ALFRED

Personal Interactive Assistant for Independent Living and Active Ageing

WP5 – Pillar II: Personalized Social Inclusion

D5.5.1 – App Building and Deployment

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This deliverable provides a description of the app implementation of Task 5.5 App Building and Deployment. It specifies the scope of this version and the degree of fulfilment of the requirements to be covered by the component. It specifies how to install and execute the apps, that are integrated in the Personal Assitant (PA). Last but not least, it will provide an overview of the limitations of the current prototype and an outlook on the further developments.

SEVENTH FRAMEWORK PROGRAMME

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Executive Summary

Older people tend to get lonely for reasons such as their declining health condition and death of friends or relatives. The ALFRED system will reinforce the social inclusion of older people by providing personalized recommendations for social events. In the task for “Society Participation Recommendations” 5.5.1, different functionalities for the social inclusion of older people are added to the ALFRED system.

In the scope of WP5, five apps have been developed to fulfil the requirements of the event recommendations as stated in US072, US073, US074, US080, US81 and US103. In D5.5.1 the focus is on the client side of the Recommendation Engine (REn). As the REn provides individual event recommendations for ALFRED users, there are two apps (ShowRec, RateRec) that allow the user to use the service. The app ShowRec is used to download, display and accept or reject recommended events. The RateRec can be used after an event in order to give a rating to improve future recommendations.

Furthermore US064 “As an older person I would like to use ALFRED to maintain my contact list in my phone” has been processed by developing an app to synchronize contacts between the the Android and the ALFRED system. The synchronisation is based on various properties of the contacts in order to get the synchronisation done automatically mostly.

US070 “As an older person I would like to use ALFRED to set up social groups of people with similar diseases” is another app, which allows the user to create, manage and join individual groups of users. A second app allows to orgazine meetings with various ALFRED users and it fulfils US070.

All apps and their interaction with the ALFRED ecosystem are explained in this document and mockups for all apps are presented in order to specify their behaviour.

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1 Introduction

ALFRED – Personal Interactive Assistant for Independent Living and Active Ageing – is a project funded by the Seventh Framework Programme of the European Commission under Grant Agreement No. 611218. It will allow older people to live longer at their own homes with the possibility to act independently and to actively participate in society by providing the technological foundation for an ecosystem consisting of four pillars:

- **User-Driven Interaction Assistant** to allow older people to talk to ALFRED and to ask questions or define commands in order to solve day-to-day problems.
- **Personalized Social Inclusion** by suggesting social events to older people, taking into account their interests and their social environment.
- A more **Effective &** Personalized **Care** by allowing medical staff and caretakers to access the vital signs of older people monitored by (wearable) sensors.
- **Physical & Cognitive Impairments Prevention** by way of serious games that help the users to maintain and possibly even improve their physical and cognitive capabilities.

This deliverable provides a description of the app implementation of Task 5.5 App Building and Deployement. It specifies the scope of this version and the degree of fulfilment of the requirements to be covered by the component. It specifies how to install and execute the the apps, that are integrated in the Personal Assitant (PA). Last but not least, it will provide an overview of the limitations of the current prototype and an outlook on the further developments.

1.1 ALFRED Project Overview

One of the main problems of western societies is the increasing isolation of older people, who do not actively participate in society either because of missing social interactions or because of age-related impairments (physical or cognitive). The outcomes of the ALFRED project will help to overcome this problem with an interactive virtual butler (a smartphone application also called ALFRED) for older people, which is fully voice controlled.

The ALFRED project is wrapped around the following main objectives:

- To empower older people to live independently for longer by delivering a virtual butler with seamless support for tasks in and outside the home. This virtual butler (the ALFRED app) aims for a very high end-user acceptance by using a fully voice controlled and non-technical user interface.
- To prevent age-related physical and cognitive impairments with the help of personalized serious games.
- To foster active participation in society for the ageing population by suggesting and managing events and social contacts.
- And finally, to improve caring by offering direct access to vital signs for carers and other medical staff as well as alerting in case of emergencies. The data is collected by unobtrusive wearable sensors monitoring the vital signs of ALFRED's users.

To achieve its goals, the project ALFRED conducts original research from a user centred perspective and applies technologies from the fields of Ubiquitous Computing, Big Data,

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Serious Gaming, the Semantic Web, Cyber Physical Systems, the Internet of Things, the Internet of Services, and Human-Computer Interaction. For more information, please refer to the project website at http://www.alfred.eu.

1.2 Deliverable Purpose, Scope and Context

The purpose of this deliverable is to describe the current grade of advance in the apps developed related with WP5 Personalized Social Inclusion based and using the components developed in previous tasks.

1.3 Document Status and Target Audience

This document is listed as “public” in the Description-of-Work (DoW), as it provides general information about ALFRED’s software extensions. While the document mainly aims at the project’s contributing partners, this public deliverable can also be useful for the wider community. The current version is the 1st of the two listed in the DoW.

1.4 Abbreviations and Glossary

A definition of common terms and roles related to the realization of the ALFRED project as well as a list of abbreviations is available in the supplementary document “Supplement: Abbreviations and Glossary”, which is provided in addition to this deliverable. Further information can be found at http://www.alfred.eu.

1.5 Document Structure

This deliverable is broken down into the following sections:

- **Chapter 1** provides an introduction for this deliverable including a general overview of the project, and outlines the purpose, scope, context, status, and target audience of this deliverable.
- **Chapter 2** describes the context and the purpose of the deliverable, what it contains and how it is related to the ALFRED system overall.
- **Chapter 3** provides information about the current status of five apps that have been developed in the context of the event recommendation functionalities and social contacts in the ALFRED system. Focusing on the client side solution of the the Recommendation Engine (REn), two apps are explained. uthermore the synchronization of contacts between ALFRED and the Android system is explained. Finally, this section will present the apps for social groups and the organization of meetings.
- **Chapter 4** presents readers with the requirements for setting up the different apps.
- **Chapter 5** provides instructions on how to install and deploy all the apps.
- **Chapter 6** details how the apps can be used after its deployment.
- **Chapters 7 & 8** are concerned with the evaluation of the prototype and discuss the test plan and the target performance respectively.
- Finally, **Chapter 9** summarizes the aforementioned content.

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2 Context and Scope

The Social Inclusion pillar of the ALFRED project is the focus of WP5. Many older people are at risk of social exclusion and loneliness due to a declining health, reduction in mobility and death of partner or friends. The ALFRED app will reinforce the social inclusion of older people (i.e. its users) by providing personalized recommendations for social events. The personalized recommendations will be based on users' personal and health profiles, their context (e.g., location, interests), their social circle and events they attended to in the past.

The "App Building and Development" task, is in charge of developing the client side, making it possible for users to interact with the ALFRED recommendations. Within the task, five Android apps were developed that will be available in the ALFREDO marketplace. Two of them are communicating with the Recommendation Engine REn which is residing inside the Personalization Manager (PM) and tightly connected with the Event Manager (EM) to obtain user profile information and available social events respectively. Another app has been developed to fulfil US064 "As an older person I would like to use ALFRED to maintain my contact list in my phone". The app manages the synchronisation of the contacts stored in the Android system and the contacts available in ALFRED. The fourth app is used to organise social activities in groups, such as meeting several ALFRED users with similar diseases or groups of friends. With the fifth app, a user can set up a meeting and invite his/her contacts.

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3 State of the Development

Task 5.5 is responsible for the development of five different apps. Therefore, this chapter is divided into subsections in order to separate all of them.

3.1 Apps for Recommendations

For the Society Participation Recommendation task two components are required. The first, on the server side is the Recommendation Engine (REn), which is seen as part of the Personalization Manager (PM) and secondly, an extension of the Personal Assistant (PA) on the client side.

This document focuses on the client side and both Android apps that are developed within this task.

There are two apps to fulfil different user stories. The first app (ShowRec) covers US072, “As an older person I would like to use ALFRED to learn about art expositions or a museum”. The app is therefore used to display recommendations and events to the user. The second app (RateRec) covers US073, US074, US080, US081 and US103. The app is used to request a rating and a conclusion from the users. The feedback is afterwards used to improve the recommendations provided by the REn.

Figure 1 shows the mockup of ShowRec. The left part of the figure shows a smartphone, displaying a list of events. The list only contains the most important information; the title, the time and criteria based on the REn calculation. The list shows events for the current day and the next one. This is a default behaviour, as the idea is to allow the user to plan his next activities for the next week. The app uses CADE to allow direct speech input. Another opportunity are regular smartphone gestures. The user is able to select an event to see further details:

- Name
- Start and end
- Location and distance
- Participating friends
- Required mobility
- Event description

The user is able to accept (Go) or to reject (Don’t go) the event. If the user accepts the event, a new event is created in the users calendar and the entry is filled with the event’s details. If the user rejects the event, the event list (first screen) is displayed again. However, in both cases, the app sends feedback to the REn in order to improve future recommendations and to enable notifications for other users as shown in Figure 2.

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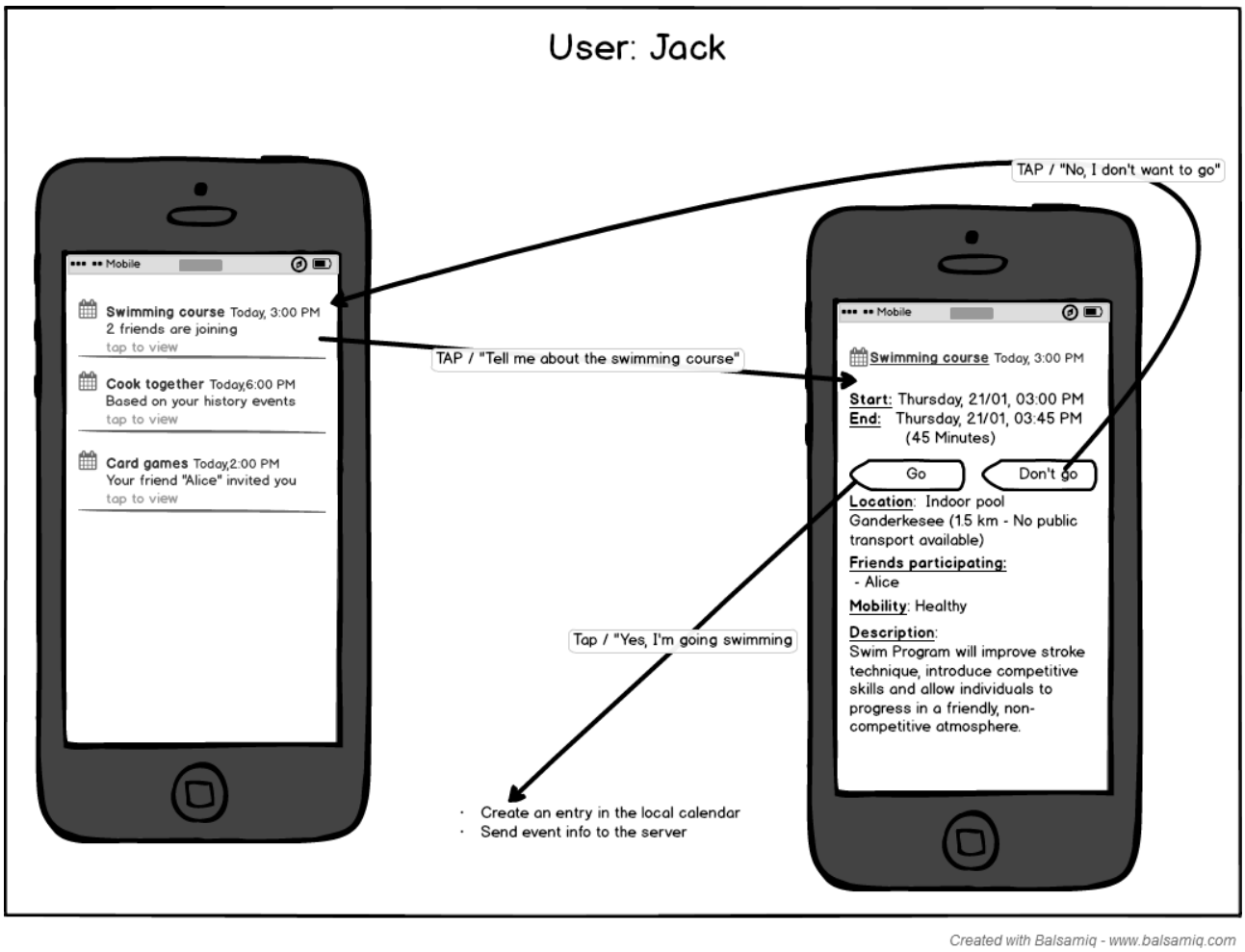

Figure 1: Show Recommendations on Android Phone (1/2)

Figure 2 shows the android activity for user notifications. Based on US074 “As an older person I would like to use ALFRED to get a personalized invitation to a social event, so it motivates more to go” and US081 “As an older person I would like ALFRED to enable me to have face to face contacts as well, not just virtual contacts over ALFRED”, the REn calculates recommendations based on social contacts in order to create personalized notifications for friends and social contacts of a user. This notification is based on the feedback of users as shown in Figure 1. The REn creates a push notification that displays a first message like “Your friend is joining an event at 1 PM for 45 minutes. Would you like to join”. Using CADE or gestures, the user can simply answer this question. If the user agrees, the event’s details are shown again and the sequence is the same as mentioned above.

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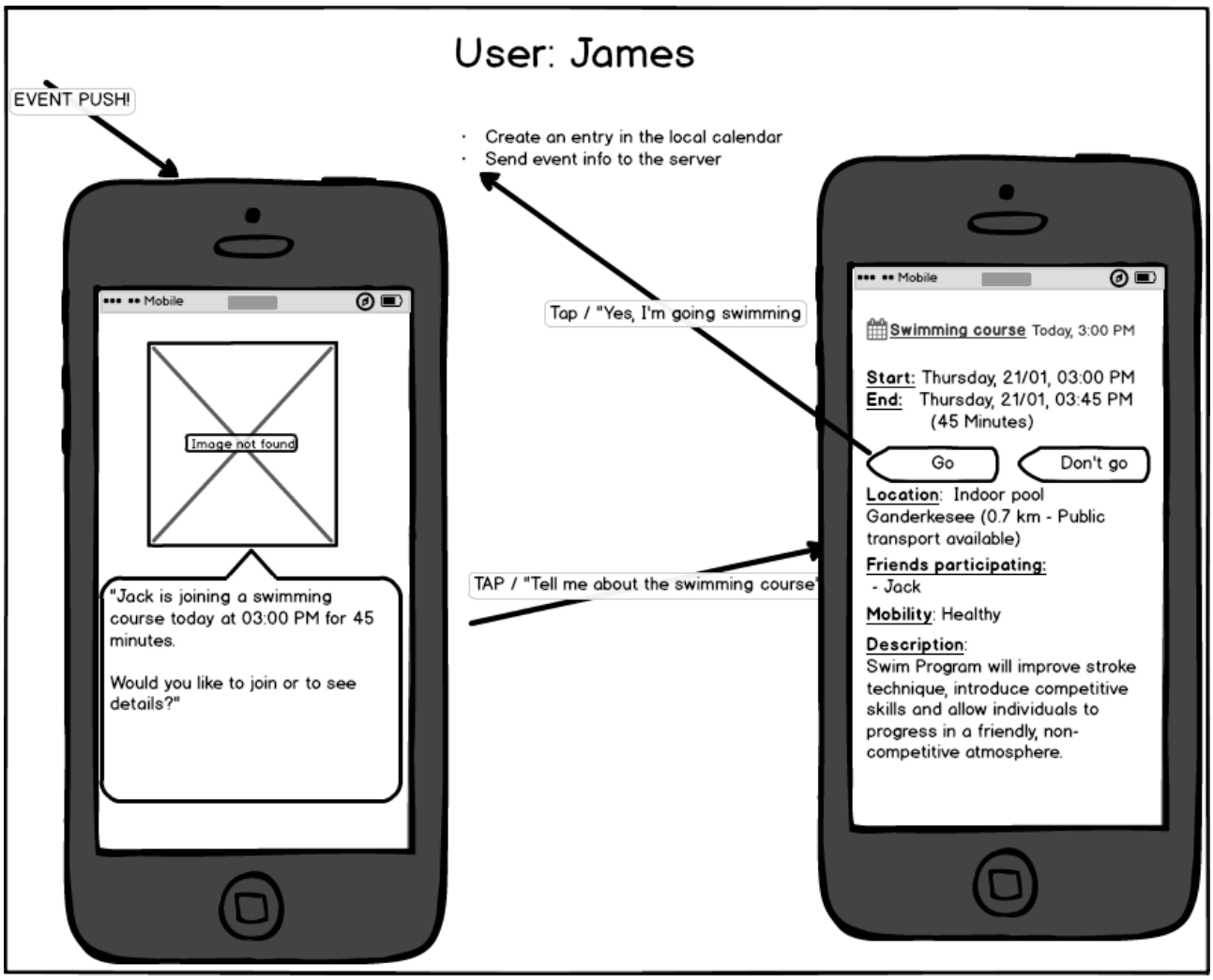

Figure 2: Show Recommendations on Android Phone (2/2)

A rating of events is important in order to improve the recommendations. Therefore, the user is asked for a rating based on stars where five stars mean “very good” and zero means “very bad”.

This also simplifies the integration of CADE.

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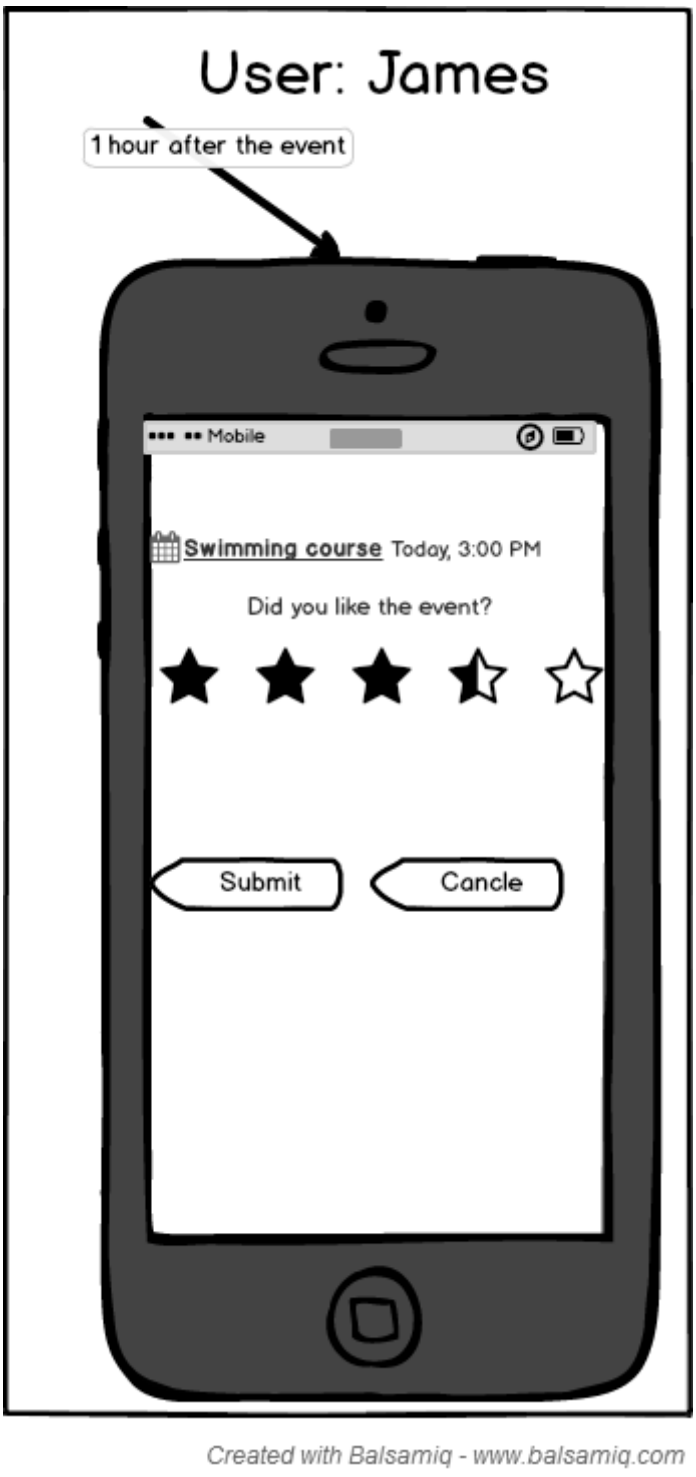

Figure 3: Rate Recommendations on Android Phone Synchronization

After the user choses the rating, the activity can be finished by submitting the form.

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3.2 Setup of Social Groups

ALFRED users should have the possibility to exchange information or experiences with other users.

With the app according to User story 78 “As an older person I would like to use ALFRED to setup social groups of people with similar diseases”, the user can create an ALFRED group with a dedicated subject. Other people from the ALFRED ecosystem can join such a group.

A group has an owner, the user, who has created the group.

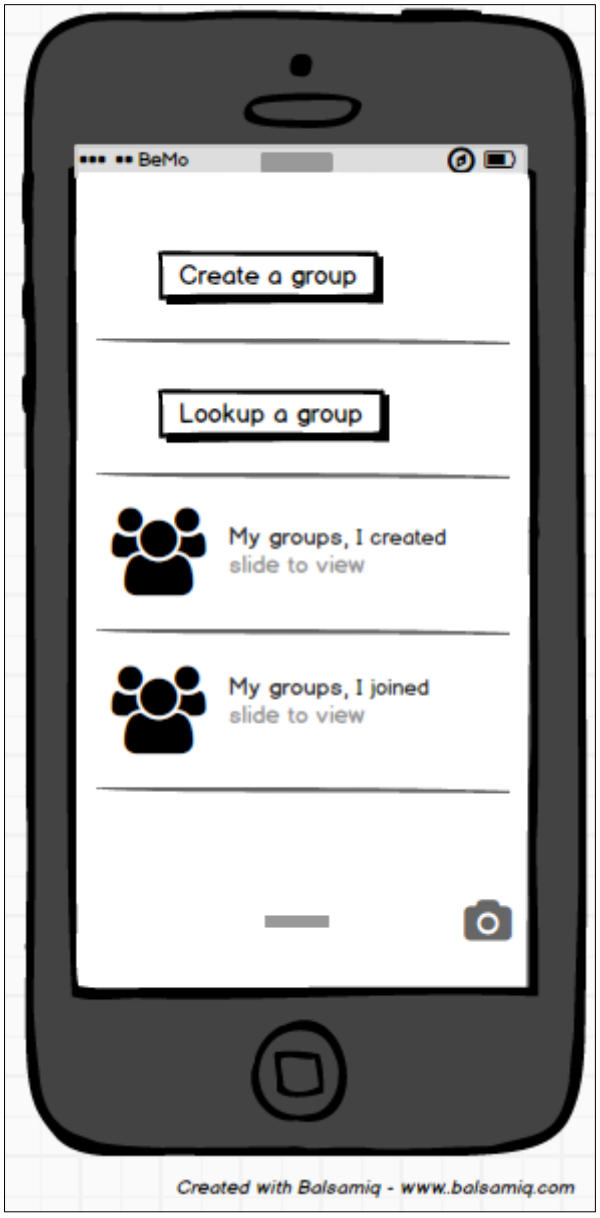

Figure 4: Create a Group on Android Phone

Using CADE or gestures, the user can create a group or lookup for groups as well as join an existing group.

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3.2.1 Create a Group

A user can create a social group within the ALFRED ecosystem. He/she has to add the following attributes:

- Subject, defining the theme (e.g. disease)
- Name (e.g. which disease it is about, together with another naming)

When creating a group, the date and user-ID will be added to the group object within the server component.

3.2.2 Lookup and Join a Group

Users can search for existing groups, he/she is not yet a member of. The list of groups is diplayed with the following information:

- User, who created the group
- Subject of that group
- Name if that group
- Creation date of that group

Users can join any existing group, they not yet a member of. Having pressed the button “Join”, the user will become a member of that group and the screen of Figure 4 will be displayed.

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Figure 5: Lookup Groups and Join a Group on Android Phone

3.3 Organize Meetings with Other ALFRED User

User story 078 “As an older person I would like to use ALFRED to organize a meeting with a group of friends at a certain place” is similar to a calendar entry of a mail-client. A user can enter a date/time, a location and she can select ALFRED users from her list of contacts (from Personalization Manager).

User has to enter date, time, location and select contacts out of list of contacts. When the user submits the form, selected contacts will receive a notification about that outstanding meeting.

Compared to an appointment in a mail-client there is no appointment management with acknowledgements of users, who have accepted or rejected the appointment. For this, the Personalization Manager would have to extend by a feature for appointments.

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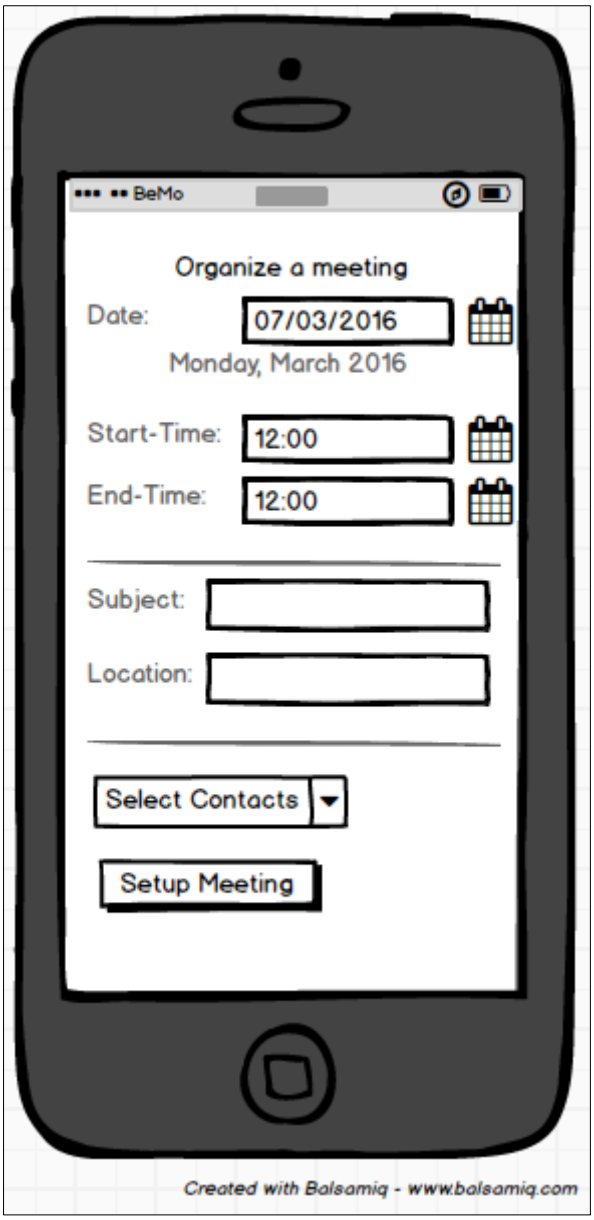

Figure 6: Organize a Meeting with Friends on Android Phone

3.4 Synchronization of User Contacts

US064 describes the ability of the user to synchronize contacts of the ALFRED system with the Android system, so the contacts are stored in the regular callbook. This is important in order to avoid redundancy and to make the usage of the system easier and centralized. Figure 7 shows the mockup for the app in order to fulfil US064. The app screen is structured into three different columns. There are two columns showing a representation of the Android and ALFRED contacts. Those columns are marked with the Android logo (left) and ALFRED logo (right). The centre column indicates the status of the synchronisation as appears in Table 1.

Table 1: Meaning of Status Icons

	Mapping of both contacts is **ok**
	A mapping is **probably found**, but the user has to verify this.
	A mapping is **not possible**

As the reader probably notices, there is an automatic mapping of both systems to assist the user. This mapping depends on several fields that are available in both systems. So if a user in the ALFRED and in the Android system have the same mobile phone number, both users are identical with a high probability, as such a number is unique.

There is also some kind of error detection available. As shown in Figure 7, both systems contain a user which last name is “Peterson”. The user in the ALFRED system has the first name “P.”, which is a short form of “Peter” in this case, and the Android contact has “Peter” as the first name. As the last names and the phone numbers are identical, this mapping needs the users “ok” to be stored.

If all properties are identical, the mapping is marked as “ok” and if a mapping is not possible, it is marked with a red cross.

If a mapping is marked as “ok”, nothing changes during the synchronisation, as both systems hold the same information. If a mapping is not possible, the according entry is synchronized with the other system to appear in both. If a mapping is probably found, the user needs to mark the valid fields in order to create a common entry. In the upper example the abbreviation “P.” or the full name “Peter” could be marked as valid. Depending on the user’s choice, the first name will be “P.” or “Peter” in both systems. To enable the user to perform an individual mapping, a second Android activity is required and shown in Figure 8.

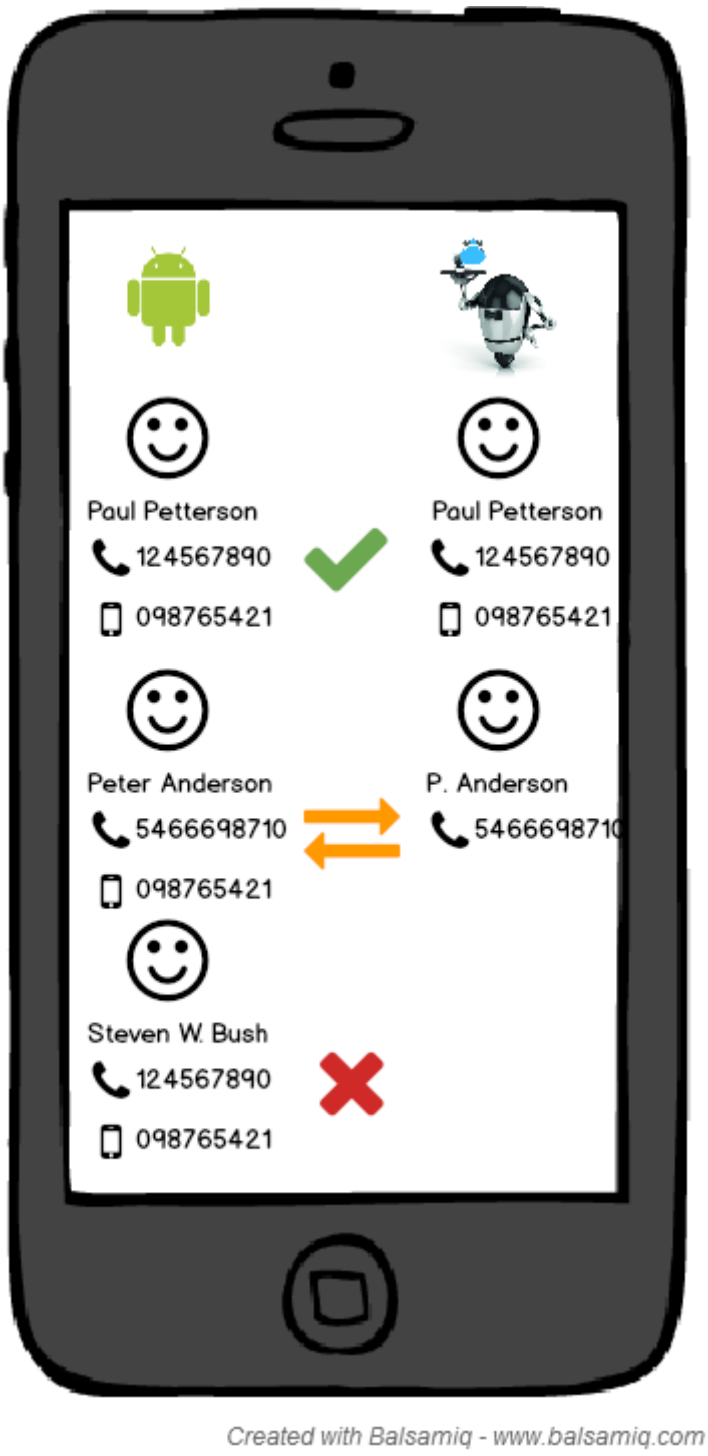

Figure 7: Synchronize Contacts[1]

[1] The Similey is a Placeholder for the Users Profile Picture

The screen shows both contacts again in the upper area. If additional fields are available, those are also displayed. This could be the address of a retirement home or other properties.

To create a correct mapping, the user has to select the correct properties from both contacts. In Figure 8, the user has chosen the name and the phone number of the android contact, but the mobile phone number has been chosen from the ALFRED system. The according entries are marked with a green hook and the equivalent from the other system is crossed out, as it is not used in the future.

The lower part of the screen shows the result of the mapping. Here the new user, that will be created during the process, is shown. The process can be finished by using the according controls at the bottom of the screen.

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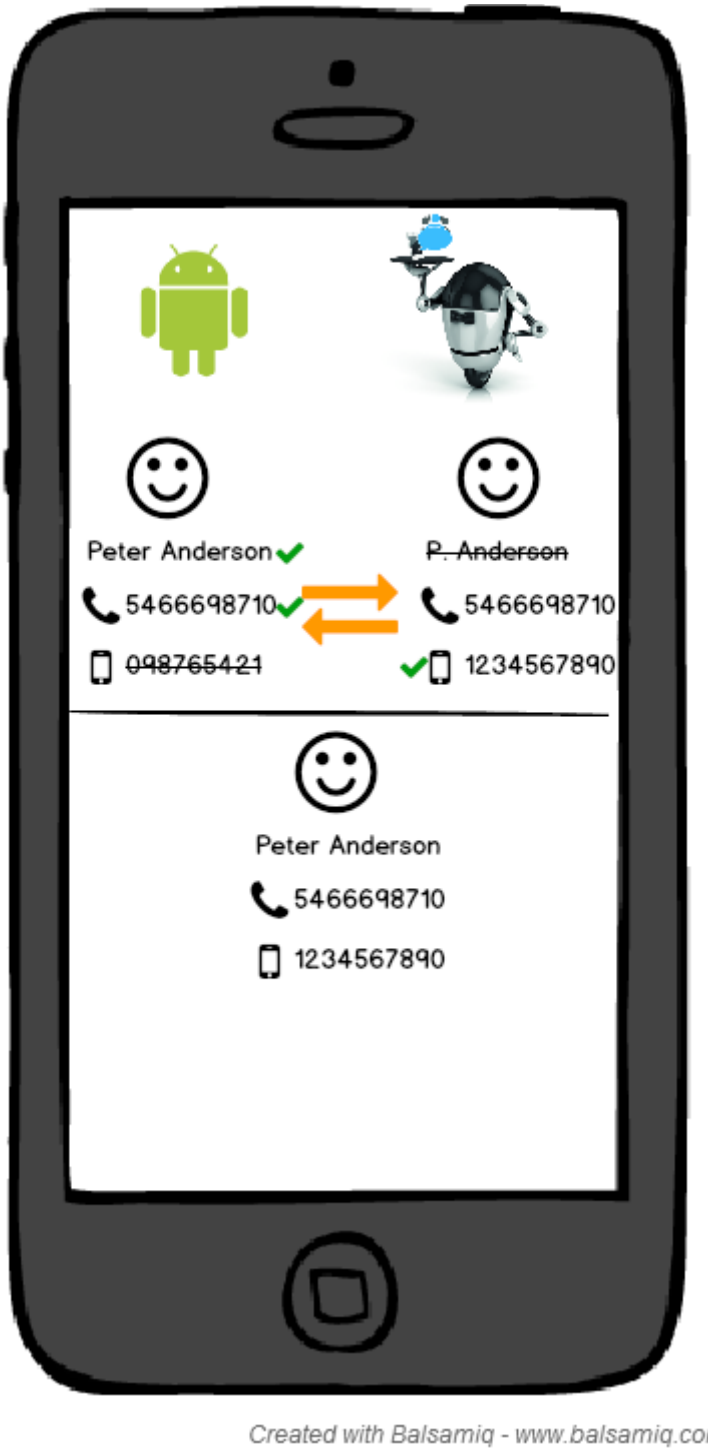

Figure 8: Synchronize Contacts. Manual Mapping of Contacts[2]

[2] The Similey is a Placeholder for the Users Profile Picture

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4 Requirements and Preparations

From a system viewpoint, all apps have been developed and tested on a Nexus 5 Android smartphone with stock firmware and API level 19.

All apps are available within the ALFREDO marketplace.

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5 Deployment (Installation)

The application is installed via the ALFREDO marketplace.

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6 Execution and Usage

The app is included in the Mobile Assistant Foundation / Personal Assistant Service. There is no direct communication with any webservice of the ALFRED infrastructure. Every webservice call is evaluated and wrapped by the Personal Assistant Service.

The contact app and ShowRec are started on demand and used based on the users need.

The RateRec is automatically loaded after the event is over.

Furthermore ShowRec is able to receive push notifications in order to suggest events on demand.

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7 Test Plan

All apps are tested on a low level by using functional tests for the core app functionality and by using integration tests to ensure the communication with the Mobile Assistant Foundation / Personal Assistant Service.

The speech input using CADE can be tested as state in D3.3.2.

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8 Target Performance

Table 2 lists the defined key performance indicators (KPI) for this component:

Table 2: Key Performance Indicators

Topic	Description	Target KPI
Ease of Use	Ease of use is an important topic and performance indicator for this component. Each component owner should be able to use this component without greater knowledge of the connected databases but only with knowledge of the provided interfaces.	Based on a short feedback questionnaire the overall component owner contentment we want to achieve is **90%**. The questionnaire will consider the configuration complexity, integration and usage of the component and it's API.
App Launch / Load Time	All apps communicate with some web service of the ALFRED infrastructure. Therefore the time for launching the app and loading the required data should be reduced to a minimum. Users should be able to launch the app, load new pages and make purchases seamlessly without thinking, *What's taking so long?*	The rate of users that are happy with the loading time shall be **95%** or higher. The questionnaire will consider the loading and launch time of the app and give an appropiate rating opportunity.
Visit frequency	How many times users open the app and interact with your contents? The fact that they have the app installed in their smartphone is useless if they just open it once and for all. Hold frequency in check; the usage during the first week is a plausible signal of what will happen in the future.	If the user really wants to use recommendation to organise the own events, the app should be used on a daily base. The questionnaire will consider the usage of the app and give an appropiate rating opportunity.

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9 Summary

This deliverable has presented the current state of progress in T5.5, which deals with the app building and development for WP5. The deliverable gives concrete screen mockups for the apps of WP5 and provides fully functional results that are completely integrated in the ALFREDO marketplace and therefore also connected to the Mobile Assistant Foundation / Personal Assistant Service.

There are five apps in WP5. Two of them are dealing with event recommendations for the user. Here, the first one gives the opportunity to download a list of personalized recommendations and to accept events. The second apps is used to give feedback for an event. This feedback is used in the recommendation engine to improve future recommendations based on machine learning approaches (D5.4.2).

The third app allows the user to create, manage and join individual groups of users and the fourth app allows to orgazine meetings with various ALFRED users.

The fifth app is used to synchronise ALFRED contacts and the contacts stored on the smartphone.

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