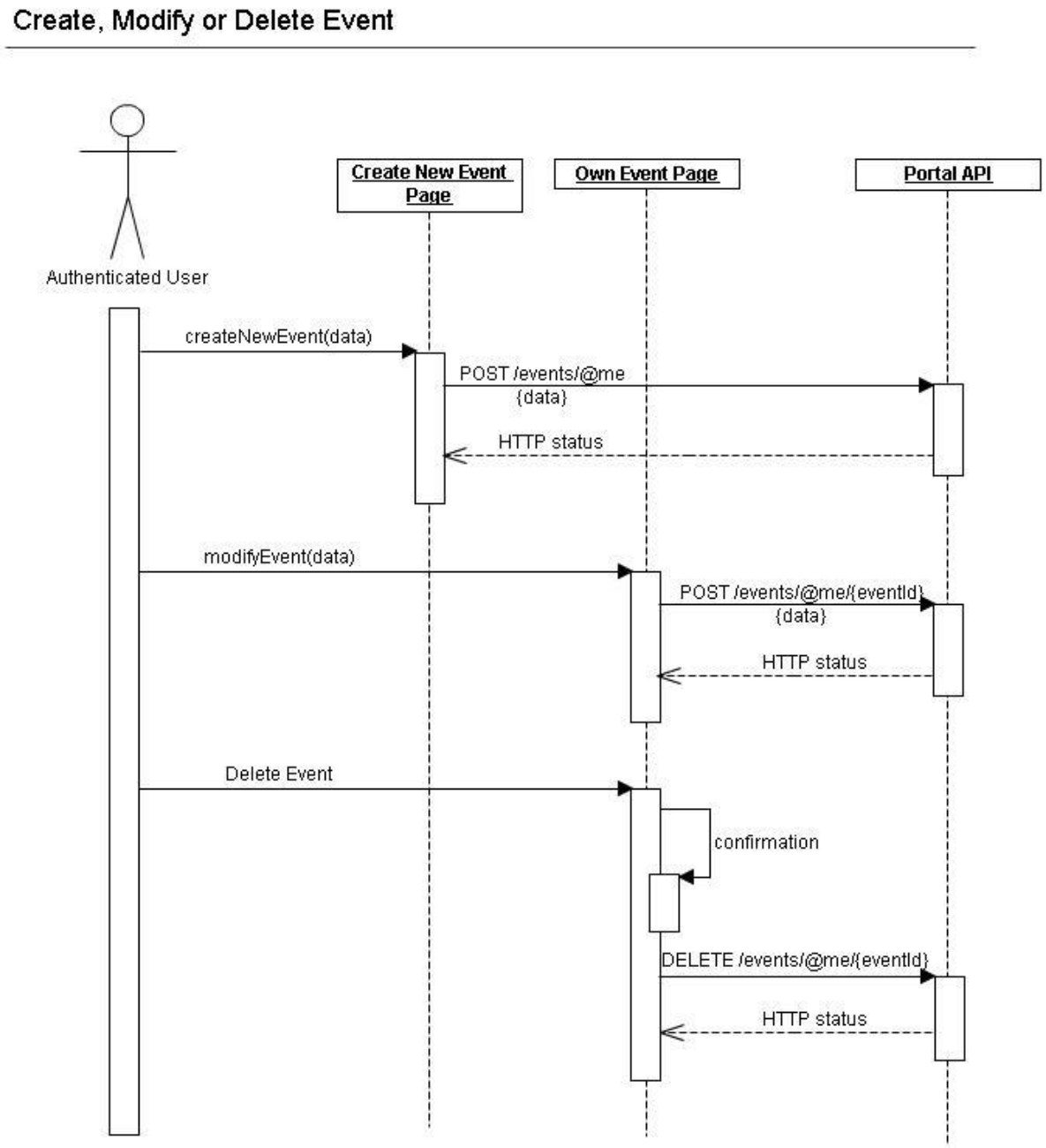

Figure 89: Sequence Diagram for Create, Modify or Delete Event

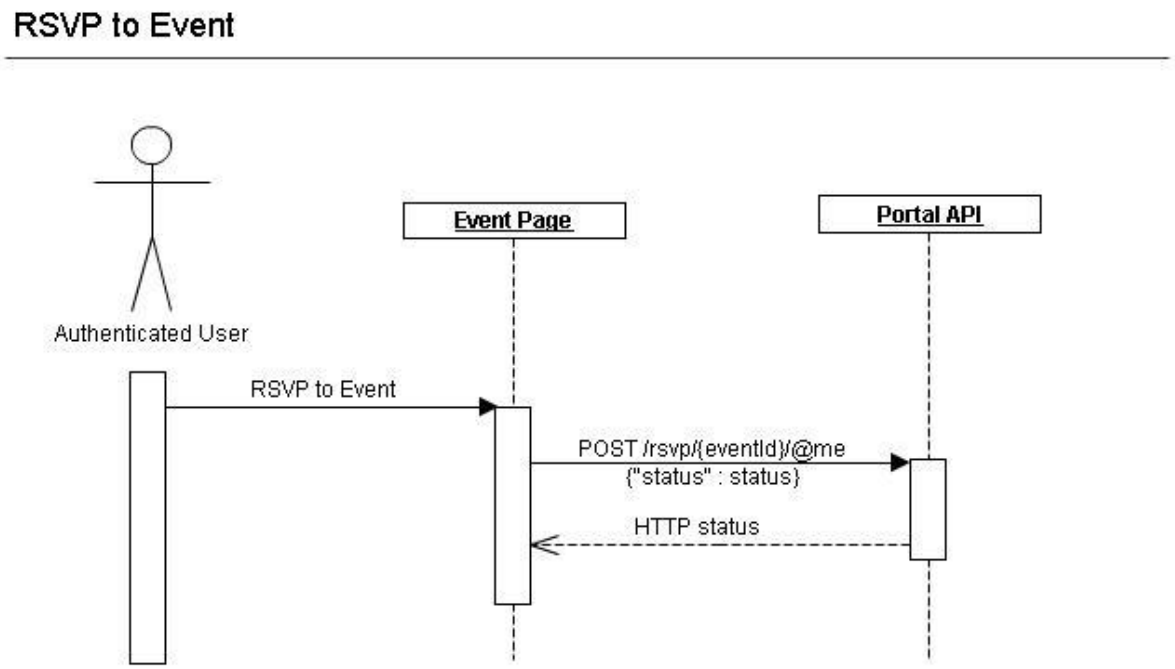

Figure 90: Sequence Diagram for RSVP to Event

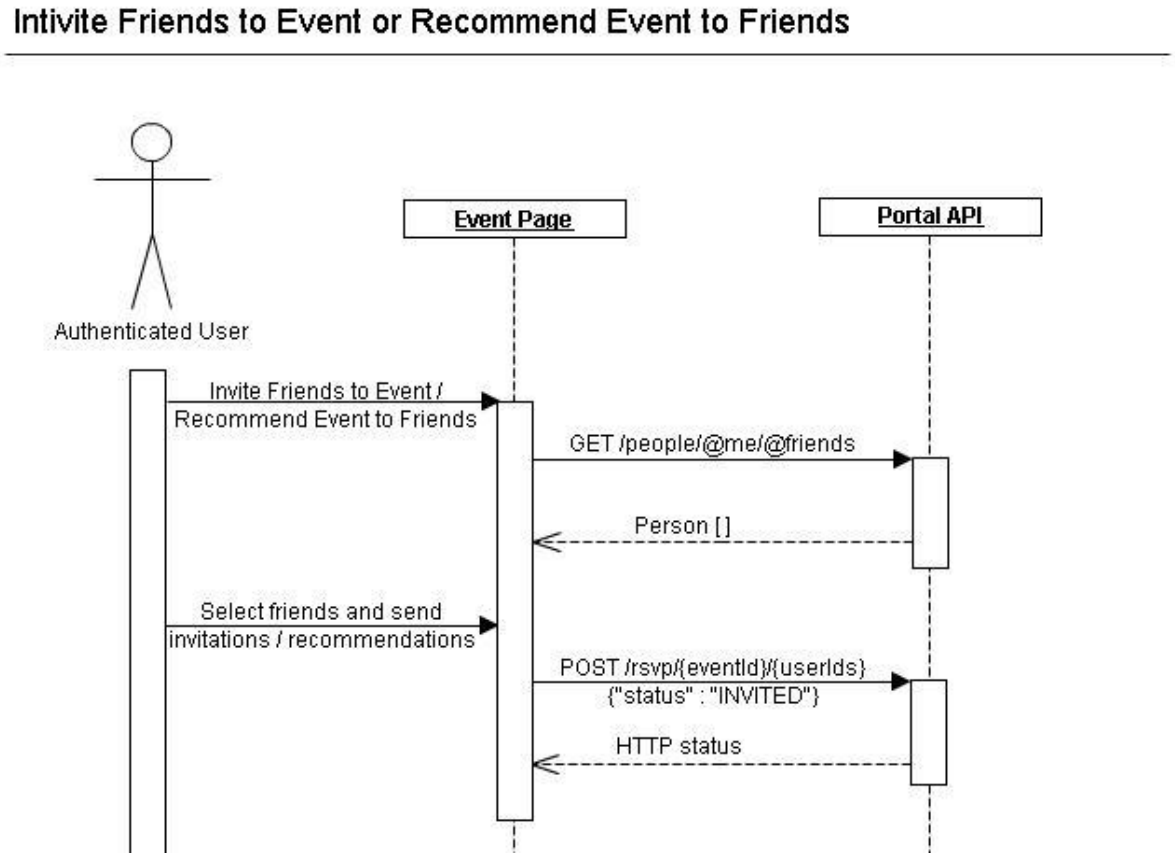

Figure 91: Sequence Diagram for Invite Friends to Event or Recommend Event to Friends

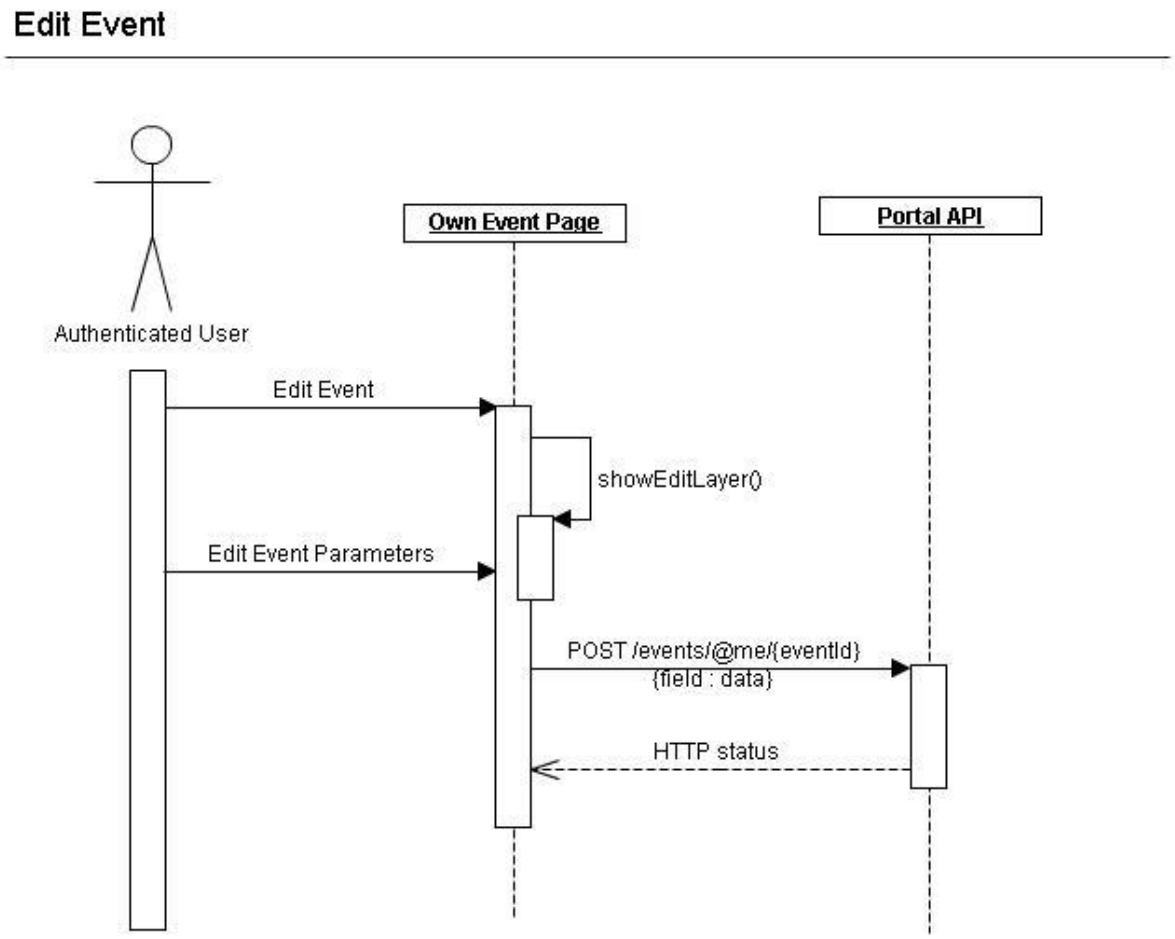

Figure 92: Sequence Diagram for Editing an Event

7.2.11 Groups

7.2.11.1 Groups UI wireframe

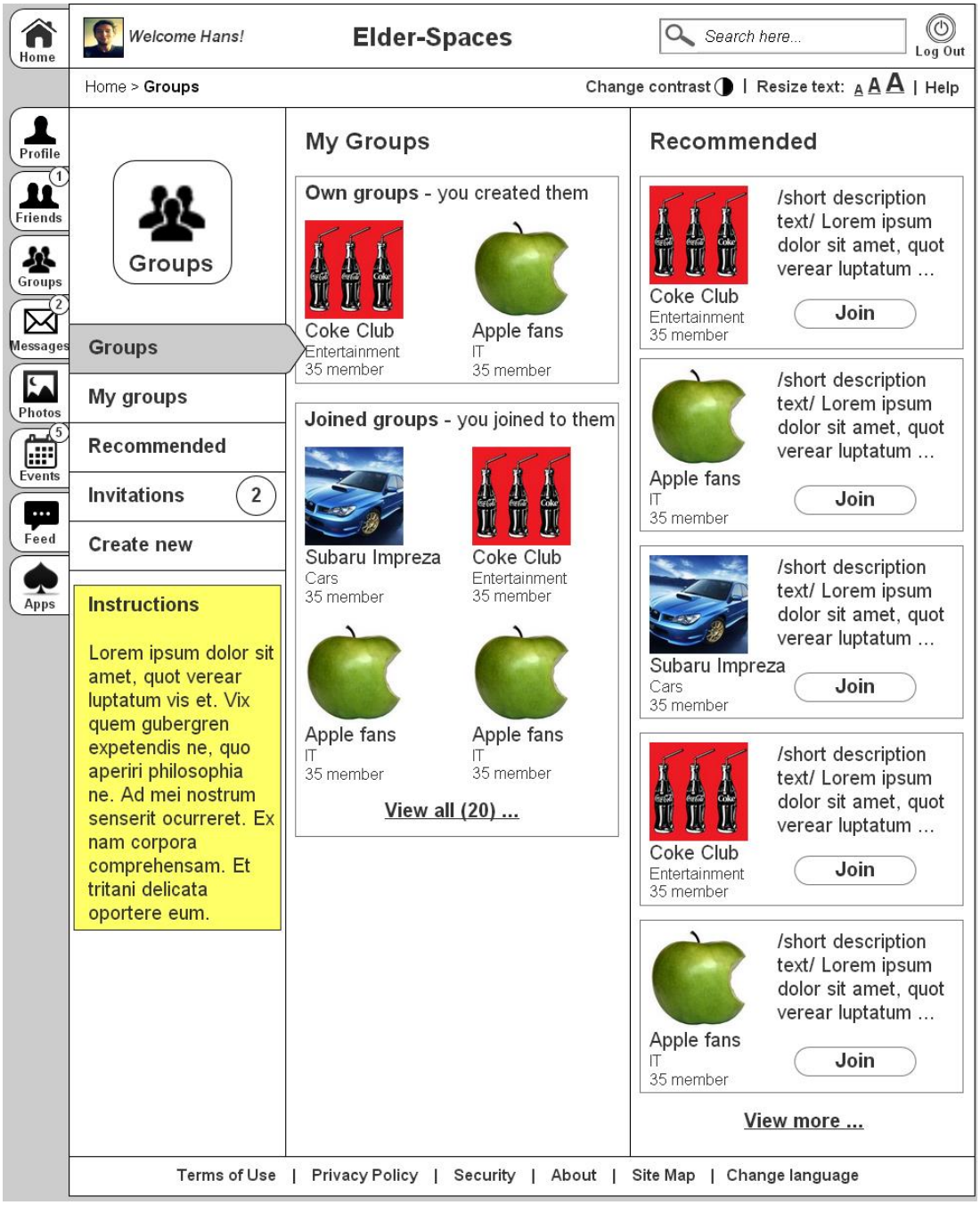

Figure 93: Groups main page UI

Screen Name	Groups main page
Description	Groups are one of the core functions of the platform. Aims to boost senior's social activation on the basis of groups that bring older people closer.

Components	local navigation column content column
Functionality	Left navigation column: • Image: Groups icon links into the Groups main page • Groups, links into the groups main page • My groups, links into the my groups page • Recommended, links into the Recommended groups page • Invitations, links in to the Groups invitations page • Create new, links into they create new group form. Right content column contains 2 columns: • left column title: My groups • left column contains 2 content boxes: top and below box. In the top is the users own groups. In the below box that groups appear where the user is a member of the group. The Group mini contains a group photo with group name, the type of the group and the number of the members. • right column title: Recommended • this group mini contains additional 2 more item: group description and Join button.
Comments	

The Groups are a core function of the platform. The users are able to create a personalized space for sharing information and knowledge. The function will motivate and engage older people in face-to-face activities. The Groups main function will build older people communities on the basis of common interests and/or culture, social graphs or even past relationships. Communities, include the association of people that graduated from a specific school, association of women, association of Catholics, etc. In this way the Elder-Spaces platform will facilitate older adults in being active and well-connected in their preferred social environment.

The following sub functions available in the Groups:

- Create new group
- Edit group
- Join to a group
- Search for groups which can be interesting for the user
- Recommend groups

7.2.11.2 Sequence Diagrams

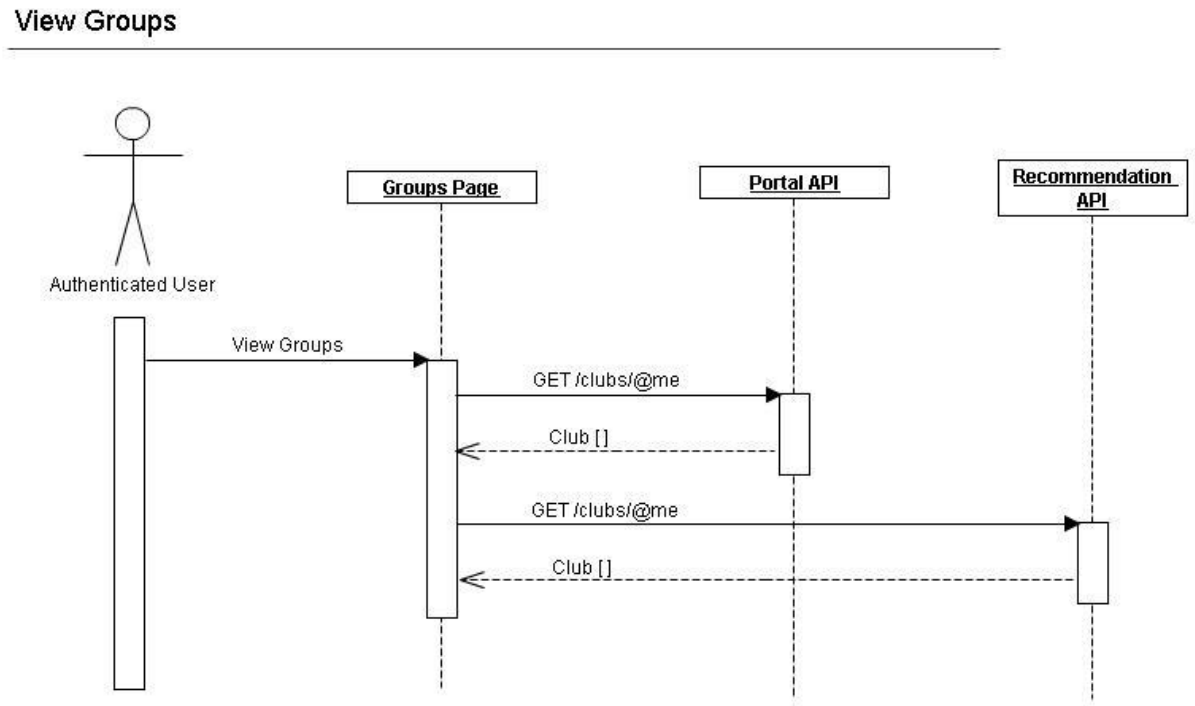

Figure 94: Sequence Diagram for Viewing Groups

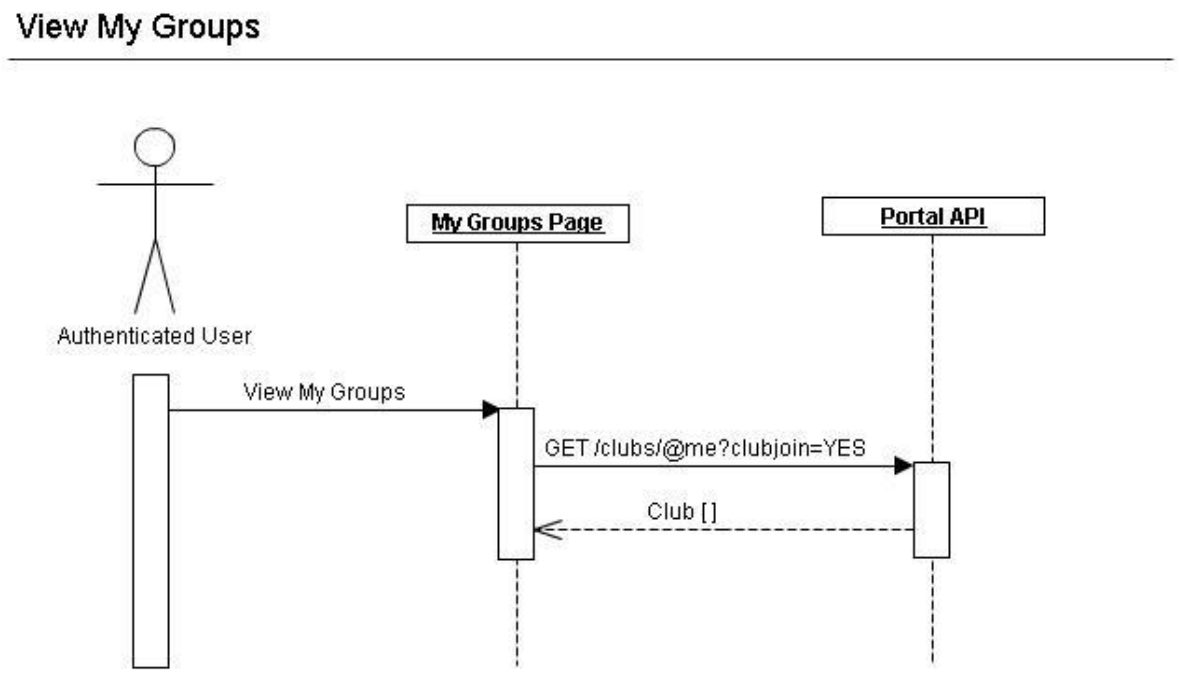

Figure 95: Sequence Diagram for Viewing My Groups

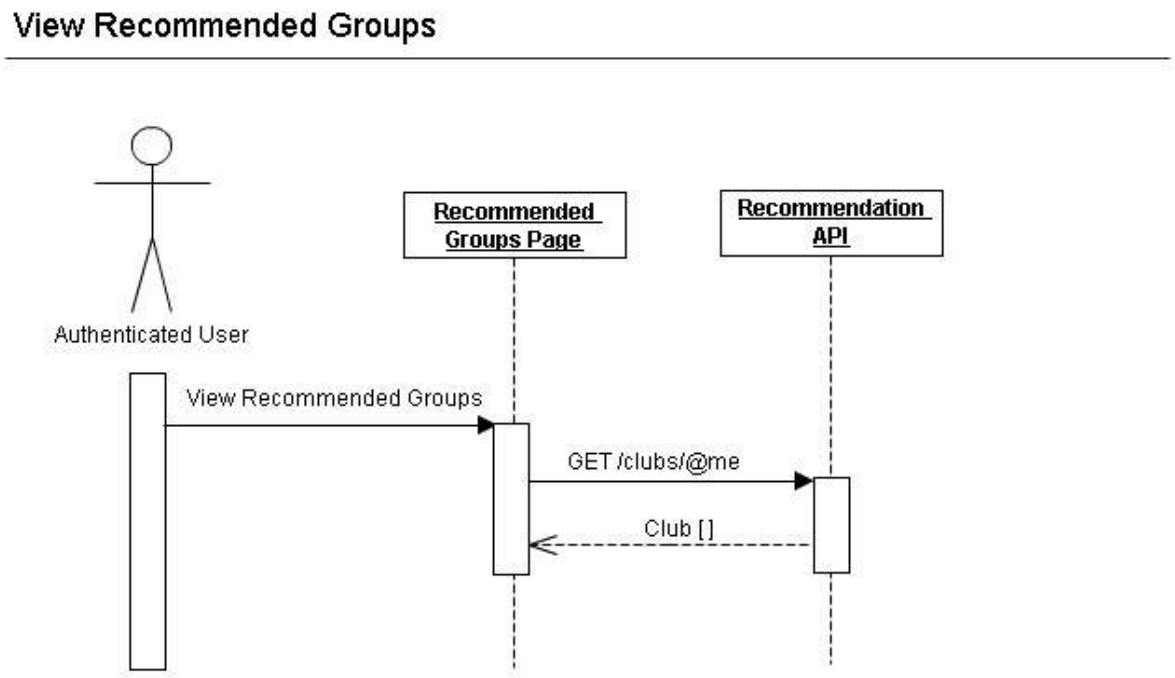

Figure 96: Sequence Diagram for Viewing Recommended Groups

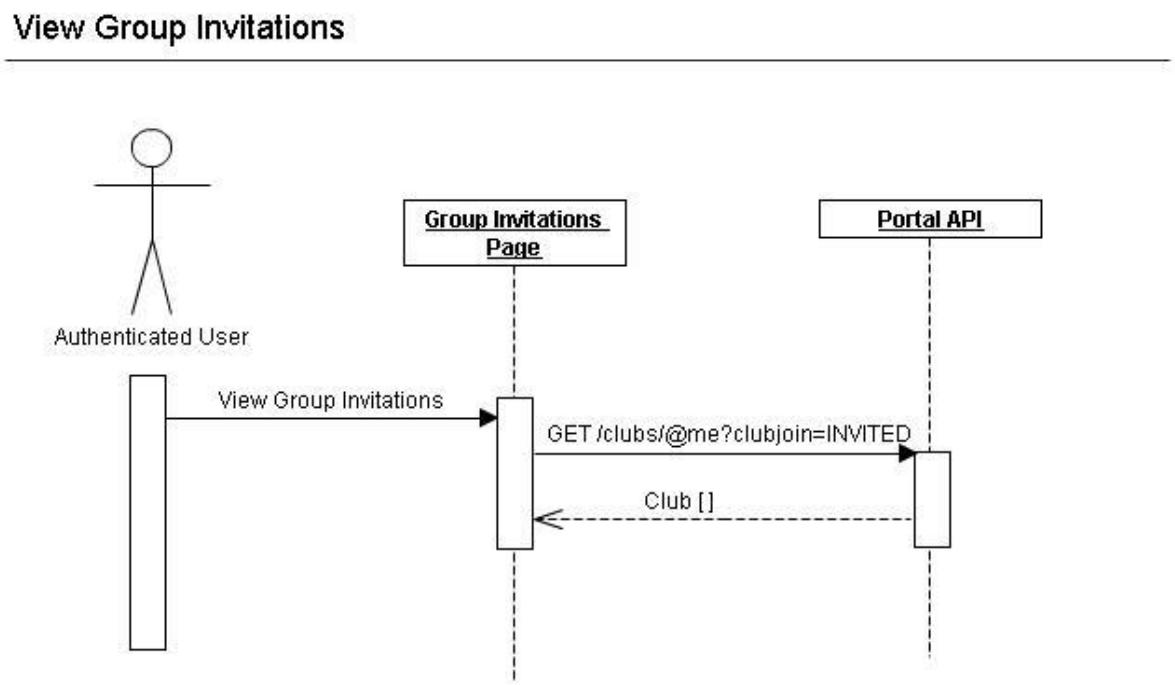

Figure 97: Sequence Diagram for Viewing Group Invitations

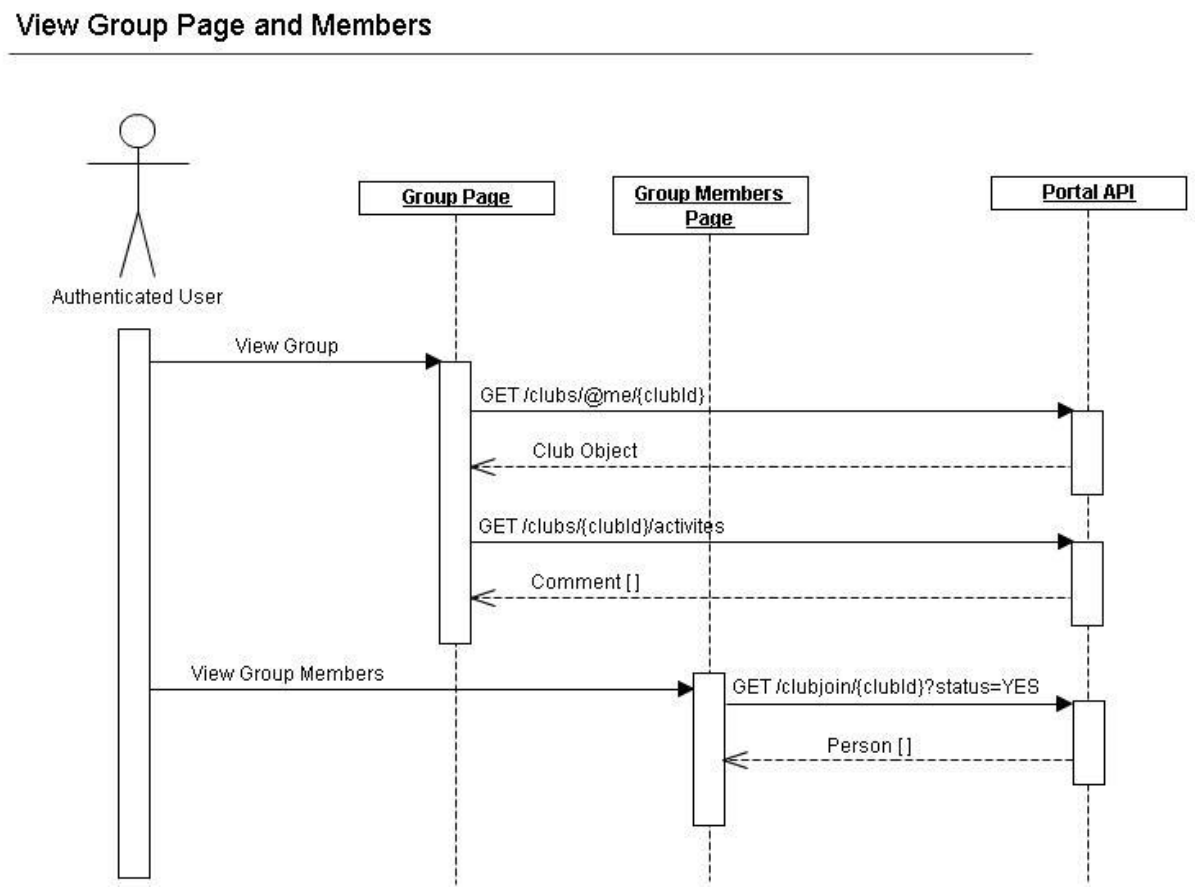

Figure 98: Sequence Diagram for Viewing Group and Members

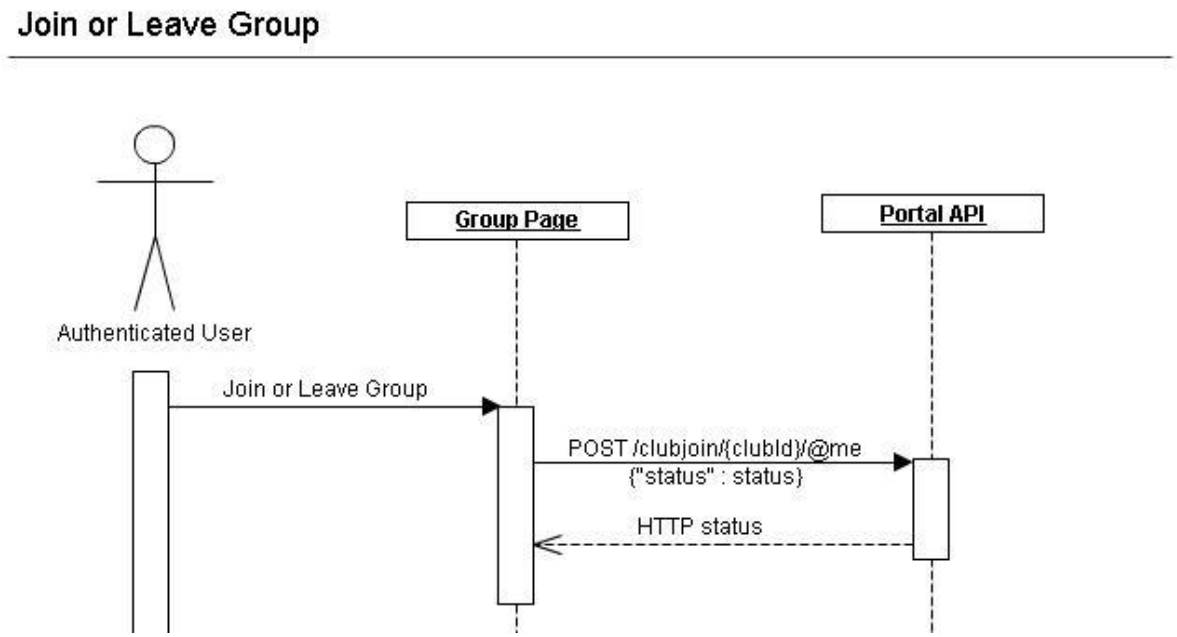

Figure 99: Sequence Diagram for Joining or leaving a Group

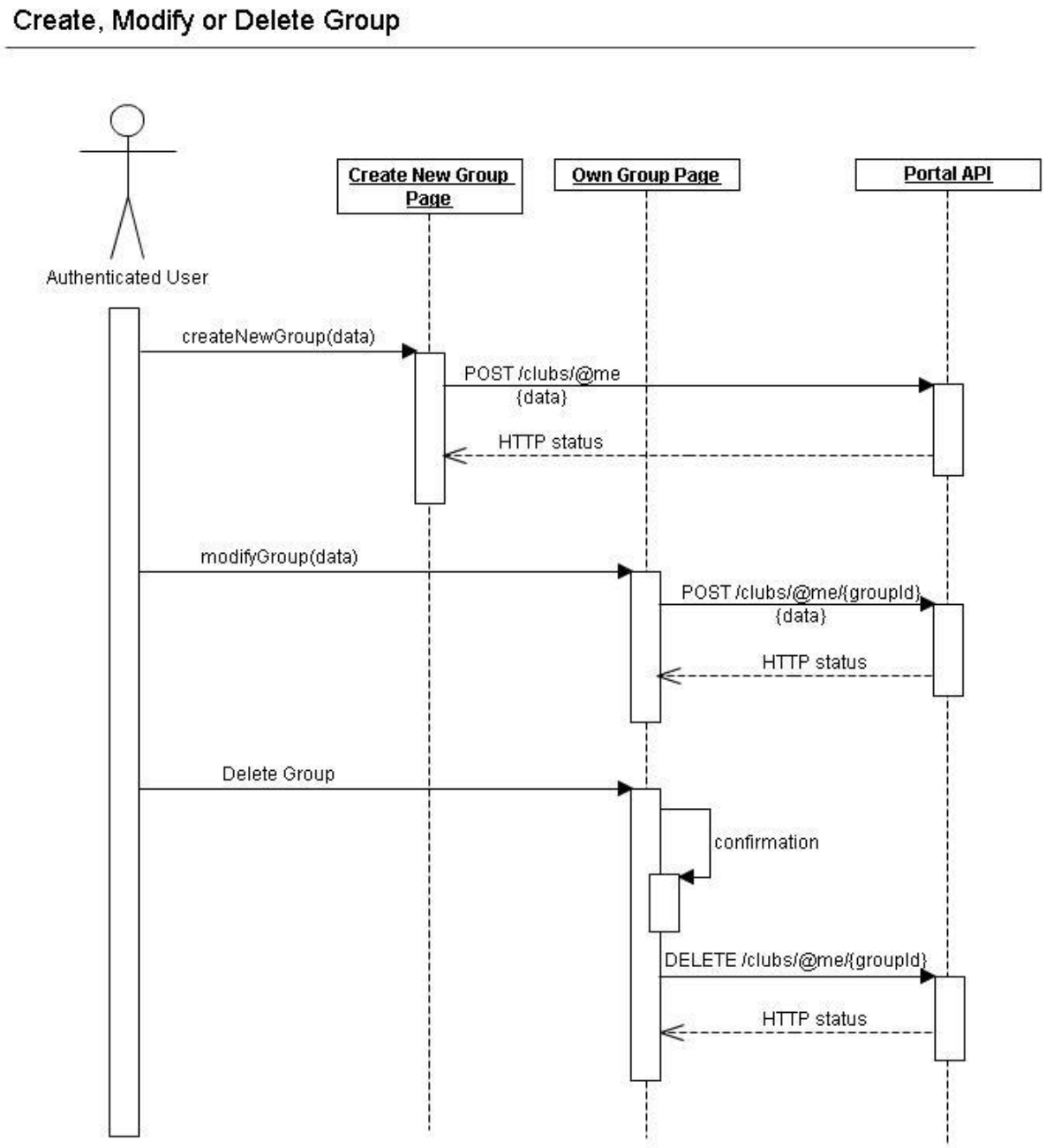

Figure 100: Sequence Diagram for Create, Modify or Delete Group

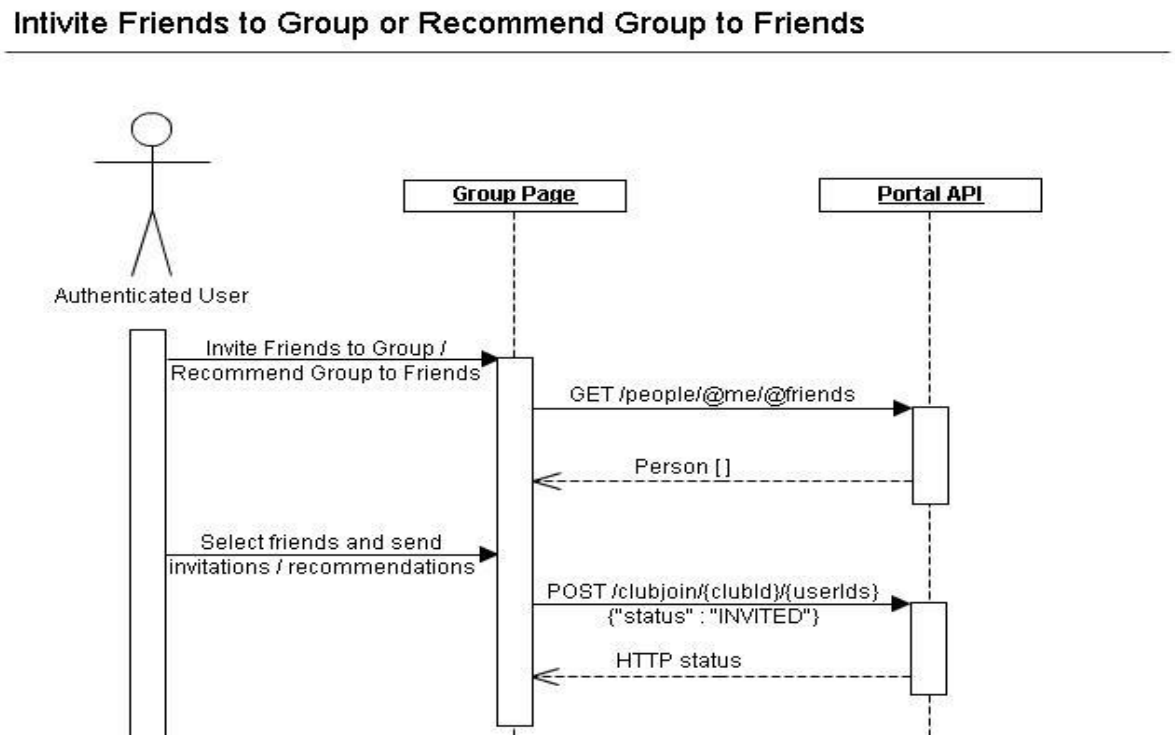

Figure 101: Sequence Diagram for inviting friends or recommending Group

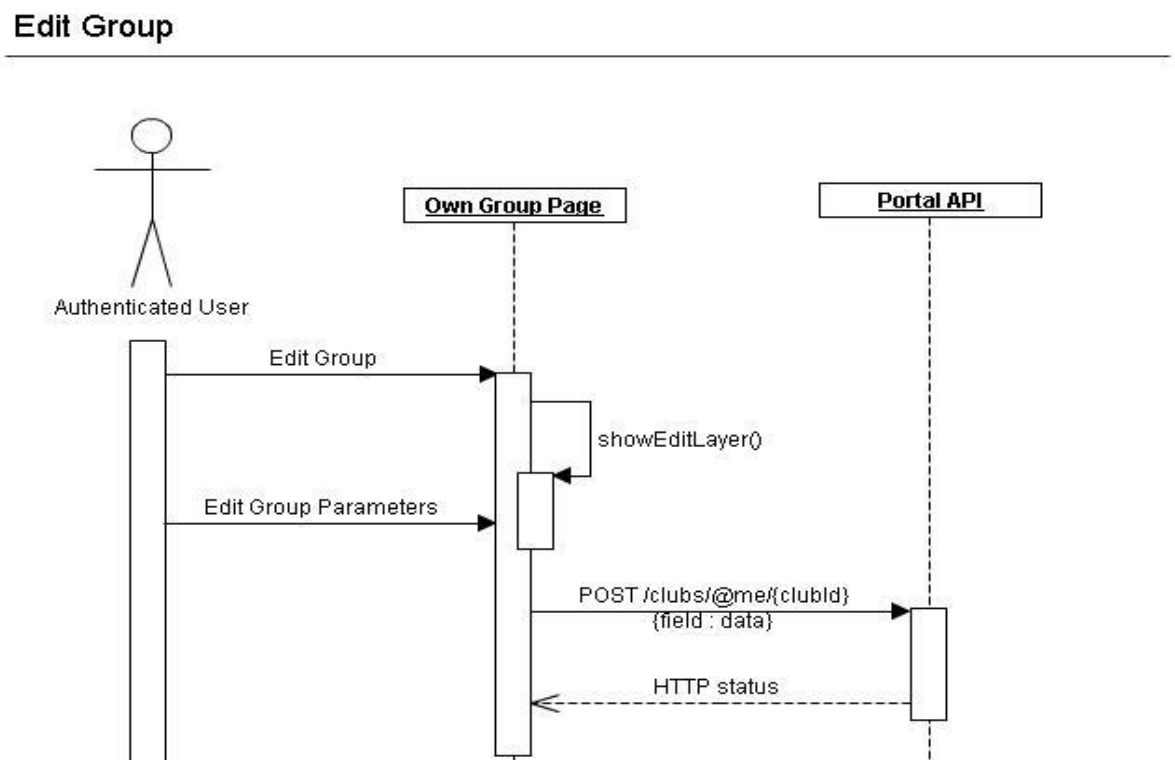

Figure 102: Sequence Diagram for Editing Group details

7.2.12 Travel Memories

7.2.12.1 Travel memories UI wireframe

Figure 103: Travel Memories UI

7.2.12.2 Travel Memories Functionality

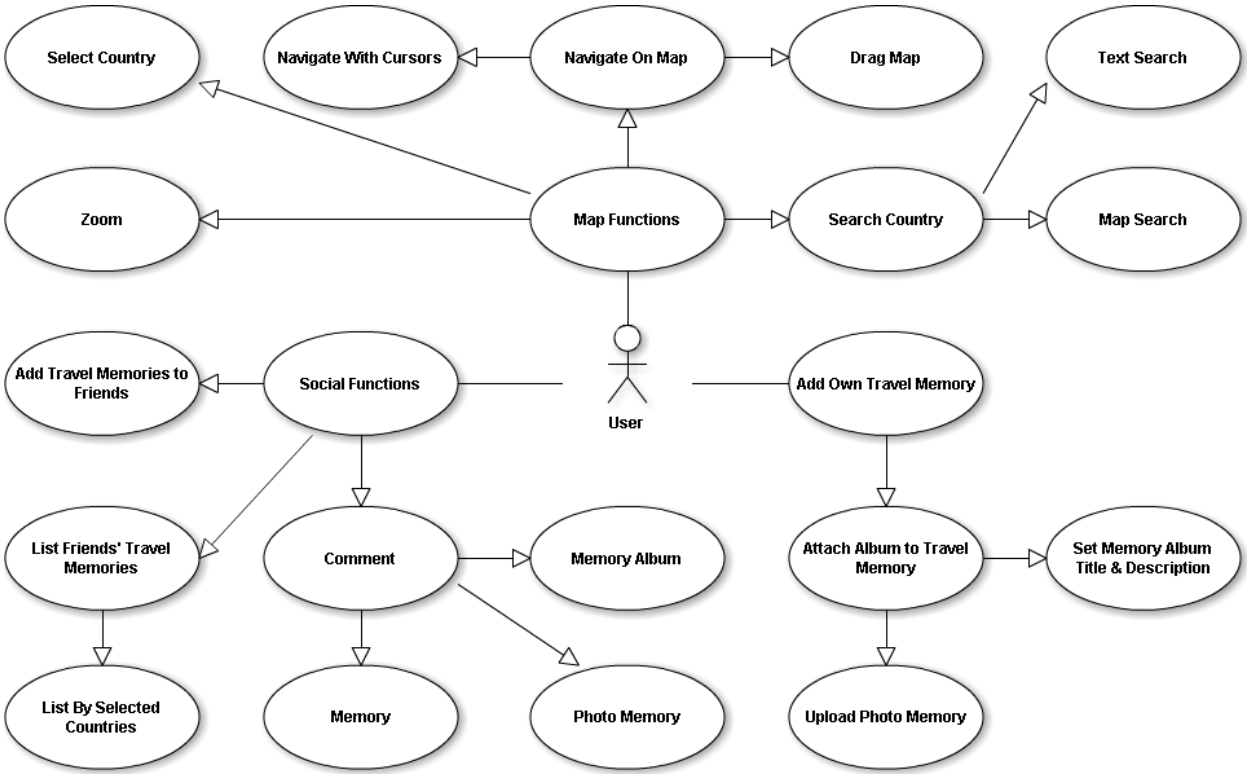

Figure 104: Travel Memories actions

7.2.12.3 Functionality Description

The Travel Memories application is a community (social networking) service that would stimulate the elderly users of Elder-Spaces platform to establish contact with one another through their travel memories, sharing them with others. Elder-Spaces albums created for the memories would enable users to share and comment their photo memories. The Travel Memories application can extend the Elder-Spaces platform to a collection pool of travel memories that would offer to aged users – by means of positive memories – a community experience rich in information.

The main site is the opening view of Travel Memories application that can be accessed following the activation of the application. The central part of the site is occupied by a stylized world map where the individual countries are distinctly separated.

The user can select a country from the map with their mouse. By pulling the mouse over a country the name of the country is written out in "hover" status. When clicking on the country the window called "My memories about the country" appears. A country may have four different colours on the map, depending on the type of travel memory the user has specified for the given country in the window "My memories about the country".

The possible values are given below, broken down to travel memory types:

Serial number Travel memory type Map colour

1. I was here Blue
2. I lived here Claret
3. I would like to go here Green
4. I live here now Yellow

One shall indicate on the map with icons understandable for aged people as well if one of my friends has already recorded travel memory for the given country. By clicking on the icons, the window called "My friends in the country" appears.

Map functions

The following functionalities are available on the map:

- Three-level zoom function, assisting the elder users in finding smaller countries.
- Four-direction moving (animating) tool enabling the user to move the zoomed (enlarged) map. The moving is also possible with the drag and drop function of the mouse.
- Country search function making possible to narrow down the countries we are looking for.
  - The function is implemented with "Auto complete" facility; therefore, the found countries automatically appear below the search field. By clicking on the name of the country, the window "My memories about the country" appears.
- Friends button – if it is pushed, the "Friends" window is shown.

7.2.13 Life-Long Learning

7.2.13.1 Life-Long Learning UI wireframe

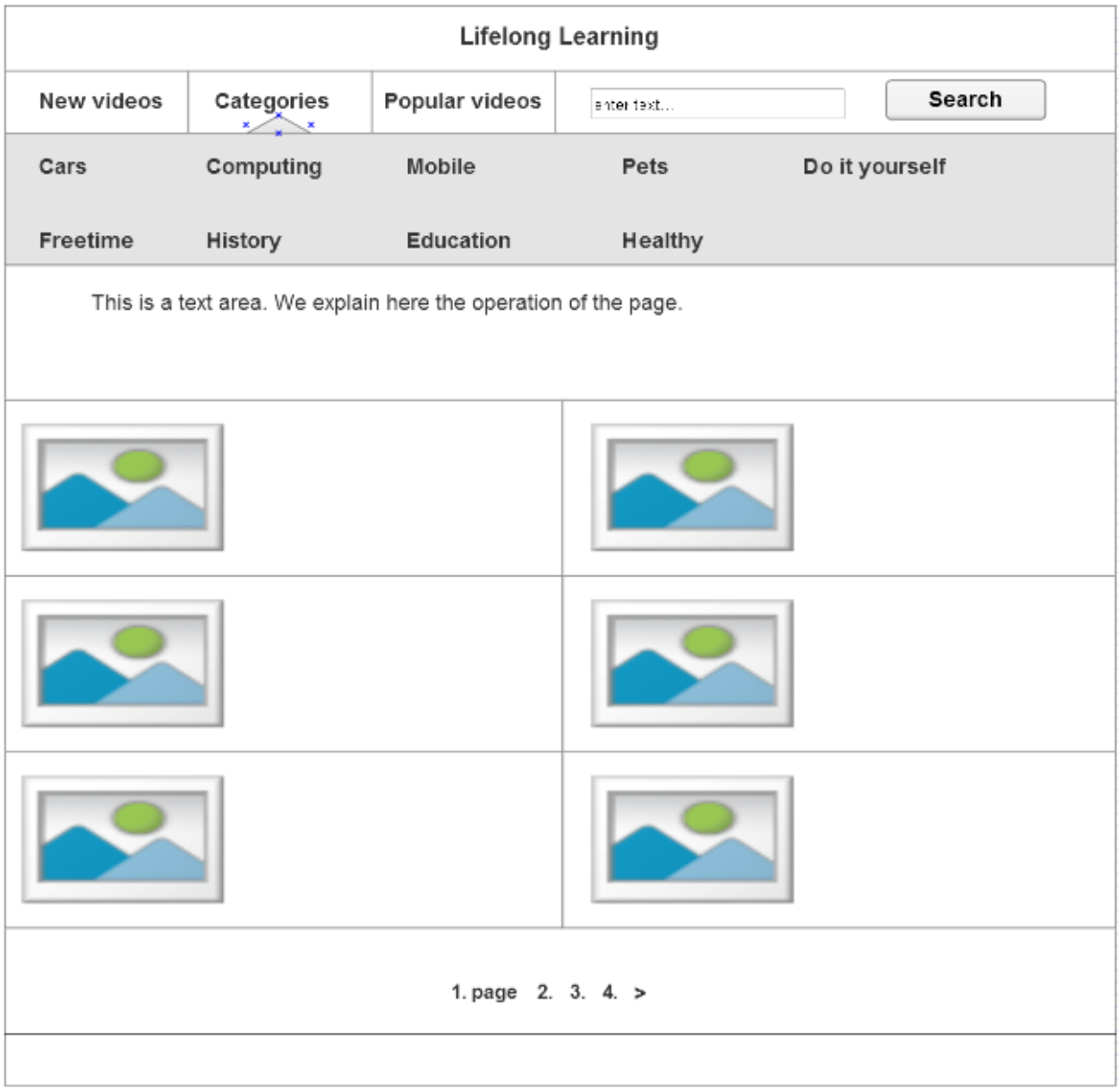

Figure 105: Life Long Learning UI

7.2.13.2 Life Long Learning Functionality Description

Lifelong learning is a social application using a bunch of selected educative videos to educate elderly people to learn new things or get involved in less known activities. Videos are pre-classified in the system. The usage of the application is quite simple therefore fits the framework elder spaces social platform provides. Because of the transparent and straightforward structure of the functions, the application can be handled easily and users can share very fast and without any meaningful obstacles the liked videos and the learnt practices with their friends.

The structure of the application

The width of the application window is 920 pixels. The height changes according to the content. The application consists of three main parts: Navigation, Search and Content. Between the navigation and the content there is a 920 pixels wide and 90 pixels height text field which contains the description to the navigation and the search functions.

Dissemination

News-flow

After the first use of the application a notification pops up in the news stream and the it notifies the friends of the user that "James just started to use the Lifelong Learning app to get acquainted with new things". If friends click on the name of the application in the news stream they will be transferred to the application directly.

Notification

Spreading of the application could be initiated by clicking on the Share button. After clicking on that button a notification will be sent to all our friends, which contains the name of the sender, the name of the app and the link to the video.

Operation

1.0 **Navigation**: a menu bar is deployed in the application which can be accessed at all functions, the buttons activate on clicking
    1.1 New videos: the first button in the menu bar, by clicking on that button the latest videos will be enlisted. At the same time this is the default screen after the application has been started.
    1.2 Categories: after clicking on the "Category" button a window pops up. The user can select from the predefined categories. Clicking outside the category window the field closes.
    1.3 Popular videos: there is a list based on the number of downloads of the shared videos. The most viewed and downloaded clips are enlisted at the top of the page.
2.0 **Search**: Search from the available videos in the database. The search is implemented with keywords and activated by clicking on the "Search" button. The search engine operates with full words.
3.0 **Content:** the field where content (video) appears. There could be maximum 6 videos at the same time on one screen after listing them. If there are more than 6 selected or listed videos, pagination is used.
    3.1 Enlisted content: videos appear in bunches consisting of 6 pieces. There are three different types of information about the videos: title, a screenshot and a brief description (content, length etc.)
    3.2 Selected content: the user might select a video by clicking on her title or screenshot. After selection the video gets into the player and appears in the content field with the size of 420 pixels*315 pixels. Simultaneously the title of the video, the brief description, the number of downloads since now, a „share" button and a „back" button appear. Below the video there is a stream bar with functional buttons to manage the play. After finishing the video the user can leave the content field by clicking on „Back" or simply using the general menu bar used for navigation.

3.3 Sharing videos: Users can share the videos they can access. Clicking on the share button the list of friends' pops up. By selecting the assigned friends the user can share the content (the default option is share with all). After the action the friends with whom the user shared the video will be notified about the recommendation. If the user does not want to share the video she just simply clicks on the „close" button in the window.

7.2.14 Paging of results

A functionality common to all web pages displaying results, is that of paging. In previous specifications, paging is not included in the sequence diagrams, in order to simplify them and avoid repeating the same motive over and over, making them more difficult to be understood.

In this paragraph, we present the common mechanism which implements paging. In the following example, we present the paging mechanism for the view friends' functionality.

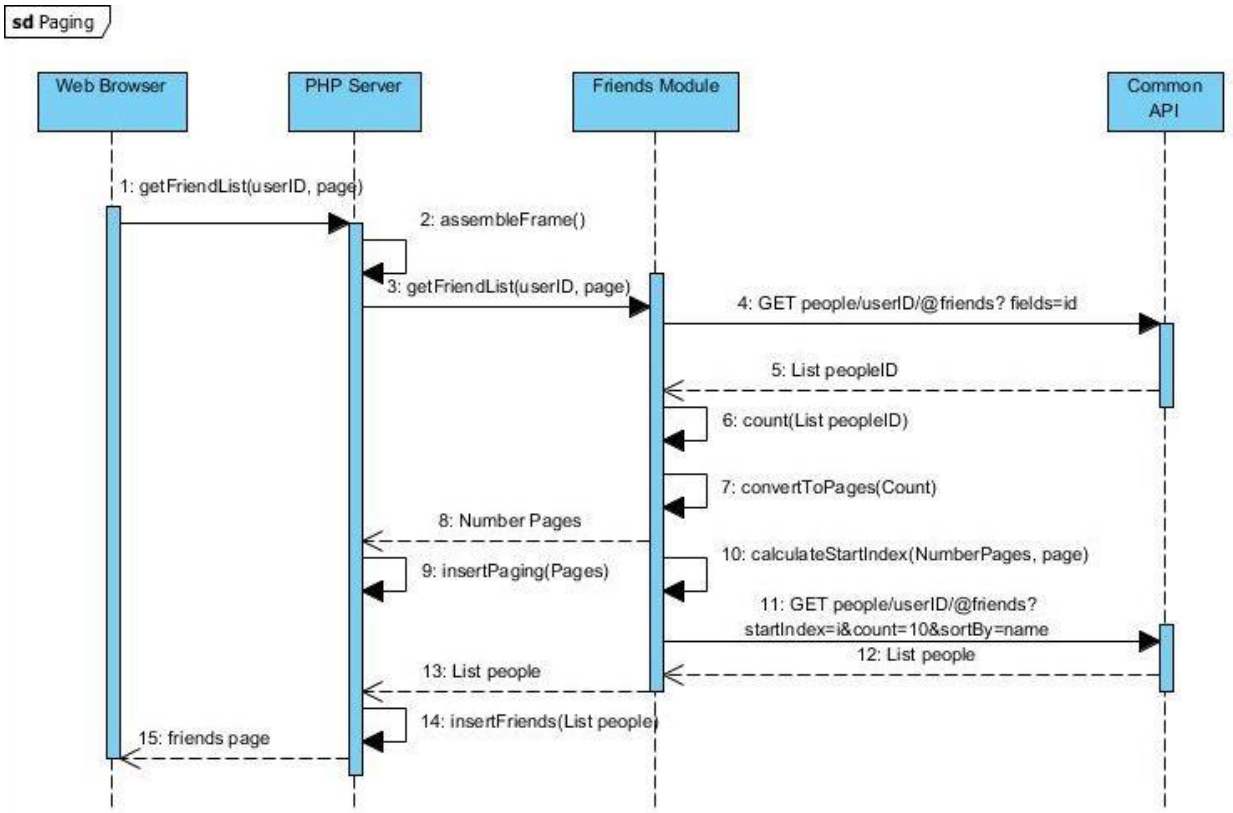

Figure 106: Sequence Diagram for paging

Friends are viewed in batches of 10. So the initial request from the browser should contain the page to be viewed (default is 1). By getting only the ids of the requested objects in the first pass, we minimize workload and I/O.

Following that the system counts the total items and according to the page requested calculates the startIndex (i) for the actual GET request.

The total number of elements is converted to pages and the selected objects are feed to the page and rendered.

This method is used in all cases where paging is necessary. For cases where only a short list of elements is displayed, results are filtered by a count=X parameter.

7.3 Multilanguage support

Multilanguage support will be available to the users of Elder-Spaces. It is of particular importance, as elder people are less likely to be fluent in a foreign language than younger ones. The default language of the social network will be English. There are going to be alternatives to switch to German, Greek, Hungarian or Italian.

Language selection will be done by the user from the functionality provided in the footer of each page. Once a choice is made, it remains as the default selection of the user, stored in its profile. Language selection affects the labels and messages of the entire site.

Figure 107: Changing the language wireframe reference

Multilanguage support implementation will be by using the functionality provided by the Symfony 2.0 Framework, and specifically the "translation" component.

In order to provide this functionality, it is necessary to abstract all text in the web pages and relevant functions into a layer that can be translated based on the user's language selection. This abstraction layer is implementing by wrapping all text elements into the translate functions provided by the Symfony Framework, in order to be translated to the selected language.

In order for the framework to be able to provide translation of the base language of the site, we will create and maintain resource files containing the different translations to all messages and labels in the UI. Each language will be a different file, and will be identified by the filename following the template: domain.locale.loader

- Domain: is optional and it can be used to identify different sections of the site (i.e. navigation, labels, etc.)
- Locale: the actual semantic indicating the target language (i.e. en_GB for English GB)
- Loader: indicates the format of the file. We can chose form Xliff, php or yml.

Translation files contain entries of an id, the source text in the default language and the target translation. Translation data may also be stored in a database instead of files.

For the initial implementation of Elder-Spaces, we are going to use file system resource files. Depending on the evaluation of the performance in the first trials, we will consider introducing the translation in a database.

This is an example of a translation file from English to Greek

```
<?xml version="1.0"?>
<xliff version="1.2" xmlns="urn:oasis:names:tc:xliff:document:1.2">
    <file source-language="en" datatype="plaintext" original="file.ext">
        <body>
            <trans-unit id="1">
                <source>Welcome to Elder-Spaces</source>
                <target>Καλώς ήρθατε στο Elder-Spaces</target>
            </trans-unit>
            <trans-unit id="2">
                <source>Press Next to continue</source>
                <target>Πατήστε Επόμενο για να συνεχίσετε</target>
            </trans-unit>
        </body>
    </file>
</xliff>
```

Although the locale may be stored in the user's session, it is better practice to include it in the site's URL, that way we avoid the issue of having the same URL showing different content to users with different language selection.

This is supported by the routing system using the _locale parameter which is given automatically the user's selected locale.

```
<route id="contact" pattern="/{_locale}/contact">
    <default key="_controller">ElderSpaces:Contact:index</default>
    <default key="_locale">en</default>
    <requirement key="_locale">en|fr|de</requirement>
</route>
```

7.4 Accessibility

In the following sections the features and techniques used to ensure best accessibility and usability of the Elder-Spaces user interfaces for elderly people are specified.

According to the Draft EN 301 549 V0.0.0.5 of Mandate 376, some of the features specified for the web-implementation in Table 6 are also applicable to the implementation on tabletop-devices. These are explicitly marked. Although it is assumed that the tabletop-devices provide a closed functionality, because some "of the functionality […] is closed because it is self-contained and users are precluded from adding peripherals or software to the product to access that functionality"[18], chapter 5 of EN 301 549 is not considered due to a very high implementation effort.

Figure 108: Global accessibility features indicated in the main-page

7.4.1 WCAG Level AA

With respect to the diversity of user capabilities, WCAG2.0 conformance level "AA"[19] will be implemented. This will ensure a high degree of accessibility, taking care of most restrictions faced by people with disabilities.

7.4.1.1 Features to meet WCAG2.0 Level AA

Guidelines for the implementation of these features, including explanations and code examples, are presented in the Appendix of this document ("Description and implementation guide to accessibility features").

Table 6 summarizes the *accessibility features* relevant for Elder-Spaces, derived from the WCAG2.0 recommendations.

The numbers of the WCAG2.0 *techniques*[20] to meet the features are listed, if applicable. The features are linked to the *requirements* listed in chapter 6 of D1.2, if applicable.

The feature list can be used as a *checklist* for self-assessment by the developers.

Guidelines for the implementation of these features, including explanations and code examples, are presented in the Appendix of this document ("Description and implementation guide to accessibility features").

Table 6: Implemented accessibility features to conform to WCAG2.0 Level AA

Feature	Technique(s)	Success Criterion	Table top	Requirement
1. Images that have no informational or control function are added via CSS.	C9	1.1.1		
2. All image resources provide an “alt”-attribute identifying their content.	H37	1.1.1		118
3. All graphical control elements provide an “alt”-attribute identifying their functionality.	H36	1.1.1		118
4. All graphical links provide an “alt”-attribute identifying their target. Additionally provided text links are not separated.	H2	1.1.1		62, 118
5. All areas in image maps provide an “alt”-attribute identifying their target.	H24	1.1.1		118
6. All applets provide an “alt”-attribute identifying their functionality.	H35	1.1.1		
7. All objects identify their functionality in the body-text.	H27, H53	1.1.1		
8. Alternative texts longer than 1024 characters are provided using the “longdesc”-attribute.	H45	1.1.1		118
9. A unique label describing clearly the purpose of a form field is provided. Therefore HTML-label-elements are connected to input elements.	H44	1.1.1	√	
10. On radio buttons and checkboxes the labels are assigned behind the input element providing a description of the value.	H44	1.1.1	√	
11. Radio buttons provide a description of their topic before and the various values as labels behind them.	H44	1.1.1	√	
12. Buttons used to perform an action directly associated with an input field, e.g. a search field, are clearly describing its purpose and are positioned right after the input field to indicate the connection.	G167	1.1.1	√	87

Feature	Technique(s)	Success Criterion	Table top	Requirement
13. No CAPTCHAs are used, analysis of response time or honeypots are used instead.	(G144)	1.1.1		
14. With exception of the applications, Elder-Spaces contains no audio or video content.		1.2.1, 1.2.2, 1.2.3, 1.2.4, 1.2.5		
15. CSS is used for specifying text format.	C22	1.3.1		33
16. All pages are structured by logically hierarchical used header tags (<h1>…).	G141, H42	1.3.1		
17. Links directly following each other are provided as lists.	H48	1.3.1		63, 64
18. Emphasizing text is done by using semantic mark-up tags.	G115, H49	1.3.1		
19. Logically associated fields, e.g. the address data, are grouped optically by using a field set with a declarative legend.	H71	1.3.1	√	157
20. Big groups of radio buttons are grouped by using the field set and the legend element.	H71	1.3.1	√	157
21. The DOM matches the visual order.	C27	1.3.2		76
22. No information on the entire site is only indicated by shape, size, sound or location.	G96	1.3.3		
23. Colours conveying information provide additionally text, patterns or symbols.	G14, G111, G182, G183, H92	1.4.1	√	102, 103
24. No audio content is played automatically.		1.4.2	√	
25. The minimum contrast ratio for text bigger than 18pt size or bold text bigger than 14 pt is 3:1.	G18	1.4.3	√	95-98
26. The minimum contrast ratio for text smaller than 18pt size or bold text smaller than 14 pt is 4.5:1.	G18	1.4.3	√	95-98
27. User agents are able to override colour settings.	C23, C25, G148, G156, G175	1.4.3		

Feature	Technique(s)	Success Criterion	Table top	Requirement
28. Size unit for all element texts and text containers is em or per cent.	C12, C14, C17, C28	1.4.4		108, 116, 133
29. All layout elements except images width and height are defined in per cent. A liquid layout is used.	G146	1.4.4		124, 133
30. Every page provides fast and easy adjustment of font size.	G178	1.4.4	√	109
31. No image contains textual information.	C22	1.4.5		119
32. Event handlers for both mouse and keyboard are implemented redundantly.	G90, G202, H91, SCR2, SCR20, SCR35	2.1.1		34, 136
33. No content element traps the keyboard's tabbing functionality.		2.1.2		
34. Completing forms has no time limit.		2.2.1	√	
35. Any content is updated only after a user interaction.		2.2.2	√	132
36. The site contains no moving, flashing, blinking or scrolling content.		2.2.2, 2.3.1	√	132, 161
37. Heading elements are provided for each section of the content.	H69	2.4.1		
38. All pages contain links to skip navigation.	G1	2.4.1		
39. Page titles are descriptive.	G88, G127, H25	2.4.2		
40. Focus order of interactive elements corresponds to content order	C27, G59, H4	2.4.3		76
41. Link targets with surrounding text are explained in link text or title attribute	G91, H30	2.4.4		
42. Image and text links with the same target are not separated	H2	2.4.4		62

Feature	Technique(s)	Success Criterion	Table top	Requirement
43. A search function is provided.	G161	2.4.5		27
44. A site map is provided.	G63	2.4.5		80
45. Descriptive headings are provided.	G130	2.4.6		
46. Descriptive labels are provided.	G131	2.4.6		
47. Standard HTML-elements are used and focus highlighting is done by CSS.	C15	2.4.7		
48. All pages set the proper HTML-lang attribute for the current user's language.	H57	3.1.1		
49. No languages are mixed on the Elder-Spaces pages.		3.1.2	√	
50. No onfocus-handlers are used on the entire site.	G107	3.2.1		
51. No new windows or pop-ups open without explicit information of the user.	G201	3.2.2		54, 140
52. Each form provides an explicit button to submit it.	G80, H32	3.2.2	√	
53. The site consists of a framework containing the different applications and functionalities. The framework and its elements are the same on every page.	G61	3.2.3		73, 74
54. All elements with the same purpose are labelled equal.	G197	3.2.4		
55. If a mandatory field of a submitted form is missed, a message identifying the missed field is displayed on top of the form.	G83	3.3.1	√	57,58
56. If not allowed values are submitted in a form, a message providing a list of allowed values is displayed on top of the form.	G84	3.3.1	√	57, 58
57. Error messages contain links to the field where the error occurred.	G139	3.3.1		57, 58
58. Messages are provided after successful form submits.	G199	3.3.1	√	

Feature	Technique(s)	Success Criterion	Table top	Requirement
59. All forms provide textual instructions on their completion on top.	G184	3.3.2	√	
60. All form elements are descriptive labelled.	G131	3.3.2	√	55
61. Form labels contain expected data formats, if applicable.	G89	3.3.2	√	55
62. Mandatory form elements contain a textual hint (‘required’) in the label.	H90	3.3.2		123
63. A message identifying the field with invalid input, which provides information on error solution, is displayed on top of the form.	G85	3.3.3		
64. Before deletion of objects, explicit confirmation is requested.	G168	3.3.4	√	
65. All pages are fully conforming to W3C-specification.	G192	4.1.1		35
66. Only standard HTML-elements are used in Elder-Spaces.	H88	4.2.1		35

7.4.1.2 Measures to ensure the conformance of user generated content

Table 7: Measures on user generated content accessibility

Measure	Success Criterion	Tabletop
67. Textual user input is performed within a simple text-area.		√
68. The upload of GIF-images is not allowed.	2.3.1	
69. Users are encouraged and have the opportunity to provide descriptions on images.		

7.4.1.3 Conformance claim

If the site *without* user generated content and 3rd-party-applications fulfils the success criterions

of WCAG2.0 Level AA, but the conformance of the whole site cannot be assured due to the fact that user generated content and 3rd-party-applications cannot be controlled, a 'Statement of Partial Conformance'[21] can be included in the 'About'-section: "This page does not conform, but would conform to WCAG 2.0 at level AA if the following parts from uncontrolled sources were removed."[21] This can additionally be marked by adding the corresponding logo:


```
<a href="http://www.w3.org/WAI/WCAG2AA-Conformance"
      title="Explanation of WCAG 2.0 Level Double-A Conformance">
      <img height="32" width="88" src="http://www.w3.org/WAI/wcag2AA"
            alt="Level Double-A conformance,
            W3C WAI Web Content Accessibility Guidelines 2.0">
</a>
```

By fulfilling above, the Elder-Spaces pages are also W3C-valid. Even this fact can be marked by adding the corresponding logo:


```
<p>
      <a href="http://validator.w3.org/check?uri=referer">
            <img src="http://www.w3.org/Icons/valid-xhtml10"
            alt="Valid XHTML 1.0!" height="31" width="88" />
      </a>
</p>
```

7.4.2 Measures beyond WCAG2.0 Level AA

Not all requirements from WP1 are covered by the above features related to WCAG2.0 level AA. To meet all of them, the additional features in Table 8 will be realized. Some of them belong to WCAG2.0 level AAA.

Table 8: Additionally implemented accessibility features

Feature	Technique(s)	Success Criterion	Tabletop	Requirement
70. Textual links with surrounding text are not styled by CSS.				59-61, 65
71. A breadcrumb-trail is provided on every page.	G65	2.4.8		77
72. A context-sensitive link leading to the corresponding help-section is provided on every page.	G71	3.3.5	√	81
73. A link to the about us-section is provided on every page.			√	82

Feature	Technique(s)	Success Criterion	Tabletop	Requirement
74. The site and its elements contain no patterned backgrounds.			√	94
75. Letter-spacing is not decreased on all pages.			√	104
76. Line-height is 1.5 em.	C21	1.4.8		104, 105
77. All text is justified left-to-right.	C19	1.4.8		106
78. Default font-size is 100%.				107, 108
79. A sans-serif font is used.			√	110
80. Buttons have minimum 2em (32px) in width and height.				134
81. Buttons have a minimum 0.25 em margin to all sides.				135
82. Simple and familiar language is used.	G153	3.1.5	√	143
83. Important information is written on top of the page.			√	144
84. Active voice is used.	G153	3.1.5	√	145
85. The sentences and paragraphs are short.	G153	3.1.5	√	146
86. The pages are short.				147
87. The search-function covers whole site.				88
88. The search results are visible in normal view-port.				90
89. The search query is repeated on every search results page.				91

7.4.3 Summary of specifications considering forms

Forms are a special challenge to most inexperienced users. Because many measures are taken to ensure their accessibility, these are summarized below on example of the registration form.

- The users are informed about the objective and get hint on how to fill it on top of the form. If there are many fields on the form that need the same specialized data format, this is explained here. Optionally, a screencast with an example of the form completion can be included.
- The labels describe clearly the purpose of the form field and are connected to the field using the ‘label for’-tag. The labels are above or on the left side of the form field.
- On radio buttons and checkboxes the labels are assigned behind the input element providing a description of the value.

- Radio buttons provide a description of their topic before and the various values as labels behind them.
- The fields change the colour to white when receiving focus and the link-text contains a hint that the link will open a new window.

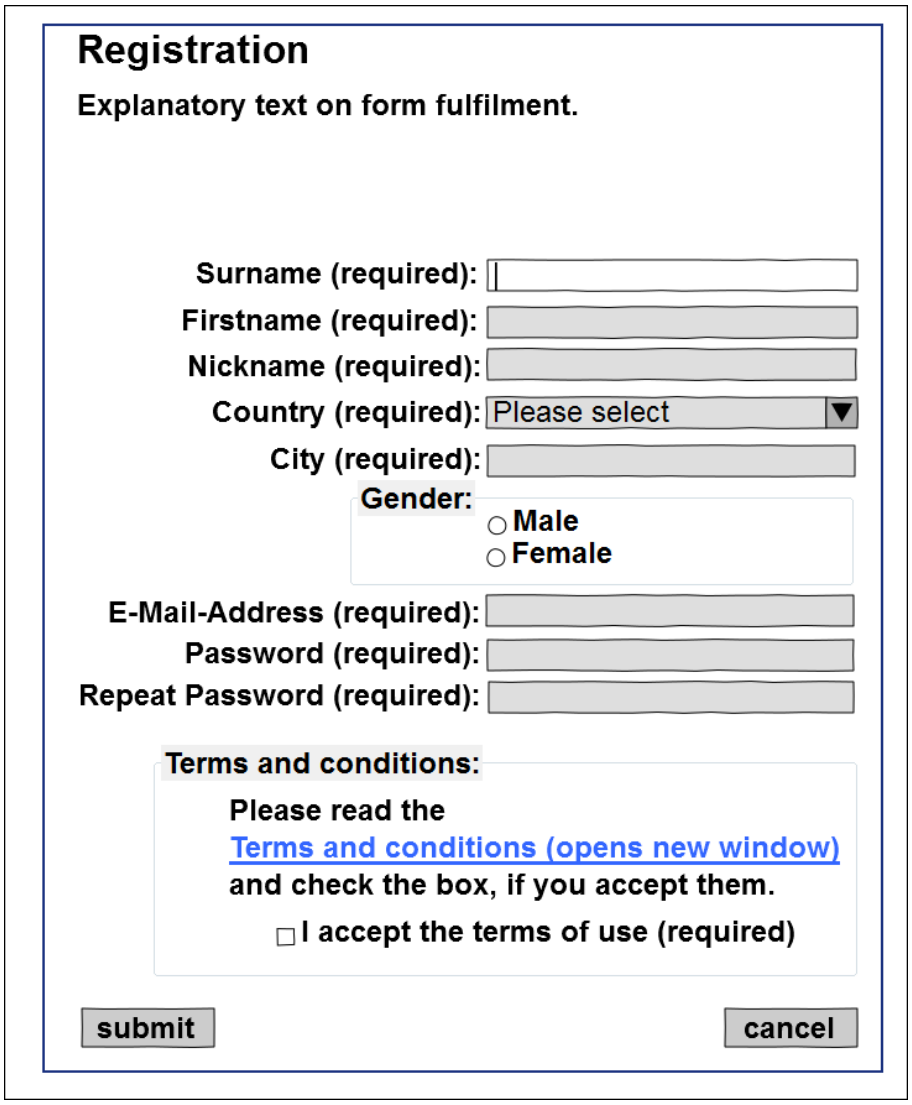

Figure 109: Exemplary registration form

Error handling

Despite the measures described above there is a possibility for input errors. If an error occurs, the user is informed about the source of the error and about the actions to be taken to solve it. Like all important informative texts even the error message is provided on top of the form and is emphasised. In very complex forms a link to the input field where the error occurred is provided. Furthermore the affected field is emphasised by a coloured frame.

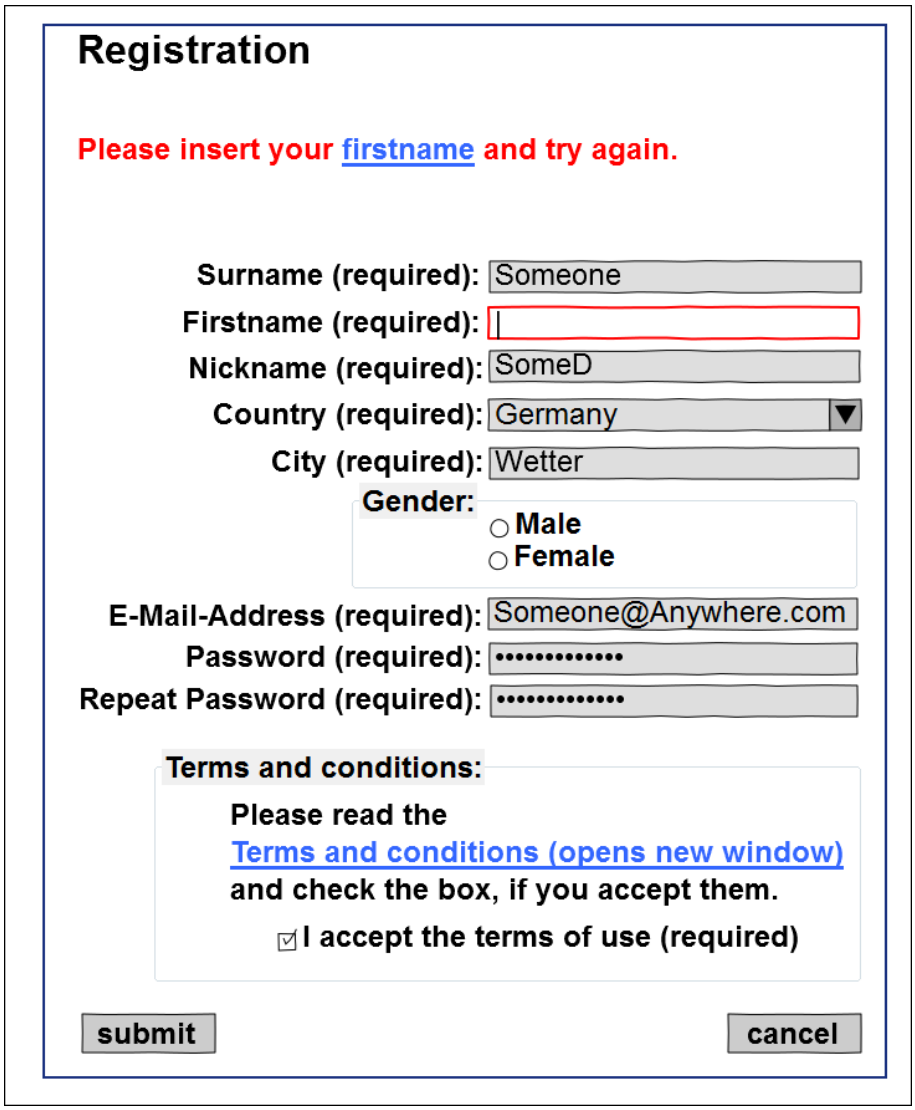

Figure 110: Exemplary registration form with error handling

Successful submission

If all data provided by the user is valid and successfully submitted, information about that fact is provided with explanation of the next steps.

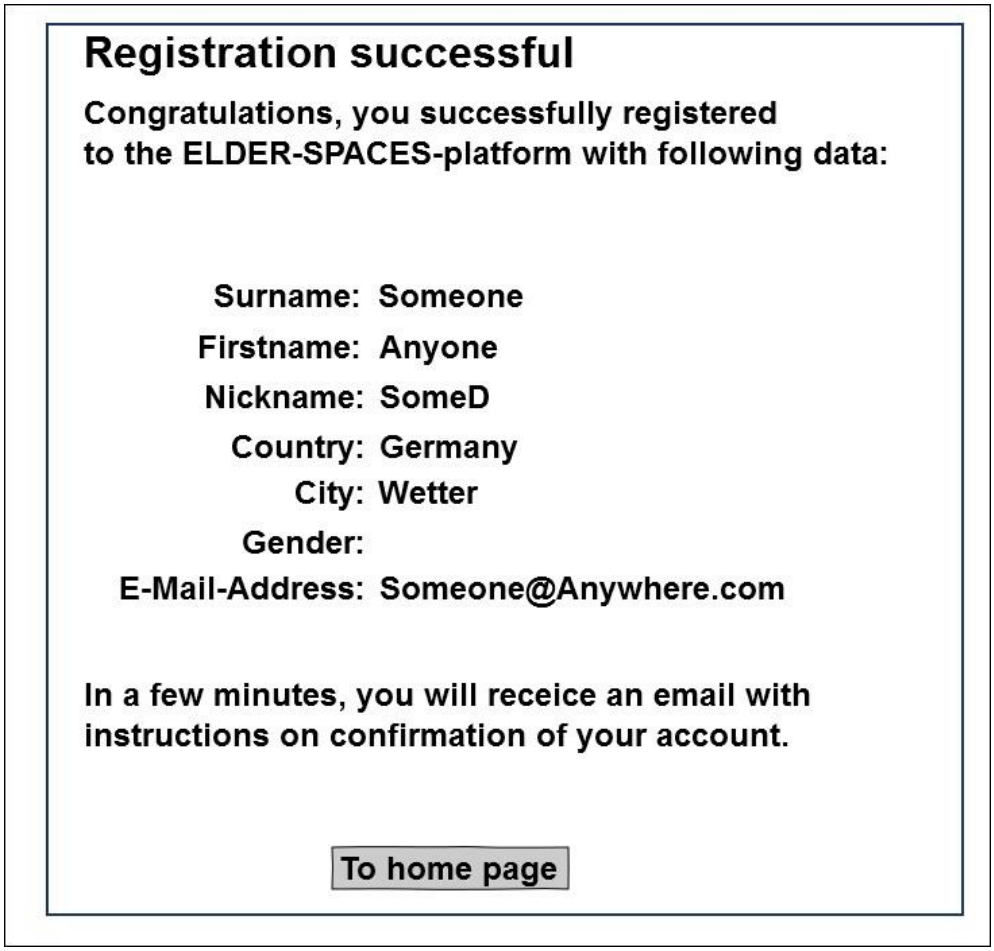

Figure 111: Exemplary screen on successful registration

7.4.4 Accessibility features on tabletop-devices

Some of the requirements collected in work-package 1 are applicable only to tabletop-devices. The measures taken to meet them are listed in Table 9.

Table 9: Accessibility features on tabletop-devices

Feature	Requirement
90. Immediate audio-visual feedback about any selection on screen is provided.	83
91. Button-clicks provide audio as well as visual feedback.	84
92. The implementation uses no scrollbars.	164
93. No double-clicks are needed.	165
94. Minimum button height and width is 12mm.	167
95. Button spacing is 12mm.	168
96. The use of the virtual keyboard is minimized by using selection-fields, buttons and sliders.	169
97. Controls to adjust or mute the audio volume are provided on every screen.	

7.4.5 Accessibility tests

Self-Assessment

The Web Accessibility Initiative provides a checklist where the success criterions are listed under http://www.w3.org/TR/2006/WD-WCAG20-20060427/appendixB.html. By using this developers can check the level of conformance in a structured way by themselves. Also the tables contained in chapters 7.4.1 and 7.4.2 can be used for that purpose.

For validation of the conformance to the HTML-Specification the W3C-Validator[22] can be used.

The sufficiency of contrasts can be checked by using the Contrast-Analyser by the Paciello Group[23].

Additionally useful browser plugins for:

- MS Internet Explorer 8
  - Web Accessibility Toolbar (WAT), Version 2011[24]
- Mozilla Firefox
  - Web Developer Toolbar, Version 1.1.9[25]
  - Juicy Studio Accessibility Toolbar, Version 1.6[26]

Laboratory tests done by experts

FTB will perform tests on Elder-Spaces attending the development phase and also perform a final test to attest WCAG2.0 conformance level AA. Therefore the German BITV-test is used, whose priority 1 must be fulfilled, to be level AA conformant.

The measures, which are not covered by the test, will be operationalized and tested separately.

The detailed specification of the test will be part of D6.1.

8. MS PixelSense Application

8.1 Overview

An Elder-Spaces application will be developed for the MS PixelSense device (Tabletop). This application will feature selected functionality from the Elder-Spaces platform, in an attempt to provide users with a novel and "natural" way of interaction with the system. The aim in this case is to take advantage of the characteristics that the MS PixelSense provides (tactile interface, multi-touch capabilities, object recognition etc.) and provide users with a friendly and interesting application that requires little or no computer skills to use.

The aim of the application is to provide ways of viewing and interacting with the Elder-Spaces content and promote real life socializing using this content and the interaction method as a catalyst. Adding more content using the MS PixelSense is a more demanding task for elder people than doing it on a PC, due to the horizontal position of the device and the lack of a physical keyboard. For these reasons, we avoid functionalities that require complex input or too much typing.

The following figure depicts the logical components of the application. Note that we only present two of the components of the Elder-Spaces platform as they are the only ones which interact with the application.

The application will be built using WPF and utilizing the Microsoft Surface 2.0 SDK. XLM will be used for storing local resource data necessary for the functionalities build in the application (like games)

The main application layers are:

- Presentation Layer

  Contains the user interfaces.

- Application Layer

  It contains the classes and controllers necessary for implementing the application's functionality.

- Service Layer

  This is an interface layer, facilitating communication with the Elder-Spaces platform.

- XML repository

  Any data necessary for the application or the implemented functionalities is stored in XLM format in the file system of the device.

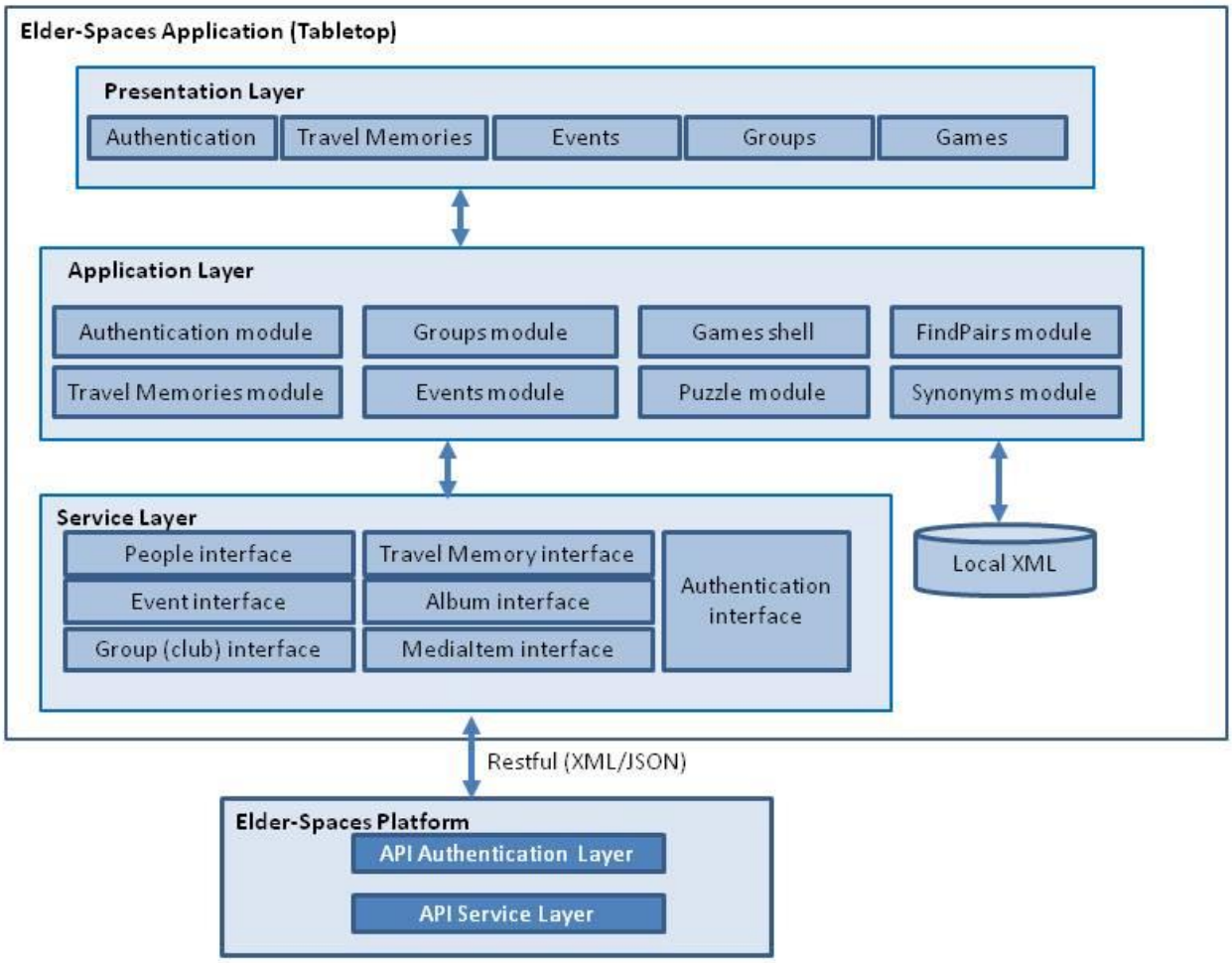

Figure 112: MS PixelSense – Application Overview

8.2 Entity Specifications

The application layer consists of the entity (class) definitions and controllers for every functionality. The service layer is a collection of interfaces, which facilitate access to the RESTful services API in Elder-Spaces Platform.

8.2.1 Person

As there is no profile view or edit functionality in the Tabletop Application, only a reduce version of the person object is used.

Field	Type	Comment
id	String	Unique identifier for the Person. Each
displayName	String	The name of this Person, suitable for display to end-users include the first and the last name (e.g. Joseph Smarr)
name	Custom data structure	The broken-out components and fully formatted version of the person's real name. Components: 1. formatted - The full name, formatted for display

Field	Type	Comment
		2. familyName - "Last Name" 3. givenName - "First Name" 4. honorificPrefix - "Title" (e.g. Mr.)
nickname	String	The casual way to address this Person in real life
thumbnail2Url	String	The URL of the bigger size thumbnail (128X128).
updated	DateTime (e.g. 2012-11-23T04:56:22Z)	The most recent date the details of this Person were updated (i.e. the modified date of this entry)

8.2.2 Event and RSVP

The Events functionality in the Tabletop application is similar to the one on the WEB, with the exception that MediaItem upload is not provided. The entity objects for events and events RSVP are the same as defined in § 6.1.7

8.2.3 Group and Group Invitations

The Groups functionality in the Tabletop application is similar to the one on the WEB, with the exception that MediaItem upload is not provided. The entity objects for groups and groups RSVP are the same as defined in § 6.1.9

8.2.4 Travel Memories

Travel Memories define a location (country) where the travel memory refers to. It is an object created for the Tabletop version of the functionality.

Field	Type	Comment
id	String	Unique identifier for the travel memory
ownerID	String	The personID of the creator of the record
LocationID	String	The country on the map that the Travel Memory refers to
Latitude	Float	Map location data
Longitude	float	Map location data
Title	String	Travel memory title
Description	String	Description about the memory
DateFrom	Date	Start date of trip (Date format: yyyy-mm-dd)
DateTo	Date	End date of trip (Date format: yyyy-mm-dd)
AlbumID	String	The photo album of the memory

8.2.5 Albums

Albums are used as part of the Travel Memories functionality. They have the same specification as the object defined in § 6.1.2.

8.2.6 MediaItems

MediaItems are used as part of the Travel Memories functionality. They have the same specification as the object defined in § 6.1.3.

8.3 Functionality and UI

In the following paragraphs, we describe the intended functionality of the Tabletop application along with wireframes for the interface, or samples where available.

8.3.1 Login and Navigation

In the diagram that follows, we present the available workflow for the primary functions of the application, login and main navigation.

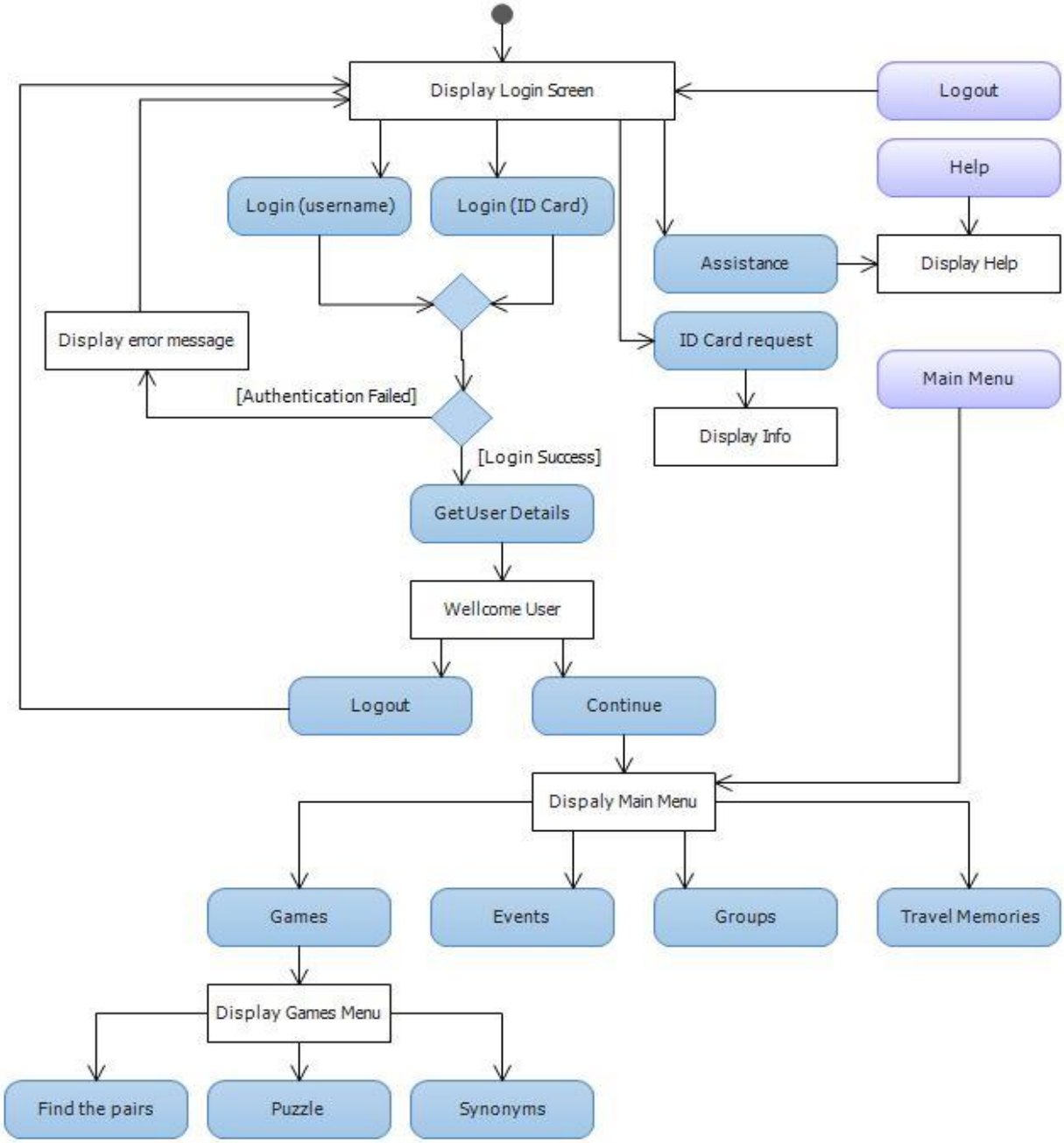

Figure 113: MS PixelSense – Flow for login and navigation

Note that the actions marked in purple denote persistent functionality that is available throughout the application.

8.3.1.1 Login

The login screen is the first one the user sees as soon as the application is loaded. It provides for two ways of singing in:

- By username and password
- By ID Card

User name and password login follows the same principle as the one described for the WEB. The "ID Card" login differs, utilizing the ability of the MS PixelSense to identify tagged objects, using the TagVisualization components[27].

Users may acquire their ID Cards from the day care centres that each MS PixelSense device is situated. The "ID Cards" are credit card size and contain on one side a 2D encoding that that the MS PixelSense can identify. "ID Cards" may be printed on request by the support stuff in the day care centres or be distributed in advance. Microsoft distributes freely the base templates for tagged objects and we are going to use them for the creation of the "ID Cards" on Elder-Spaces.

"ID Cards" contain an identifier that is linked to the user's profile. The login request sent by the Elder-Spaces MS PixelSense application sends this ID to the authentication module of Elder-Spaces and effectively substitutes the username and password call.

An authenticated user may enter the application's main navigation or choose to logout.

Additionally the user is provided with assistance for singing in. In the case of traditional login via username and password, they can invoke the link "I can't access my account" which will provide help instructions for logging in.

Furthermore, a user can get information on what is an "ID Card" and how to acquire one by pressing the "I want an ID Card" link.

After a successful login, the user's profile photo and name is displayed on the bottom of the screen and he/she may enter the application.

8.3.1.2 Main Menu

Main navigation, as most of the application will use image icons as action buttons. Users will select the action or menu item of their choice by Tapping on the image of the icon that represents their selection.

There are two levels of navigation.

- The main menu
- The game menu

The main menu holds icons to the main applications available. Games are grouped in one icon and they are presented in detail in the second navigation menu.

The other three applications are:

- Events
- Groups
- Travel Memories.

Users may choose any one of the four options by Tapping on the icon. Games option leads to a sub menu for games, while the other three execute the corresponding application.

8.3.1.3 Game Menu

Games are grouped under the main navigation in the "Games" icon. Once activated, a new menu

is displayed, in a similar layout it presents the available games loaded in the host application.

There are three games to be implemented for the MS PixelSense:

- Find the pairs
- Puzzle
- Synonyms

8.3.1.4 Persistent functionality

Throughout the application, there are a number of functions that will always be available to the users. For enhancing interaction and in an effort to improve usability, these are grouped into one object. This way, users may move it around, minimize it when not needed or enlarge it to use it.

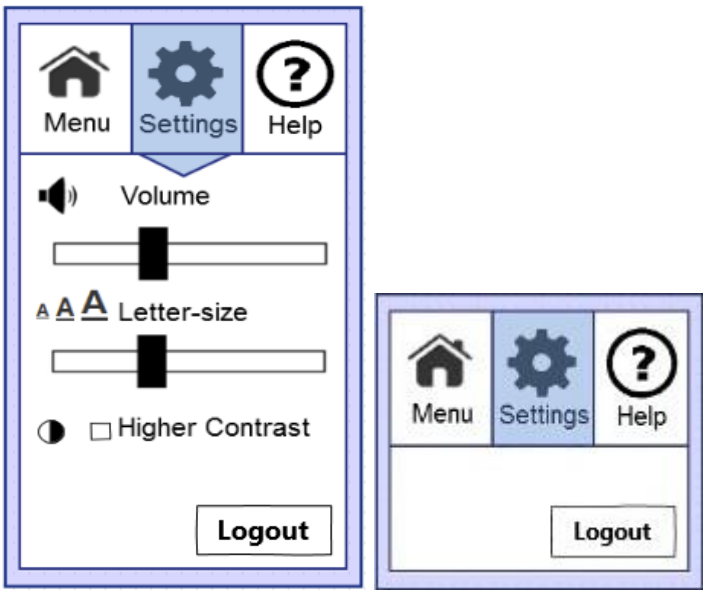

Figure 114: MS PixelSense – Persistent functionality (open and minimized)

The available functionality will be:

- Home

  At any point in the application, a user may choose to go back to the main menu. This action will close any open objects and redirect the user to the main menu.

- Logout

  Logout follows the same principle as the Home button. At any point in the application the user may logout, effectively closing any objects in Elder-Spaces and returning to the login screen

- Help

  At any occasion users may require help. Depending on the screen they are, context sensitive help will be produced by pressing this button.

- Settings

  Users may apply preferences to the UI. They may adjust the font size, contrast and sound

volume.

8.3.1.5 User Interface

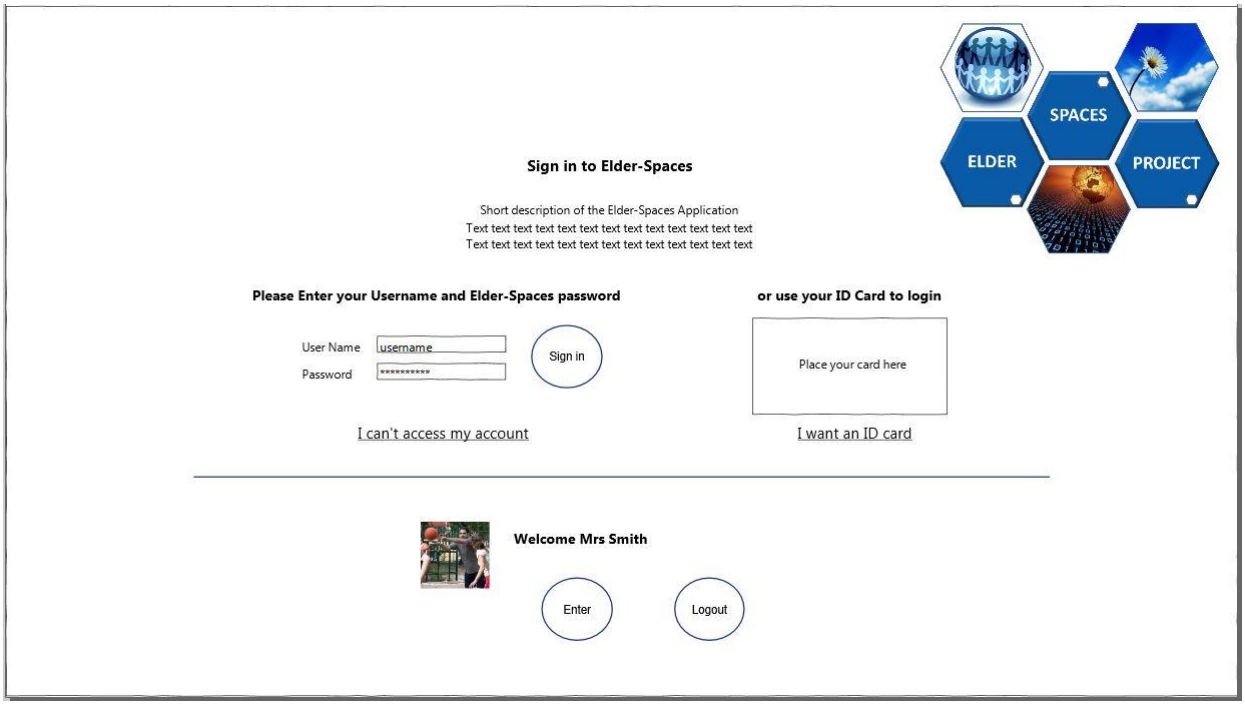

Figure 115: MS PixelSense - Login Screen

Screen	M:1 – Login
Size (X, Y)	N/A
Location	Objects are centred on the middle of the screen
Description	Login screen
Components	SurfaceKeyboard, SurfaceTextBox, SurfacePasswordBox, SurfaceButtons, TagVisualization Control
Functionality	Username and password entry. Users may type a username and password in the corresponding fields, by the utilization of a virtual keyboard By pressing the button Sign-in the username and password information are sent to the Elder-Spaces platform for verification and user authentication. The TagVisualization control is used for the alternative login method, using the ID Card. The card needs to be placed on the designated area, the coded tag facing the screen and the system reads this code which is then used instead of username and password for singing in. Two links provide assistance should the user has difficulties logging in or wishes to get an ID Card. After the user is authenticated, the application retrieves the profile data from the Elder-Spaces platform and displays the profile photo, while greeting the user. Two options are available at that point, either to continue to the main menu or to logout.

Comments	The virtual keyboard is missing from the figure, it can be seen though in subsequent wireframes, as it is an object that is used throughout the application.
Tactile Interface	
Tap	Tapping on the keyboard simulates typing. Tapping on the buttons executes functionality
Move	Virtual keyboard can move freely
Resize	Virtual keyboard can be resized freely
Rotate	Virtual keyboard can be rotated freely
Spread	N/A

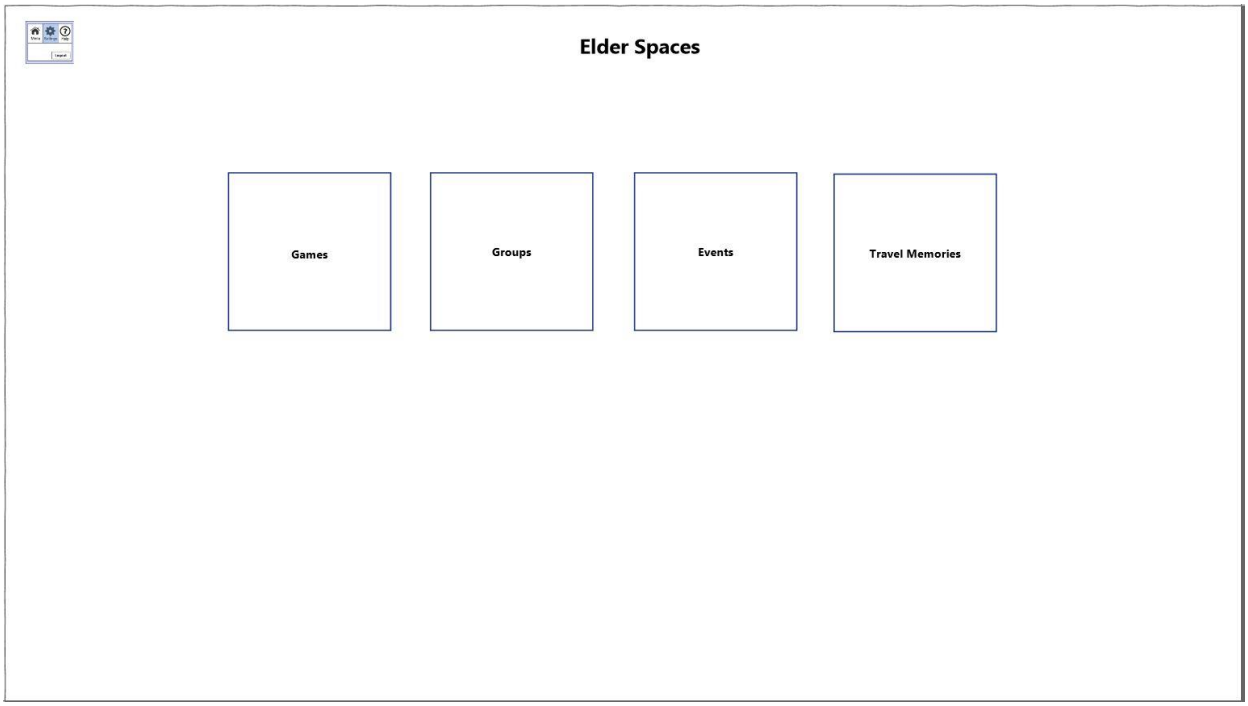

Figure 116: MS PixelSense - Main menu

Screen	M:2 – Main menu
Size (X, Y)	N/A
Location	Top Left corner reference: (350, 250)
Description	Main menu
Components	SurfaceButtons
Functionality	Tapping on each icon executes functionality • Games lead to the games menu screen • Groups execute the groups application • Events execute the events application • Travel Memories execute the travel memory application
Comments	

Tactile Interface	
Tap	Tapping on the buttons executes functionality
Move	N/A
Resize	N/A
Rotate	N/A
Spread	N/A

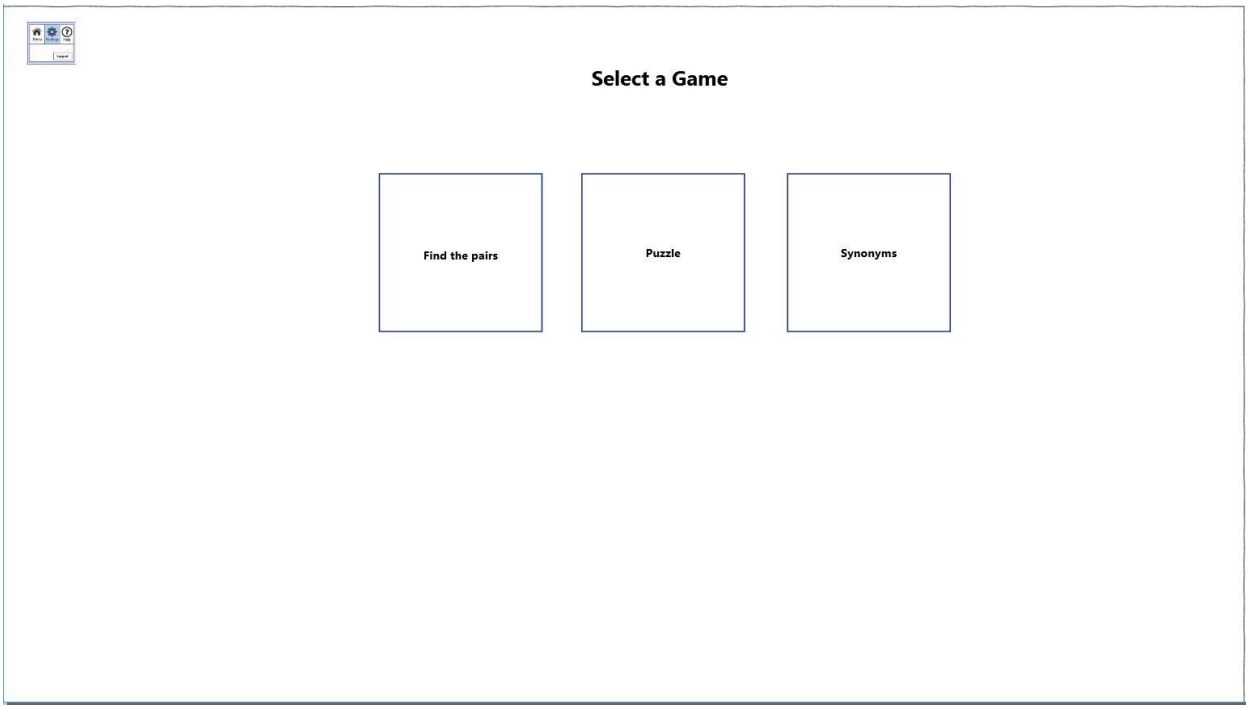

Figure 117: MS PixelSense – Game menu

Screen	M:3 – Games menu
Size (X, Y)	N/A
Location	Top Left corner reference: (600, 250)
Description	Games menu
Components	SurfaceButtons
Functionality	Tapping on each icon executes functionality
Comments	
Tactile Interface	
Tap	Tapping on the buttons executes functionality
Move	N/A
Resize	N/A
Rotate	N/A
Spread	N/A

8.3.2 Games shell

8.3.2.1 Functionality

All games share some common features, with respect to the functionality necessary to start a game and that for presenting the game result (end game).

In the following diagram, we present the main functionality with respect to the common elements necessary before and after the games.

There are four distinct functionalities, three before the games starts and one after, which are common to all games and are implemented in a generic way, so that any game may use them. This way the game design and development may focus on the actual game play, while we maintain a constant and familiar layout that the intended users are going to find easy to remember.

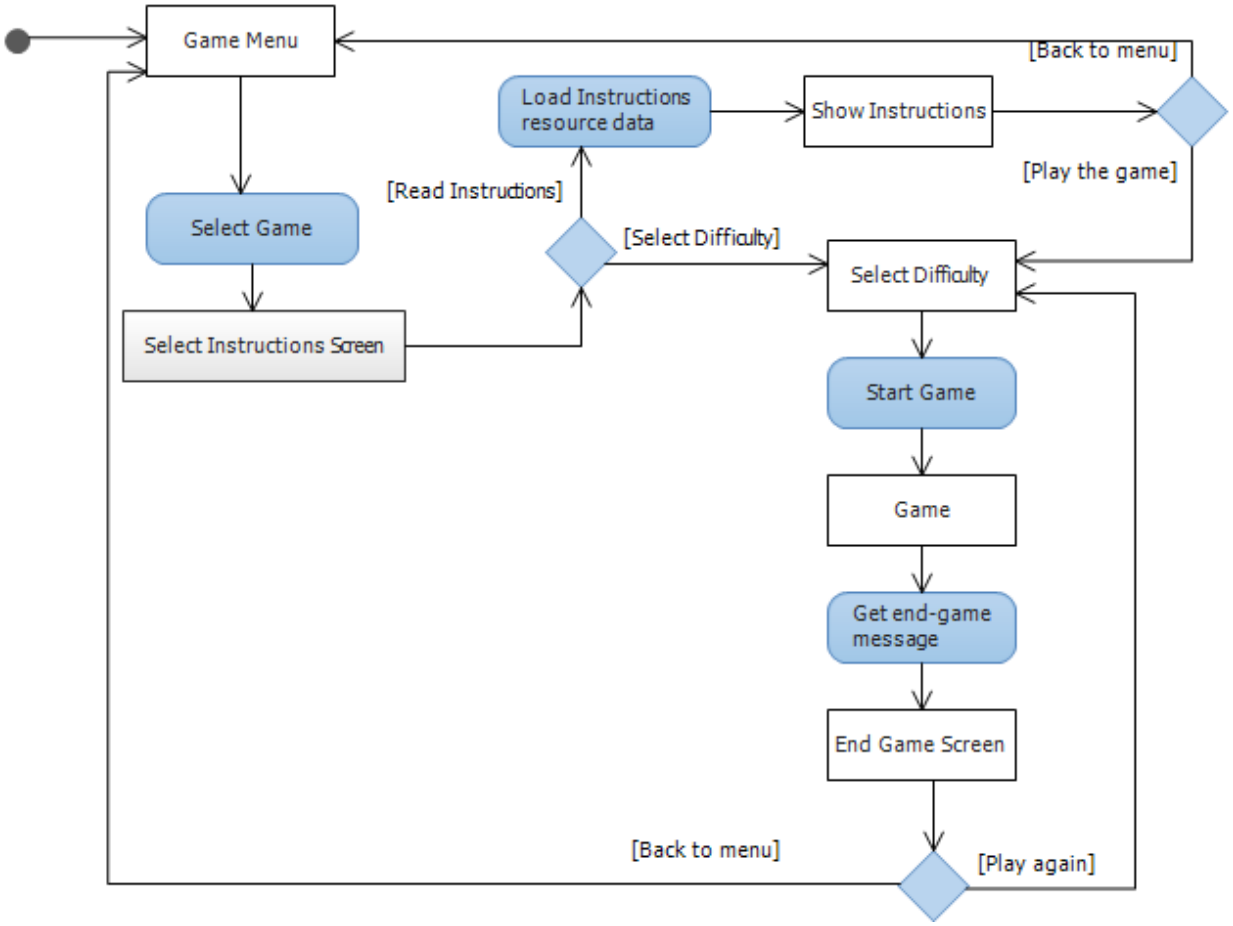

Figure 118: MS PixelSense – Workflow for Games

8.3.2.2 User Interface

In this section, we present the UI wireframes for the games shell. As shown in the previous UI wireframes for main navigation, these screens are relatively simple, containing only some icons used as buttons to execute specific tasks and navigate the user from one to the other until the game starts and then finally to the end-game screen. We present the next four UI wireframes in one figure indicating their sequence and key objects.

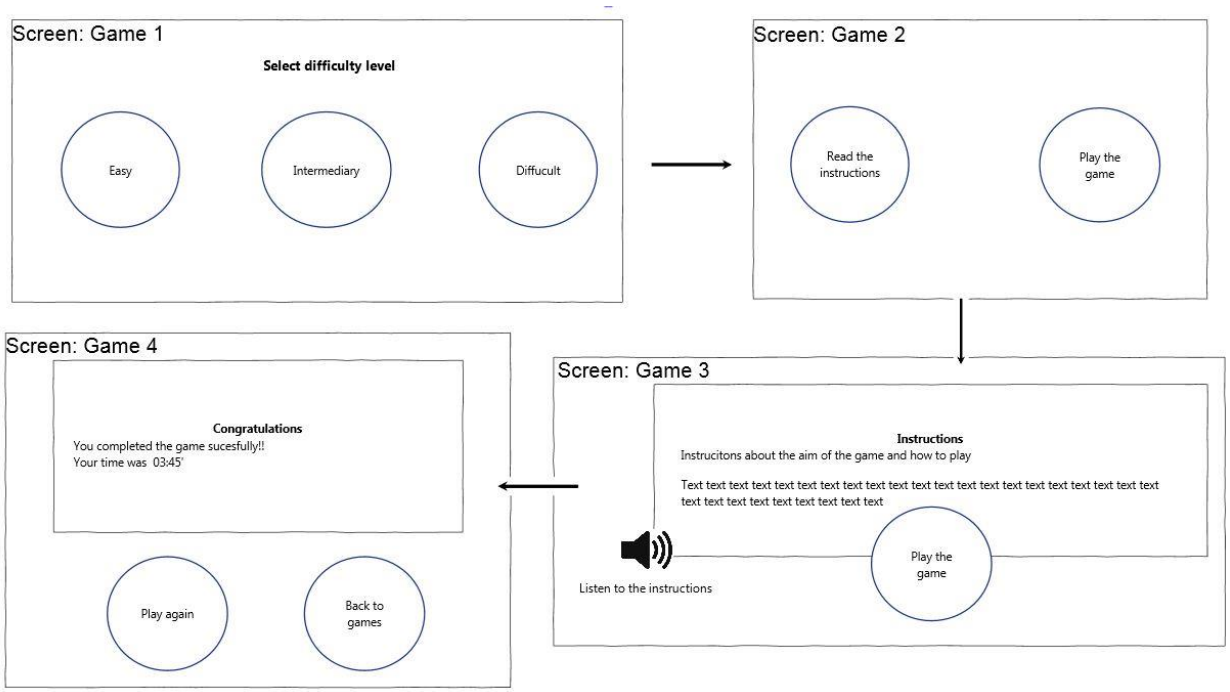

Figure 119: MS PixelSense – Games decide to read instructions or play

Screen	Game:1 – Select Instructions
Size (X, Y)	N/A
Location	Top Left corner reference: (700, 350)
Description	Selection screen to read instructions
Components	SurfaceButtons
Functionality	Tapping on each icon executes functionality
Comments	
Tactile Interface	
Tap	Tapping on the buttons executes functionality
Move	N/A
Resize	N/A
Rotate	N/A
Spread	N/A

Screen	Game:2 – Read Instructions
Size (X, Y)	1200 x 300 pixels
Location	Top Left corner reference: (360, 400)
Description	Selection screen to read instructions
Components	SurfaceButtons
Functionality	Tapping on the "Play the game" moves to the difficulty selection It is possible to listen to the instructions, by pressing the speaker icon on the bottom left corner.
Comments	Box size may expand in height depending on the amount of text for the instructions
Tactile Interface	
Tap	Tapping on the buttons executes functionality
Move	N/A
Resize	N/A
Rotate	N/A
Spread	N/A

Screen	Game:3 – Set Difficulty level
Size (X, Y)	N/A
Location	Top Left corner reference: (700, 350)
Description	Select the difficulty level of the game
Components	SurfaceButtons
Functionality	Tapping on each icon executes functionality
Comments	
Tactile Interface	
Tap	Tapping on the buttons executes functionality
Move	N/A
Resize	N/A
Rotate	N/A
Spread	N/A

Screen	Game:4 – End Game
Size (X, Y)	620 x 250 pixels
Location	Top Left corner reference: (650, 300)
Description	Select the difficulty level of the game
Components	SurfaceButtons
Functionality	Tapping on the "Play again" icon redirects to screen "Game:3" to select difficulty level and start a new game

	The “Back to games” icon returns the user to the games menu.
Comments	
Tactile Interface	
Tap	Tapping on the buttons executes functionality
Move	N/A
Resize	N/A
Rotate	N/A
Spread	N/A

8.4 Travel Memories

8.4.1.1 Overview

Travel Memories for the MS Surface, is an application described in D2.2 § 4.2. For economy, we do not repeat he information presented there, besides the items that have been revised and expanded. We present here an overview of the application, the provided functionality, enhanced UI wireframes and their related specs.

Travel Memories utilizes the existing infrastructure developed for the WEB application, along with all the common APIs available for friends, events, MediaItem and comments that are necessary for implementing the functionalities for this tabletop version.

The tabletop version of Travel Memories is simplified compared to its WEB counterpart. The aim here is to attract the user’s attention by sharing with others at the same time the travel experience of a user. Tactile interaction in a large screen area such as the MS PixelSense can provide, will allow more than one users to interact, each one viewing and manipulating photos as if they were shared over a common table between friends.

The aim here is to provide a common experience for older people, to interact with each other in real life, exchange experiences and “playing around” with the available photos. This application also has intergenerational characteristics. It can be fun for younger people visiting their elder in the day care stations, to get involved in experience sharing and to experience the use of the natural interaction that the tabletop provides. This way of photo and experience sharing can be appealing to younger people too, providing an incentive for further socialization with their elder.

The available functionality provided by the MS PixelSense Travel Memories application is summarized in the following list:

- Filter Memories by user.

  In order to maintain a simple and not crowded map, the user chooses first the person whose travel memories wants to see. On the navigation bar, the user is informed in the form of notifications, about new travel memories that his friends have posted. Ribbon navigation allows browsing through to his friends using travel memories and he/she can select one by tapping on the profile photo to view the corresponding travel memories.

- View travel memories on the map.

Travel memories appear as pins on the map. The user may interact with the map (resize, rotate, zoom in and out) in order to isolate the pin that is of interest.

In contrast to the WEB application, this version displays only the places where the owner has been.

- View Travel Memory (event)
- View Photos

  When the user selects a travel memory all associated photos are displayed by the ScatterView control, allowing for a more natural interaction with the user. ScatterView provides all necessary functionality for moving, resizing and rotating of the items it contains, allowing the user to naturally interact with the images, as if they were actual physical photos on a table.

  Initially, the photos will appear on a heap, one on top of each other. The user interaction will remind people looking at photographs over a table, moving them out of the heap and passing them around to see them. This is an approach that we are going to test in real life at the first user trials. Depending on the results, it is possible to switch the control to a more "traditional" album view should we discover that this way of interaction gets poor feedback.

- View Comments

  Each travel memory holds a number of user comments to it. These are displayed in a similar layout as the one used in the WEB, as a feed under the description of the memory. They are sorted in reverse chronological order, with the most recent first

- Add comments

  Users may choose to add comments on the travel memory. This is done in a simple way utilizing the virtual keyboard of the table top.

8.4.1.2 User Interface

The figures that follow present the different screen objects created by travel memories application on MS PixelSense.

UI dimensions refer to a canvas of 1,920 x 1,080. Objects are to approximate proportions.

There is no final colour selection for the wireframes, at some instances colour is used to define areas. Initial colour selection will follow the WEB site's template. Final colour selection will be made after the first user trials.

Also, a discreet background with a "Travel Memories" motive should be present in the background.

The main functionality is presented in the flow below. Note that return to main menu and help is always available on the top of the screen.

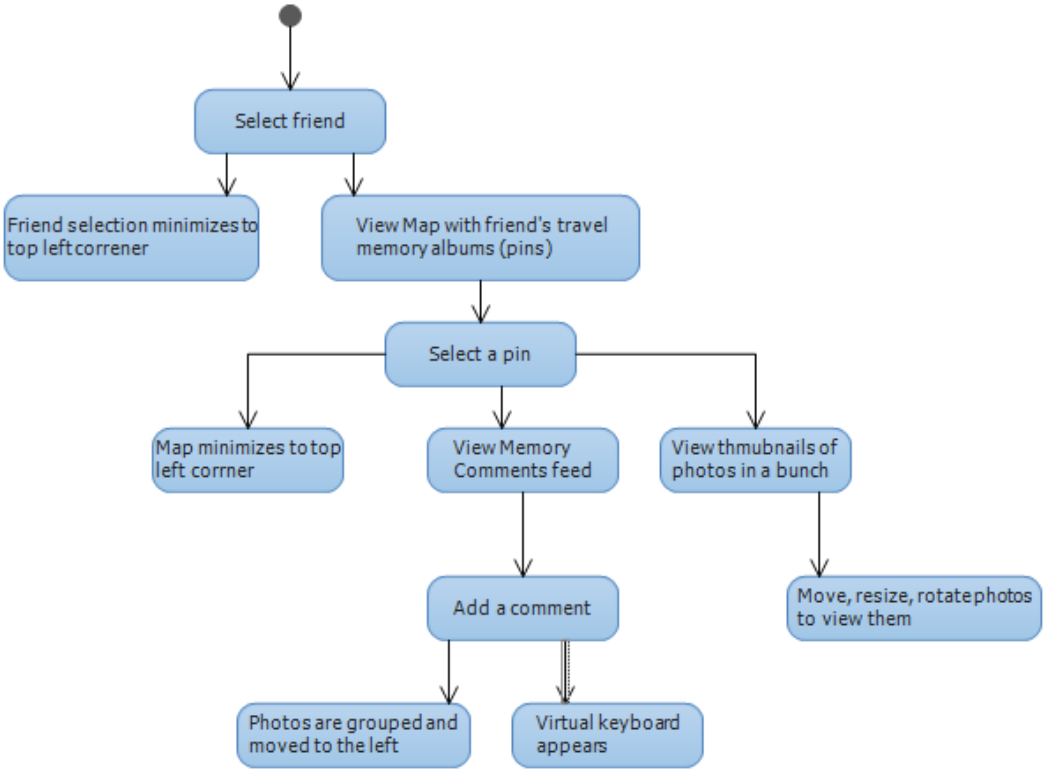

Figure 120: Workflow of main functionality in travel memories (tabletop version)

With respect to functionality, activating the initial object (Select Friend), clears the screen from any active memory items and resets the workflow.

Figure 121: Screen TM1- select friend or self to view travel pins in map

Screen	TM:1 – Select person
Size (X, Y)	920 x 250 pixels
Location	Top Left corner reference: (500, 300)
Description	Friend selector.
Components	SurfaceScrollViewerControl, SurfaceButtons
Functionality	Tap on the profile image of a user to view his/hers travel memories Navigation is horizontal, scrolling left or right to show more friend photos.
Comments	In the scroll viewer, the logged in user sees himself and all of his friends who have travel memories.
Tactile Interface	
Tap	Selects User
Move	Left / Right scrolling of the control is available.
Resize	N/A
Rotate	Enabled
Spread	N/A

Figure 122: Screen TM2 - View Friend's pins in the map

Screen	TM:2 – View and select Travel Memory
Size (X, Y)	900 x 600 pixels
Location	Top Left corner reference: (510, 180)
Description	Travel Memory selector.
Components	Map Frame, Map and overlapping images
Functionality	Map Frame: it is possible to move, rotate and resize the frame, the map inside it will follow suit. Map: It is possible to move, resize (zoom) the map in order to see the country and pins clearly Pins: Tap to select a travel memory
Comments	In the sequence of events, the previous control is minimized on the top left corner of the screen. It can be reactivated by tapping it.
Tactile Interface	
Tap	Selects travel memory
Move	Map window may be moved by touching and dragging the margin The map may be moved by touching and dragging the map image
Resize	Map frame resize will be propagated to the map Map resize will work as zooming in or out the map in the frame area
Rotate	Enabled for map frame
Spread	N/A

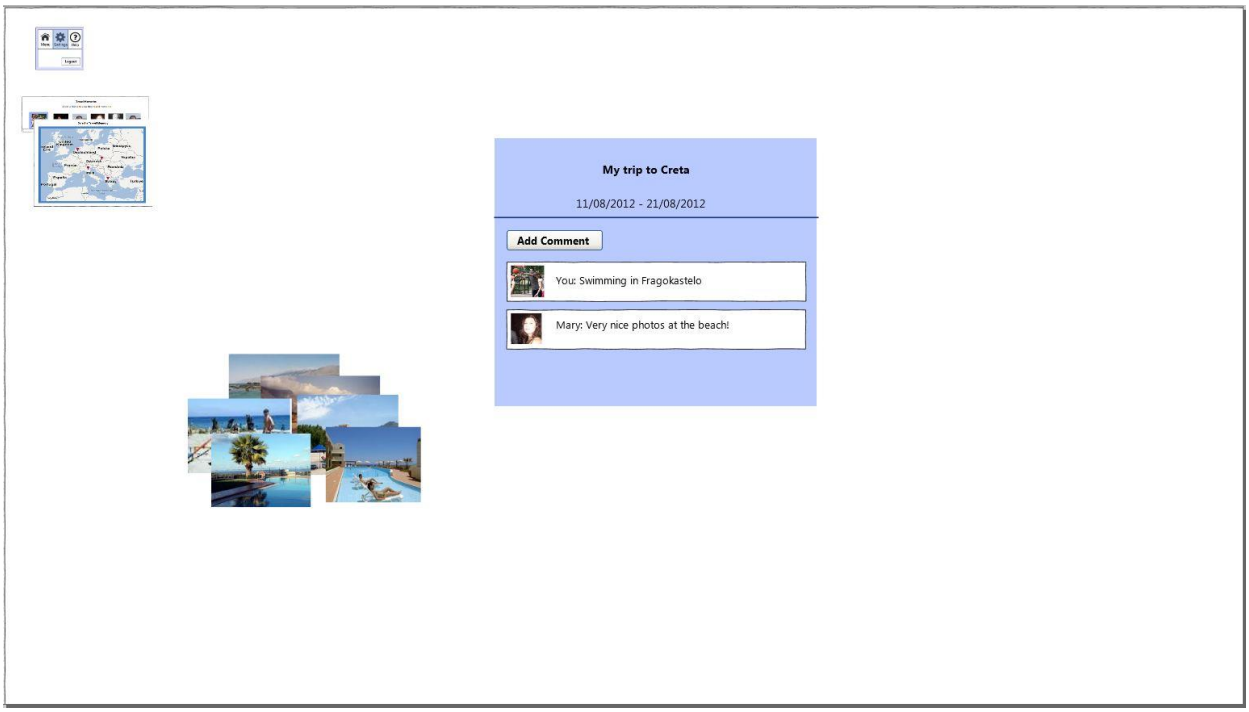

Figure 123: Screen TM3 - View travel memory, comments feed and photos in small size

Screen	TM:3 – View Travel Memory
Size (X, Y)	500 x 600 pixels (refers to max value, else fit to size)
Location	Top Left corner reference: (750, 300)
Description	View travel memory, photos and comments.
Components	ScatterView Control, ScatterViewItems, SurfaceScrollBar, SurfaceButtons.
Functionality	Photos: Using scatterview, photos may be manipulated in any way (scatter, resize, move, rotate) Travel Memory window: it holds the text information about the travel memory and all comments related to it. It may be moved, rotated and resized. Users may add comments by clicking on the "Add comment" button
Comments	In the sequence of events, the previous control is minimized on the top left corner of the screen. It can be reactivated by tapping it.
Tactile Interface	
Tap	Selects photo or the memory window. Tapping on the button activates it
Move	Photos and memory window can move freely
Resize	Photos and memory window can be resized freely
Rotate	Photos and memory window can be rotated freely
Spread	Photos may be spread or gathered back in the heap

Figure 124: Screen TM4 - Adding Comment with virtual keyboard

Screen	TM:4 – Add comment
Size (X, Y)	500 x 250 pixels
Location	Under the comments widow
Description	View travel memory, photos and comments.
Components	SurfaceKeyboard, SurfaceTextBox, SurfaceButtons
Functionality	Textbox: type in the keyboard a short message (up to 250 Characters) Buttons: tap a button to post or discard the message The virtual keyboard may be moved, resized and/or rotated. It remains on the screen until the message is posted or discarded.
Comments	The appearance of the virtual keyboard does not affect any other items on the screen.
Tactile Interface	
Tap	Tapping on the keyboard simulates typing. tapping on the buttons executes
Move	Virtual keyboard can move freely
Resize	Virtual keyboard can be resized freely
Rotate	Virtual keyboard can be rotated freely
Spread	N/A

8.4.2 Events

8.4.2.1 Overview

Events maintain most of their functionality, compared to the WEB implementation, with the distinct exception that media related actions are excluded in the MS PixelSense version.

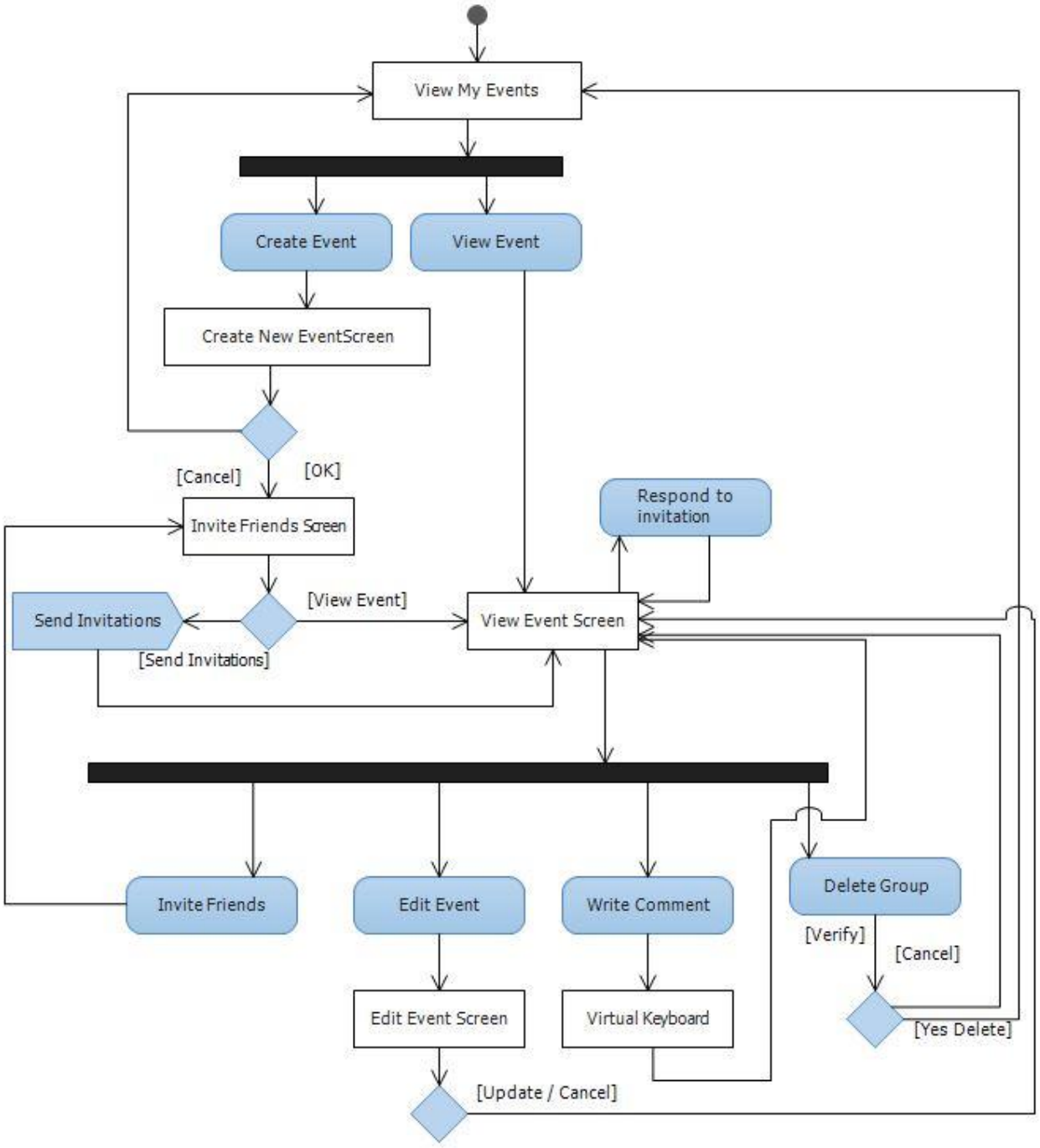

Figure 125: Workflow of Events functionality (tabletop version)

- View event list.

Users may see the events they are either attending, maybe attending or invited to. Events are sorted by date, starting from the current date. It will be possible to view events that have passed.

- Create Event

  Users can create a new event.

  - Add original content

    In the appropriate screen they need to fill the main fields of an event, Title, subject, location, date and time. By submitting the information, the event is created. All information is sent to the Elder-Spaces platform and an event object is created.

  - Invite friends

    Following the creation of the event, users may invite their friends to the event. A list of their friends will be displayed and they will be able to drag the photos of their friends they want to invite.

- View Event

  - Respond to event invitation

    For events that the viewer has not responded to the invitation, it will be possible to decide from the tabletop application. If the invitation is not declined, then the rest of the functionality becomes available to the user.

  - Invite friends

    In the same way as when created, the user may invite friends to the event

  - Edit details

    An edit event details page opens and the user may edit the event details. The virtual keyboard will be used for this purpose.

  - Write comment

    Users may add comments to the event's wall. There will not be an option to upload photos or videos to the event.

  - Delete event

    The owner of an event will be able to delete it along with all relevant information.

8.4.2.2 User Interface

The first wireframe presents the different objects that the event functionality comprises of. There are three main components

- the event list (all user events are there plus a dummy event that is used for creating a new event),

- the event object, with the information about the event and user actions on that
- the comments object with all comments and the ability to add more using the virtual keyboard.

Figure 126: Screen Events – View event list, single event and add comment

Screen	Events
Size (X, Y)	Relative sizes are displayed on the wireframe
Location	Relative positions are displayed on the wireframe
Description	View event List with single event open
Components	SurfaceKeyboard, SurfaceTextBox, SurfaceButtons, SurfaceScrollViwer
Functionality	ScrollViewer: presents the user's events, plus a default one used for creating new events. Textbox: type in the keyboard a short message (up to 250 Characters) Buttons: tap a button to execute functionality • Edit: opens the editor window (next wireframe) • Invite: opens the invite friends window • Going, maybe, not going: are responses to join requests • Add comment: opens the virtual keyboard for writing new comment. The virtual keyboard may be moved, resized and/or rotated. It remains on the screen until the message is posted or discarded.

Comments	The appearance of the virtual keyboard does not affect any other items on the screen. The buttons "going" and "maybe" are only visible if the user has not responded to an invitation. Else, the user's selection is not visible.
Tactile Interface	
Tap	Tapping on the keyboard simulates typing. Tapping on the buttons executes corresponding functionality.
Move	All objects but the slider may move freely
Resize	All objects may be resized
Rotate	All objects may be rotated (slider may rotate in 90 degree angles only)
Spread	N/A

Figure 127: Screen Events Invite – View event list, single event and add comment

Screen	Events Edit
Size (X, Y)	800 x 600 pixels
Location	Top Left corner reference: (500, 200)
Description	Event edit window.
Components	SurfaceTextBox, SurfaceButtons
Functionality	Textbox: tap on a box to edit or insert text using the virtual keyboard Buttons: tap a button to execute The virtual keyboard may be moved, resized and/or rotated. It remains on the screen until the edited text is submitted or discarded.
Comments	
Tactile Interface	
Tap	Tapping on the keyboard simulates typing. Tapping on the buttons executes corresponding functionality.

Move	Yes
Resize	Yes
Rotate	Yes
Spread	N/A

Figure 128: Screen Events Invite – View friend list and move friends to invitation object

Screen	Events Invite
Size (X, Y)	Relative sizes are displayed on the wireframe
Location	Relative positions are displayed on the wireframe
Description	Add from the list of friends, to the invitation box and send a join event invite.
Components	SurfaceButtons, SurfaceScrollbar, images.
Functionality	Scroll the friend list on the left to find a friend's image Drag image to the invitation box and repeat the procedure Buttons: tap a button to post or discard the message
Comments	
Tactile Interface	
Tap	Tapping on the buttons executes corresponding functionality.
Move	Yes
Resize	Yes
Rotate	Yes
Spread	N/A

8.4.3 Groups

8.4.3.1 Overview

Groups share the same structure and layout as Events. From the development point of view, the differences are that groups do not have location, address, and a date-time parameter

As it is evident in the following diagram, there are no actual differentiations between Events and Groups. There exist differences in the user interface, in the Create New, View and Edit screens where the information for viewing and editing is different.

Groups share the same functionality as Events:

- View group list.

  Users may see the group they are either joining or invited to. Groups are sorted alphabetically.

- Create group

  Users can create a new group.

  - Add original content

    In the appropriate screen they need to fill the main fields of an group, Title, subject, category and privacy level. By submitting the information, the group is created. All information is sent to the Elder-Spaces platform and a group object is created.

  - Invite friends

    Following the creation of the group, users may invite their friends to it. A list of friends will be displayed and the user will be able to drag friend's photos on the invitation box to include them in the invitation.

- View group

  - Respond to group invitation

    For group that the viewer has not responded to the invitation, it will be possible to respond from the tabletop application.

  - Invite friends

    In the same way as when created, the user may invite friends to the event

  - Edit details

    An edit group details page opens and the user may edit specific fields. The virtual keyboard will be used for this purpose.

  - Write comment

    Users may add comments to the group's wall. There will not be an option to

upload photos or videos.

- Delete event

  The owner of a group will be able to delete it and all relevant information.

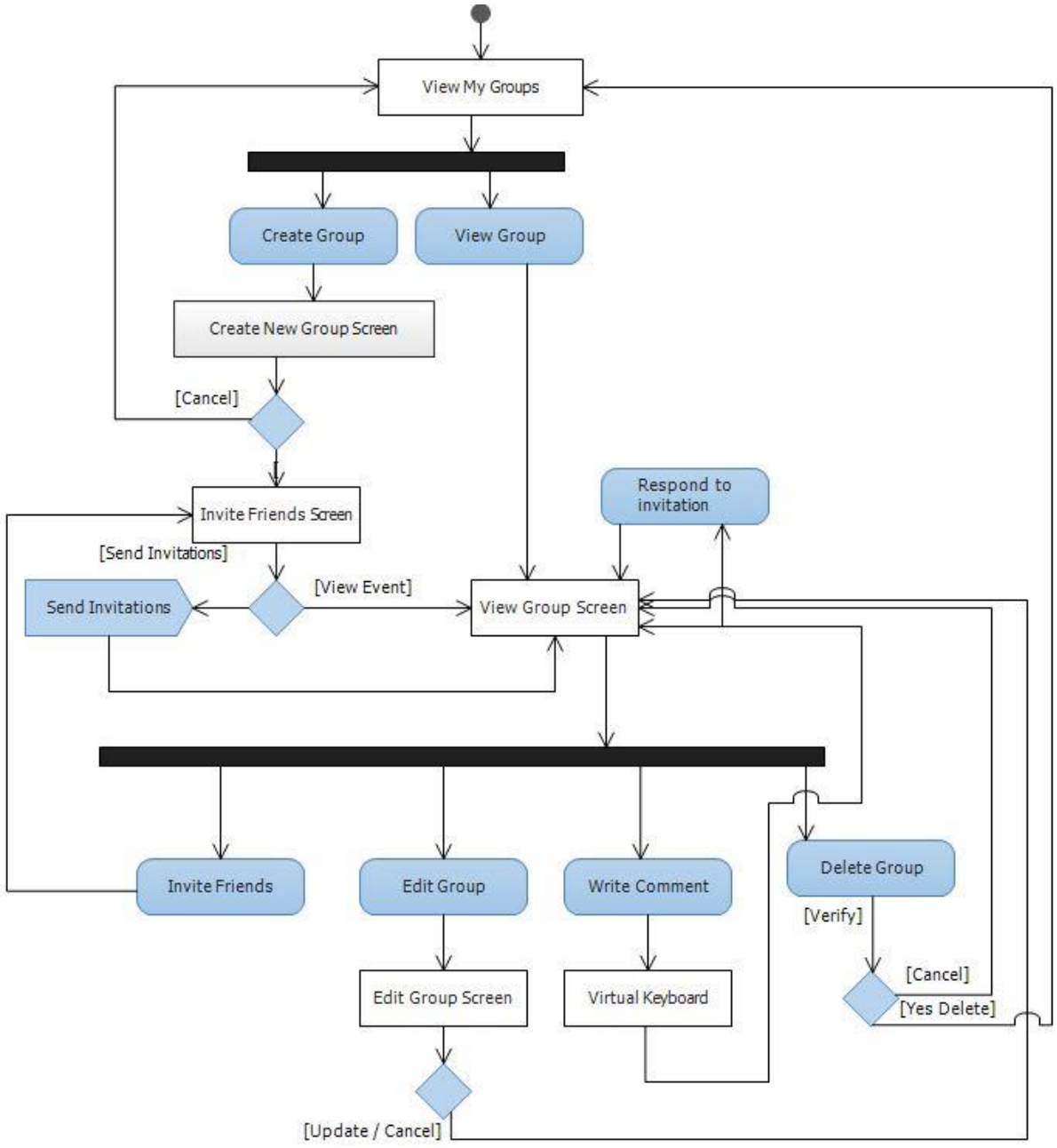

Figure 129: Workflow of Groups functionality (tabletop version)

8.4.3.2 User Interface

The group's user interface is slightly different from that of Events, as mentioned earlier the two underlying entities have differences in fields. We present the main view with group objects and the edit/new group window. Group invitations have the same layout and functionality as event invitations.

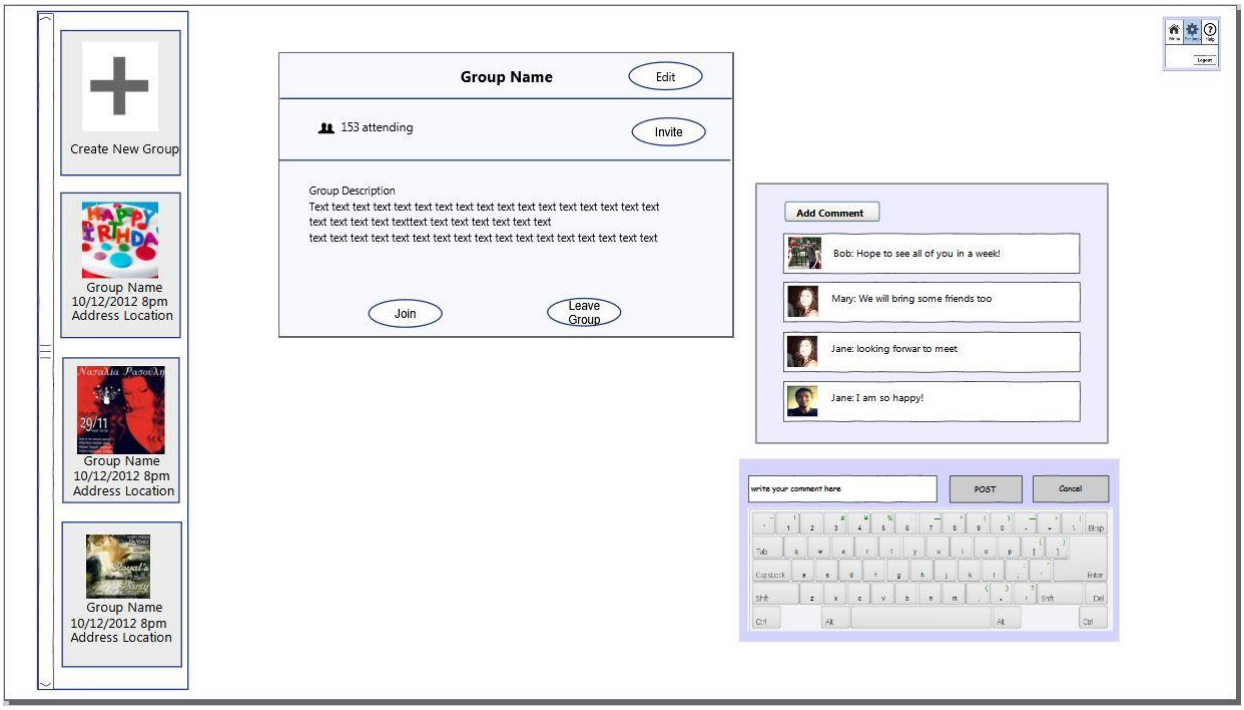

Figure 130: Workflow of Groups functionality (tabletop version)

Screen	Groups
Size (X, Y)	Relative sizes are displayed on the wireframe
Location	Relative positions are displayed on the wireframe
Description	View Groups List with single group open
Components	SurfaceKeyboard, SurfaceTextBox, SurfaceButtons, SurfaceScrollViwer
Functionality	ScrollViewer: presents the user's groups, plus a default one used for creating new events. Textbox: type in the keyboard a short message (up to 250 Characters) Buttons: tap a button to execute functionality • Edit: open the editor window (next wireframe) • Invite opens the invite friends window • Join and Leave group are responses to join requests • Add comment: opens the virtual keyboard for writing new comment. The virtual keyboard may be moved, resized and/or rotated. It remains on the screen until the message is posted or discarded.
Comments	The appearance of the virtual keyboard does not affect any other items on the screen. The button "Join" is visible only if the user has not responded to an invitation. A user may leave a group at any time.
Tactile Interface	

Tap	Tapping on the keyboard simulates typing. Tapping on the buttons executes corresponding functionality.
Move	All objects but the slider may move freely
Resize	All objects may be resized
Rotate	All objects may be rotated (slider may rotate in 90 degree angles only)
Spread	N/A

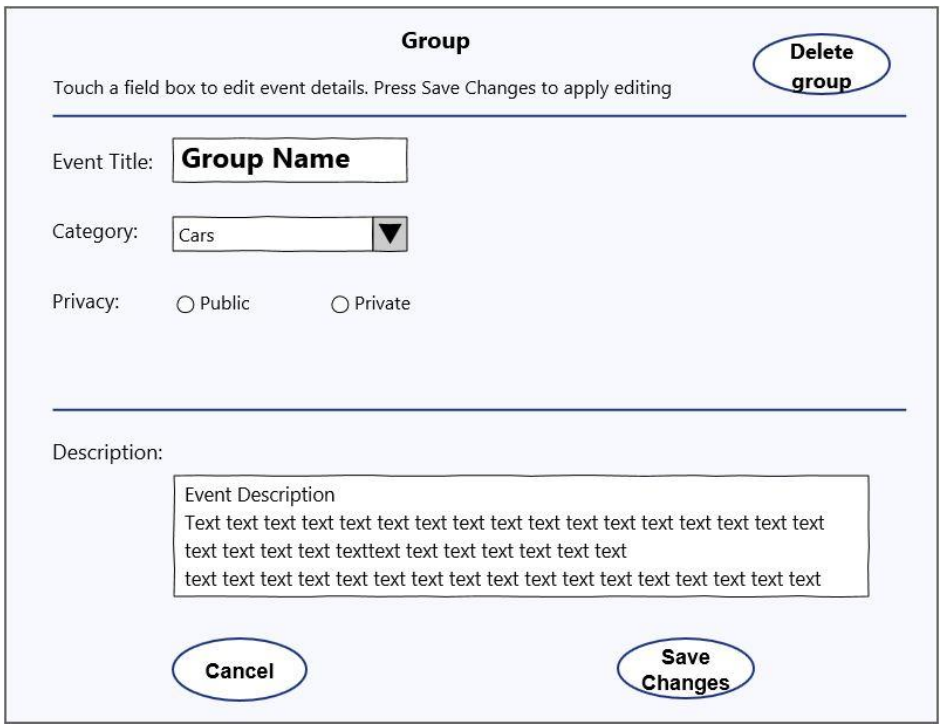

Figure 131: Workflow of Groups functionality (tabletop version)

Screen	Groups Edit
Size (X, Y)	800 x 600 pixels
Location	Top Left corner reference: (500, 200)
Description	Group edit window.
Components	SurfaceRadioButtons, SurfaceListBox Control
Functionality	Textbox: tap on a box to edit or insert text using the virtual keyboard List box: scroll through the categories, tap to select one Radio buttons: tap on one to make exclusive choice. Buttons: tap a button to execute The virtual keyboard may be moved, resized and/or rotated. It remains on the screen until the edited text is submitted or discarded.
Comments	The appearance of the virtual keyboard does not affect other objects
Tactile Interface	

Tap	Tapping on the keyboard simulates typing. Tapping on the buttons executes corresponding functionality.
Move	Yes
Resize	Yes
Rotate	Yes
Spread	N/A

8.4.4 Games

In this chapter we present briefly the games that will be developed for the tabletop application. In Deliverable 2.2 § 3.3.2.2 Tabletop games, there is a first description of the games and their goals. We present here a short description of the games, a UI sample and some information related to the data that are necessary to keep in the file system for each game.

As mentioned in the overview of the Tabletop application, information particular to specific functionality like games will be stored in XML format on the file system, as well as graphic files necessary for the user interface.

8.4.5 Game Find the pairs

A number of images (cards) are sown to the user in tabular layout. Each image appears twice and the users must find the matching pairs. The cards turn hiding their image and the user must try by flipping them over to find a pair.

Upon uncovering a pair, the user sees a success icon (green tick) and the cards are removed from the board. On a wrong selection, the user sees a fail icon (red X) and has to try again. The user wins when all the pairs are uncovered. A clock will time his/hers score.

Difficulty setting controls the number of cards to be displayed.

The repository will hold:

An XML file containing:

- The name of the game
- The instructions for the game
- An wma sound file with audio instructions
- The number of cards corresponding to each difficulty level
- The end game message
- The relative path for the image files.

Additionally, the image files for the cards of the game along with any other graphic will be placed in the path specified in the XML

A draft version of the game's screen is presented in the following figure.

Figure 132: Games – Find the pairs draft UI

8.4.6 Game Puzzle

The user has to complete a puzzle. The game has two screens. On the first, a number of images are shown to the user to select the one. On the second page, the user sees the image, and around an empty canvas, there are the pieces of the puzzle. By moving the pieces with their fingers, users can complete the puzzle. A clock on the side times their score.

Difficulty settings change the number of pieces in the puzzle.

The repository will hold:

An XML file containing:

- The name of the game
- The instructions for the game
- An wma sound file with audio instructions
- The number of pieces corresponding to each difficulty level
- The end game message

- The relative path for the image files.
- The different images available for construction the puzzle and their relevant paths.

Additionally, the image files for the puzzles along with any other graphic will be placed in the path specified in the XML

A draft version of the game's screen is presented in the following figure.

Figure 133: Games – puzzle draft UI

8.4.7 Game Synonyms

The goal of the game is to make pairs between synonymous words. A "notebook" image holding two lists of words is displayed to the users. They need to drag a line with their finger from one to the other that means the same thing.

On a successful connection, the user sees a success icon (green tick) and the words are stricken out. On a wrong choice, the user sees a fail icon (red X) and has to try again. The game ends when all the matches are found. A clock times the users score.

Difficulty setting controls the number of words to be displayed.

The repository will hold:

An XML file containing:

- The name of the game
- The instructions for the game
- An wma sound file with audio instructions
- The number of words corresponding to each difficulty level
- The end game message
- The relative path for the image files.
- The pair of words resource file location

Additionally, the words resource file along with any other graphic will be placed in the path specified in the XML

A draft version of the game's screen is presented in the following figure

Figure 134: Games – synonyms draft UI

9. Conclusions

The deliverable at hand is the main outcome and result of *Task 2.5 "Modular and Extensible Architecture"* and completes the second millstone of the project *M2: Modular Architecture Specified*. It achieves numerous key goals for the successful continuation of the project with respect to the technical developments of the project. More specifically, this deliverable:

1. Verifies the end-user (key stakeholders) requirements in terms of the services and applications provided by the ELDER-SPACES platform as well as determining the key functionality behind the main elements of the platform.
2. Provides detailed analysis and specification with respect to the ELDER-SPACES platform architecture, thus providing key functionality specifications beginning from the underline middleware and framework of the platform all the way up to the expected Graphical user Interface. These specifications will support all consecutive developments for the implementation and integration phases in the subsequent workpackages.
3. Updates additional specification and outcomes as these have been derived from work performed already in previous tasks (i.e. WP1 and WP2) as part of the outcome from past deliverables, in such a way, as to eliminate any gaps in specifications of functionality and applications to be implemented.
4. Constitutes through its outcomes towards the specification of all technical test cases for the system testing and verification that will take place throughout the development of the platform as well as during the integration phase. Furthermore, the specifications provided within this deliverable will be verified also during piloting phase with the end-user evaluation.

By additional user requirement trials, it was able to verify and extend the functionality intended for the Elder-Spaces platform.

The consortium has agreed on adopting the WCAG Level AA accessibility recommendations and a thorough revision of the user interfaces along with the programming techniques and choices was carried out.

Detailed specifications on the platform architecture were delivered, along with detailed specifications on the basic functionality and specific applications to be implemented. Using REST services, the system combines reusable elements to create functionality and applications.

The user interface has been revised and presented in great detail, to the extent that a working prototype is now available online.

The MS PixelSense application has been defined and described in detail. Early versions of the implementation have also been presented.

In all, by extending the original deliverable to this version, the vision for the Elder-Spaces platform is now clear. A detailed and concise specification for the platform exists and will guide the work in the following workpackages.

APPENDIX

Description and implementation guide to accessibility features

In the following the technical implementation of the specified accessibility features is described. Where applicable, corresponding code samples are provided. For additional information the used techniques are listed in brackets behind the feature and can be found on www.w3.org/TR/2012/NOTE-WCAG20-TECHS-20120103/complete.html.

Principle 1: Perceivable

Non-text Content (Success Criterion 1.1.1)

1. Images that have no informational or control function are added via CSS. (C9)

```
div { background: url('/images/decoration.png') no-repeat center 0; }
```

2. All image resources provide an “alt”-attribute identifying their content. (H37)

```
<img src="logo.gif" alt="ELDER-SPACES logo" />
```

3. All graphical control elements provide an “alt”-attribute identifying their functionality. (H36)

   The “alt”-attribute is filled for all image resources. If the image contains words that are needed to understand the content, these are provided.

```
<input type="image" name="submit" src="submit.gif" alt="Submit" />
```

4. All graphical links provide an “alt”-attribute identifying their target. Additionally provided text links are not separated. (H2)

```
<a href="nextPage.htm">
  <img src="next.gif" alt="next page icon"/>
  Go to the next page
</a>
```

5. All areas in image maps provide an “alt”-attribute identifying their target. (H24)

```
<img src="worldmap.gif" usemap="#map"
  alt="Map of the world. Select a country for further information." />
<map id="map" name="map">
  <area shape="rect" coords="75,75,100,100"
   href="a_country.html" alt="A country" />
  <area shape="rect" coords="75,100,100,125"
   href="another_country.html" alt="Another country" />
</map>
```

6. All applets provide an “alt”-attribute identifying their functionality. (H35)

```
<applet code="a_game.class" width="300" height="300" alt="a game">
  a game
</applet>
```

7. All objects identify their functionality in the body-text. (H27, H53)

```
<object classid="http://www.elderspaces.eu/script.py">
  <p>long textual description of the object and its purposes. </p>
</object>
```

8. Alternative texts longer than 1024 characters are provided using the “longdesc”-attribute. (H45)

   According to RFC1866 the maximum value length for among others the “alt”-attribute is 1024 characters[28]. If these are not enough to provide an adequate description, the “longdesc”-attribute is used. It consists of a URL which leads to an html-page that contains the long textual description.

```
<img src="complex.gif" alt="complex information"
longdesc="description.html"/>
```

9. A unique label describing clearly the purpose of a form field is provided. Therefore the HTML-label-element is used before the input element. This can be above or on the left side. (H44)

```
<label for="surname">Surname:</label>
<input type="text" name="surname" id="surname" />
```

10. On radio buttons and checkboxes the labels are assigned behind the input element providing a description of the value. (H44)

```
<input type="checkbox" id="terms" name="terms" />
<label for="terms">I agree to the terms of use</label>
```

11. Radio buttons provide a description of their topic before and the various values as labels behind them. (H44)

```
<span>Gender:</span>
<input type="radio" name="gender" id="male" value="male" />
<label for="male">Male</label><br/>
<input type="radio" name="gender" id="female" value="female"/>
<label for="female">Female</label><br/>
```

12. Buttons used to perform an action directly associated with an input field, e.g. a search field, are clearly describing its purpose and are positioned right after the input field to indicate the connection. (G167)

13. No CAPTCHAs are used, analysis of response time or honeypots are used instead.

    Response time:

The time is taken, when the form is delivered and compared to the submit time. Any form that is filled too fast can be considered as automatically filled.

Honeypot:

The functional principle of a honeypot is to lead an automatic actor in a trap. The whole division containing the form elements acting as the trap is masked out by CSS-definition. Users that have CSS disabled see the hint that this field must not be filled. If the field is filled the submit-action leads to a page indicating that the field was filled with the option to go back to the form with all data still present. Most programmers of malicious software do not make the effort to handle such issues making this approach a quite secure way of reducing spam.

HTML:

```
<div class="nospm">
  <label for="contact_spm" id="contact_nospm">
  Please do NOT fill following field
  </label><br>
  <textarea class="inputbox" id="contact_spm" name="nospm">
  </textarea>
</div>
```

CSS:

```
. nospm { display: none; }
```

Alternatives for time-based media (Guideline 1.2)

14. With exception of the applications, Elder-Spaces contains no audio or video content.

Info and Relationships (Success Criterion 1.3.1)

15. CSS is used for specifying text format (C22)
16. All pages are structured by logically hierarchical used header tags (<h1>…). (G141, H42)
17. Links directly following each other are provided as lists. (H48)

```
<ul class="navigation">
  <li><a href="friends.html">Friends</a></li>
  <li><a href="groups.html">Groups</a></li>
  <li><a href="events.html">Events</a></li>
  …
</ul>
```

18. Emphasizing text is done by using semantic mark-up tags. (G115, H49)

```
<em>emphasized text</em>
<strong>strong text</strong>
<cite>Citation</cite>
<blockquote> Blockquote </ blockquote >
<sub>subscribed text</sub>
```

```
<sup>superscripted text</sup>
```

19. Logically associated fields, e.g. the address data, are grouped optically by using a fieldset with a declarative legend. (H71)

```
<fieldset>
  <legend>Postal Address</legend>
  <label for="street">Address:</label>
  <input type="text" id="address" name="address" />
  <label for="zip">Zip Code: </label>
  <input type="text" id="zip" name="zip" />
  <label for="city">City: </label>
  <input type="text" id="city" name="city" />
  <label for="country">Country: </label>
  <input type="text" id="country" name="country" />
</fieldset>
```

20. Big groups of radio buttons are grouped by using the fieldset and the legend element.

```
<fieldset>
  <legend>Gender</legend>
  <input type="radio" name="gender" id="male" value="male" />
  <label for="male">Male</label><br/>
  <input type="radio" name="gender" id="female" value="female"/>
  <label for="female">Female</label><br/>
</fieldset>
```

Meaningful Sequence (Success Criterion 1.3.2)

21. The DOM matches the visual order. (C27)

Sensory Characteristics (Success Criterion 1.3.3)

22. No information on the entire site is only indicated by shape, size, sound or location. (G96)

Use of Colour (Success Criterion 1.4.1)

23. Colours conveying information provide additionally text, patterns or symbols. (G14, G111, G182, G183, H92)

Audio Control (Success Criterion 1.4.2)

24. No audio content is played automatically

Minimum Contrast (Success Criterion 1.4.3)

25. The minimum contrast ratio for text bigger than 18pt size or bold text bigger than 14 pt is 3:1. (G18)
26. The minimum contrast ratio for text smaller than 18pt size or bold text smaller than 14 pt is

4.5:1. (G18)

27. User agents are able to override colour settings. (C23, C25, G148, G156, G175)

    User agent's feature to override main content's text background and foreground colour settings is supported. Therefore the colours for the main content are not specified in code or CSS. It is allowed to specify the border-colours.

    The sufficiency of contrasts can be checked by using the Contrast-Analyser by the Paciello Group[23].

Resize text (Success Criterion 1.4.4)

28. Size unit for all element texts and text containers is em or per cent. (C12, C14, C17, C28)

```
input, label, legend, select, textarea, p, div, span, a { font-
size:100%; }

.radiobuttonAndCheckboxClass { width: 1em; height: 1em; }
```

29. All layout elements width and height is defined in per cent. A liquid layout is used. (G146)

    To ease the development, the usage of a CSS-framework like YAML (Yet Another Multicolumn Layout)[29] is recommended.

30. Every page provides fast and easy adjustment of font size. (G178)

Images of Text (Success Criterion 1.4.5)

31. No image contains textual information.

Principle 2: Operable

Keyboard (Success Criterion 2.1.1)

32. Event handlers for both mouse and keyboard are implemented redundantly. (G90, G202, H91, SCR2, SCR20, SCR35)

    The whole site functionality is accessible by using solely the keyboard. This means all navigation and control elements as well as client-side JavaScript-functionality. To meet the latter, event handlers for both mouse and keyboard are implemented redundantly:

    Click:

```
<img onclick="next();" onkeypress="next();" src="next.gif" alt="Next
page">
```

    Hover:

```
<a href="http://www.elderspaces.eu" onmouseover="doSomething();"
onfocus="doSomething();" onmouseout="undoSomething();"
onblur="undoSomething();">
```

    Mousedown/up:

```
<p onmousedown="doSomething()" onkeydown=”doSomething()”>Click here</p>

<p onmouseup="doSomething()" onkeyup=”doSomething()”>Click here</p>
```

No Keyboard Trap (Success Criterion 2.1.2)

33. No content element traps the keyboard's tabbing functionality.

Timing Adjustable (Success Criterion 2.2.1)

34. Completing forms has no time limit.

    A JavaScript-function opens a confirmation dialogue two minutes before the server-side session time ends, which provides the opportunity to prolong the session time.

```
<script type="text/javascript">
// call the confirmation after 13 minutes,
// if not already prolonged
if(! session_prolonged){
   // 13 minutes in ms
   var expiration_warning_time = 780000;
} else {
   // 148 minutes in ms
   var expiration_warning_time = 8880000;
}
var t=setTimeout(function(){
   var r=confirm("Warning, you have been inactive for " +
expiration_warning_time / 60000 + " minutes. Please press 'OK' within
the next 2 minutes to go on. Otherwise you will be logged out.")
   if (r==true){
     // AJAX call to a server-side script,
     // that prolongs the session time to 150 min
   }
}, expiration_warning_time);
</script>
```

Pause, Stop, Hide (Success Criterion 2.2.2)

35. Any content is updated only after a user interaction.

Three Flashes or Below Threshold (Success Criterion 2.3.1)

36. The site contains no moving, flashing, blinking or scrolling content except the notification indicators, which flash once per notification.

    To fulfil SC 2.3.1 the notification indicators are only updated on a page reload/ on user interaction.

Bypass Blocks (Success Criterion 2.4.1)

37. Heading elements are provided for each section of the content (H69)

38. All pages contain links to skip navigation. (G1)

    To facilitate the keyboard-only users to reach the content in a fast and easy way, links are

added on the top of the page that lead directly to the main content areas. Thereby the user does not need to tab through the whole navigation menu or advertisement banners on every page to get to the desired content block. In most cases this is the main content.

The technique to achieve this is to set the links far to the left by CSS and hide them from the users until they get focus. The links lead to anchors set on top of the content.

HTML:

```
<div id="topnav">
<!-- start: skip link navigation -->
  <ul class="skiplinks">
     <li><a class="skip" title="skip link" href="#navigation">Skip to the
navigation</a></li>
     <li><a class="skip" title="skip link" href="#content1">Skip to
content 1</a> </li>
     <li><a class="skip" title="skip link" href="#content2">Skip to
content 2</a> </li>
  </ul>
<!-- end: skip link navigation -->
</div>
<!-- skiplink anchor: navigation -->
<a id="navigation" name="navigation"></a>
…
<!-- skiplink anchor: content1 -->
<a id="content1" name="content1"></a>
…
```

CSS:

```
#topnav  ul{
  list-style-type:none;
}

/* (en) classes for invisible elements in the base layout */
.skip {
  position:absolute;
  top:-32768px;
  left:-32768px; /* LTR */
}

/* skiplinks:technical setup */
#skiplinks {
  position:absolute;
  top:0px;
  left:-32768px;
```

```
  z-index:1000;
  width:100%;
  margin:0;
  padding:0;
  list-style-type:none;
}

/* (en) make skip links visible when using tab navigation */
.skip:focus, .skip:active {
  position:static;
  top:0;
  left:0;
}
```

Page Titled (Success Criterion 2.4.2.)

39. Page titles are descriptive (G88, G127, H25)

    The page title is very important for the user to indicate which page he is currently watching. If the page is bookmarked the title is the proposed name for the bookmark. So it is also useful to retrieve information for later use.

    The page titles are descriptive, meaningful and short. They give a hint to the site the page belongs to and should be unique on the site.

    The title can be set by the title-element in the head-section of the page.

```
<head>
  <title>Current page title – Elder-Spaces</title>
</head>
```

Focus Order (Success Criterion 2.4.3)

40. Focus order of interactive elements corresponds to content order (C27, G59, H4)

Link Purpose (Success Criterion 2.4.4)

41. Link targets with surrounding text are explained in link text or title attribute (G91, H30)

```
You can find additional information on <a
href="someonesHomepage.htm">someones Homepage</a>.
```

    or

```
You can find additional information on <a href="someonesHomepage.htm"
title="someones Homepage">this site</a>.
```

42. Image and text links with the same target are not separated (H2)

```
<a href="nextPage.htm">
 <img src="next.gif" alt="next page icon"/>
```

```
 Go to the next page
</a>
```

Multiple Ways (Success Criterion 2.4.5)

43. A search function is provided. (G161)
44. A site map is provided. (G63)

Headings and Labels (Success Criterion 2.4.6)

45. Descriptive headings are provided. (G130)
46. Descriptive labels are provided. (G131)

Focus Visible (Success Criterion 2.4.7)

47. Standard HTML-elements are used and focus highlighting is done by CSS. (C15)

Principle 3: Understandable

Language of Page (Success Criterion 3.1.1)

48. All pages set the proper HTML-lang attribute for the current user's language. (H57)

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
```

Language of Parts (Success Criterion 3.1.2)

49. No languages are mixed on the Elder-Spaces pages.

On Focus (Success Criterion 3.2.1)

50. No onfocus-handlers are used on the entire site. (G107)

On Input (Success Criterion 3.2.2)

51. No new windows or pop-ups open without explicit information of the user. (G201)

    Any element opening a new window or a pop-up is textually marked.
52. Each form provides an explicit button to submit it. (G80, H32)

Consistent Navigation (Success Criterion 3.2.3)

53. The site consists of a framework containing the different applications and functionalities. The framework and its elements are the same on every page. (G61)

Consistent Identification (Success Criterion 3.2.4)

54. All elements with the same purpose are labelled equally. (G197)

Error Identification (Success Criterion 3.3.1)

55. If a mandatory field of a submitted form is missed, a message identifying the missed field is displayed on top of the form. (G83)

56. If not allowed values are submitted in a form, a message providing a list of allowed values is displayed on top of the form. (G84)
57. Error messages contain links to the field where the error occurred. (G139)
58. Messages are provided after successful form submits. (G199)

Labels or Instructions (Success Criterion 3.3.2)

59. All forms provide textual instructions on their completion on top. (G184)
60. All form elements are descriptive labelled. (G131)
61. Form labels contain expected data formats, if applicable. (G89)
62. Mandatory form elements contain a textual hint (‘required’) in the label. (H90)

Error Suggestion (Success Criterion 3.3.3)

63. A message identifying the field with invalid input, which provides information on error solution, is displayed on top of the form. (G85)

Error Prevention (Success Criterion 3.3.4)

64. Before deletion of objects, explicit confirmation is requested. (G168)

Principle 4: Robust

Parsing (Success Criterion 4.1.1)

65. All pages are fully conforming to W3C-specification. (G192)

Name, Role, Value (Success Criterion 4.2.1)

66. Only standard HTML-elements are used in Elder-Spaces. (H88)

User generated content

Textual content

67. Textual user input is performed within a simple text-area.

    Textual messages generated by users are set into text-areas with no possibility to change the appearance of the text. HTTP-Links contained in the text are filtered programmatically and embedded to <a>-tags with the link target as link text and an additional hint, that following the link will open a new window.

```
<a href=”Any_matched_URL” target="_blank">Any_matched_URL (opens new
window)</a>
```

Images

68. The upload of GIF-images is not allowed.

    To ensure fulfilment of success criterion 2.3.1, the upload of gif-images is not allowed,

because they could be blinking, moving or flashing.

69. Users are encouraged and have the opportunity to provide descriptions on images.

    Users get an opportunity and are encouraged to provide a descriptive text, when uploading images. This is appended as alternative text to the images. If no text is provided, the alternative text is automatically set (‘Picture XX, no further description’) with a hint that the user did not provide an alternative text.

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