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## Ambient Assisted Living user interfaces

### Document Identification

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## Abbreviations

<i>Abbrev.</i>	<i>Description</i>
AAL	Ambient Assisted Living
AAL JP	Ambient Assisted Living Joint Programme
EUP	End user perspective
SP_CG	Service Provider/Caregiver
SP_DEV	Service Provider/Developer
SP_MC	Service Provider/Monitoring Centre
UI_DEV	User Interface Developer

## Executive Summary

The scenarios presented in this deliverable demonstrate situations and potential benefits of AALuis enabled services for end users as well as for main stakeholders in the area of AAL. This does not mean that we will implement all scenarios we present in this deliverable but some of them. These scenarios are rather meant to explain the ideas and visions of the AALuis project.

At the beginning of this deliverable we describe the process how the scenarios evolved before the illustrated scenarios are presented by means of the various target groups of AALuis and their perspectives to the services: end users, caregivers, monitoring centres and developers. The evaluation of the scenarios happened not only within the consortium but also with the help of participants of the target groups. Methodology and results of this evaluation are reported in D1.3. Overall the attitudes to the scenarios were quite positive especially in terms of demonstrating realistic situations and concerning potential benefits for end users.

# 1 About this Document

## 1.1 Role of the deliverable

The goal of the scenarios is to demonstrate the ideas of AALuis the consortium has. Based on primary ideas of the partners and the results of the requirements analysis as well as discussions with end users the scenarios for AALuis have been created. We decided to illustrate the scenarios in order to assure that the different groups of interest got the same understanding of the service ideas. By this means, scenarios and use cases demonstrate easily how services and user interfaces of AALuis shall support end users and stakeholders.

This deliverable took the results of the user interface analysis (D3.1) and service analysis (D4.1) into account. The scenarios have been discussed with end users and stakeholder feedback was gathered as well. The accordant results and implications are published in D1.3 which has been created in parallel to this deliverable.

## 1.2 Relationship to other AALuis deliverables

The deliverable is related to the following AALuis deliverables:

<i>Deliverable:</i>	<i>Relation</i>
D1.3	The results of the requirements analysis as well as discussions with end users and questionings of stakeholders flow into the development of the scenarios for AALuis.
D3.2	The user interfaces described in the scenarios will be conceptualised and specified in D3.2.
D4.2	The described services are the base for the services we will develop in AALuis and are specified in D4.2.

## 2 Creation process of scenarios and use cases

Scenarios serve to demonstrate project goals and to illustrate use cases in the form of stories about experiences of fictive end users or stakeholders. By this means, every interested person independent of part of the consortium or externals should be able to easily understand which goals AALuis wants to achieve. For this reason existing problems and suggested solutions by AALuis as well as potential benefits of the involved persons are depicted. However, it does not mean that the consortium will implement all these scenarios in project life time.

The process of creating scenarios was broken down into several iteration steps:

- Discussion of first use cases
- Writing first scenarios individually
- Consolidation of written scenarios
- First illustration of consolidated scenarios
- Final feedback of project partners
- Second illustration of consolidated scenarios
- Presentation and feedback gathering of end users and stakeholders

Before every partner created scenarios we talked about various use cases within the consortium. In order to assure that the ideas of each partner concerning services and user interfaces that shall be developed within AALuis were given attention the task of creating scenarios was dispersed among all partners. The task was for every partner organisation to write down short scenarios about possible use cases of AALuis and how the different target groups could benefit. Finally, each partner wrote at least one scenario either out of the view of end-users or the various stakeholders' perspectives. In total 19 scenarios have been written: 7 out of the end users' perspective (EUP), 7 out of the service providers' perspective (SP) and 5 out of the developers' perspective (DEV). Examples of the first written versions can be found in Appendix A. The three mentioned perspectives reflect the main target groups of AALuis.

Based on first results of the Cultural Probing to analyse end user needs (see D1.3) we were able to start consolidating and summarising the written scenarios. Finally, we ended up in having 11 scenarios – 3 EUP, 5 SP and 3 DEV. As services can be provided in various contexts within a high diversity of offers we distinguished between monitoring centres, caregivers and also developers. Partly services and devices come up in several scenarios as situations can be described out of different perspectives. For demonstration purposes and for creating a better idea of which goals the AALuis project wants to achieve we illustrated these scenarios in comic style.

The created illustrations and textual description have been iterated within the consortium again in order to assure that the scenarios transport the messages of AALuis. For this reason some illustrations were updated or changed completely. At the end, the scenarios were finalised in consent with all consortium partners. Afterwards we were able to present them to end users and stakeholders. Methodology and results are reported in D1.3. The reactions on the scenarios were quite positive especially in terms of demonstrating realistic situations and concerning potential benefits for end users. Sceptical participants were mainly concerned about realisation aspects and costs. Substantial adaptations did not become necessary for the moment.

### 3 Illustrated Scenarios

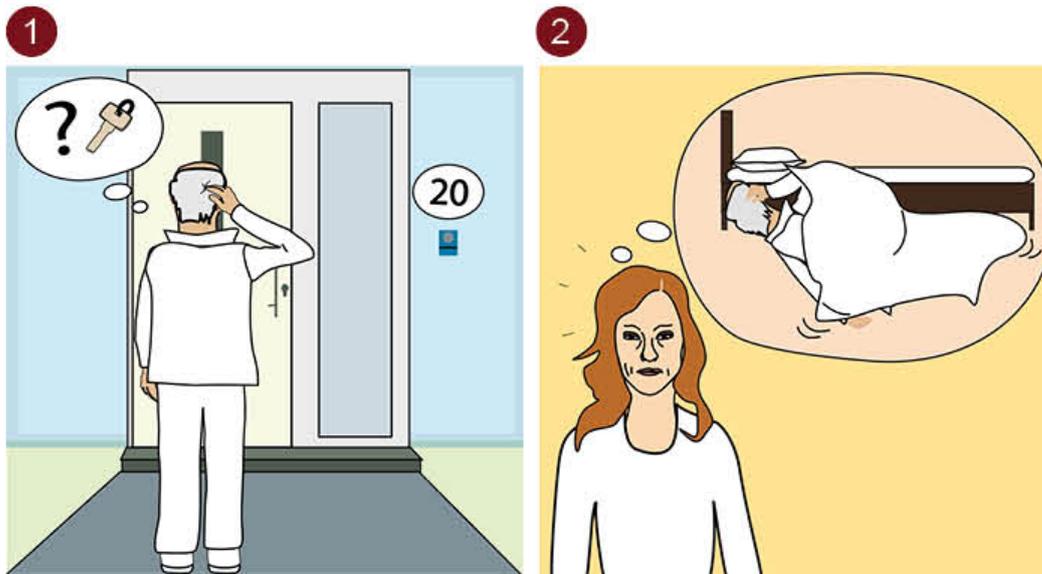
In this section we present the illustrated scenarios of AALuis that are arranged like storyboards. Key frames are depicted graphically and additional text connects the pictures and tells the complete story. The graphics have been designed in comic style which allows directing the attention to important details. First, the three scenarios out of the end users' perspective are shown, then there are five scenarios out of the service providers' perspective, and finally we present the three scenarios out of the developers' perspective.

#### 3.1 Scenarios out of the end users' perspective (EUP)

In these scenarios typical situation and living circumstances of older people as the end users of AALuis are covered. Potential services and control devices of AALuis are introduced that could support older people to remain living independently in their homes, to reduce loneliness and to decrease health problems. While the first scenario applies mainly for user group 2 and the third one mainly to user group 1 (see detailed definitions of user groups in D1.3), the second scenario contains aspects of both end user groups.

##### 3.1.1 EUP\_1: John, 75

### John, 75



John is an active widower. With his 75 years he is still fit, living alone in an autonomous way and he tries to stay as independent as possible, even though he has got some problems with arthrosis. Due to his high blood pressure he has to take antihypertensive drugs on a regular basis. Sometimes it may happen that he faces his front door locked, because he has forgotten the key.

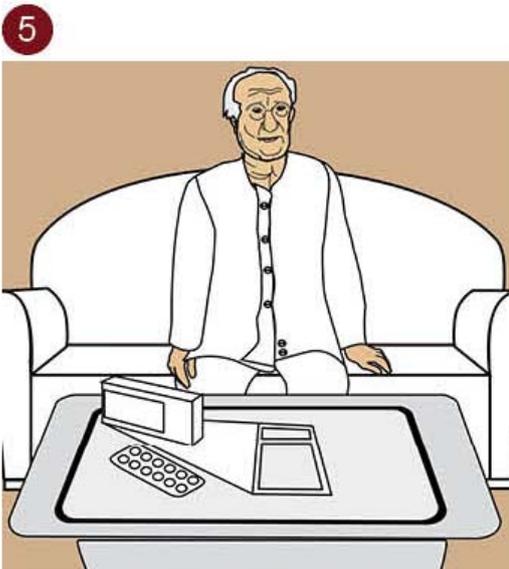
His daughter Mary lives in another city. As her father told her, that he sometimes forgets to take his medicine, she is concerned about his health situation. What if he forgets to turn off the stove or the water? Mary is also worried that her father who often gets up at night could fall in the apartment and could not be able to stand up by himself. Thus she looks for a health support system and arranges an assessment meeting with a care organization at Johns home.



Peter from the care team visits John and Mary. Together they fill in a questionnaire about John's abilities, needs and wishes. By this means, also the need for smart home assistance is discovered due to his arthrosis e.g. to handle windows and blinds. Also a telecare solution for his blood pressure monitoring and a fall detection application would be helpful. Peter recommends a system that is extendable and adoptable to the possibly changing needs of John.



The care organisation provides a set-top box which organises services at the patient's home. So for John just the best way of interaction with the system has to be found. As the system is based on the AALuis Middleware and Interface Layer, many different kinds of user interfaces can be applied. Peter looks at the AALuis Personas Database, which contains a collection of European stereotypes of users and their abilities, and selects the best fitting one to John.



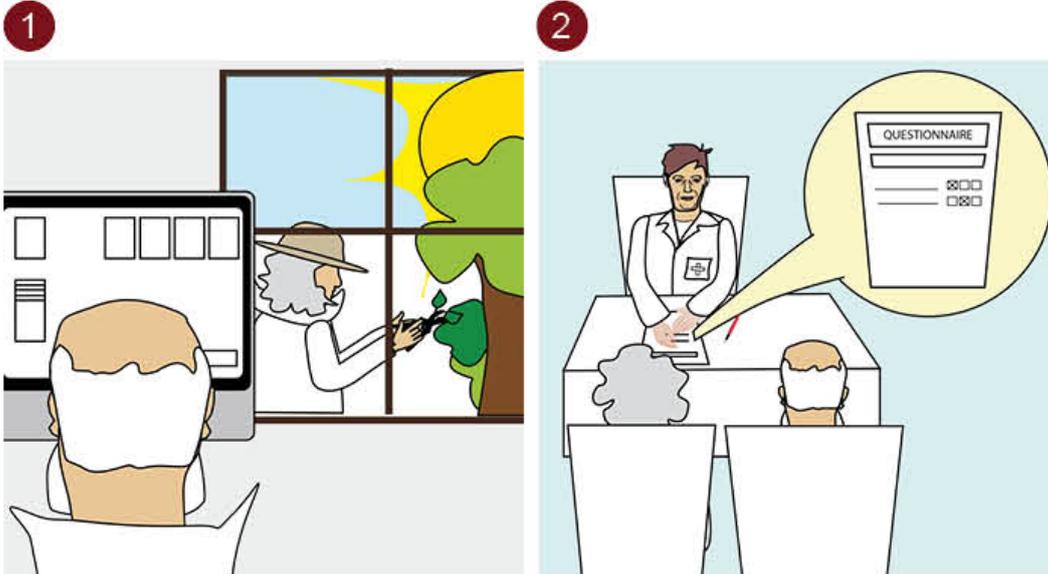
In the best fitting "Persona story" a touch table is used for the user interaction at home. Installed smart home components can be operated by touching a symbol on the table. The table can also be used for playing cognitive games or reading the newspaper in large print. An intelligent sensor system allows the interaction with objects around. When for example the medication box is placed on the table, the medication instruction is given immediately.



In the monitoring centre Peter can observe the health status of John and in case of deterioration or emergency he can prompt necessary interventions. An alarm will be sent to the monitoring center and a two-way speech connection between John and the monitoring center agent will be available. If John does not respond, the monitoring center agent will also be able to call his daughter, the hospital or a nearby homecare nurse.

### 3.1.2 EUP\_2: Getrud, 81 and Alois, 79

## Gertrud, 81 and Alois, 79

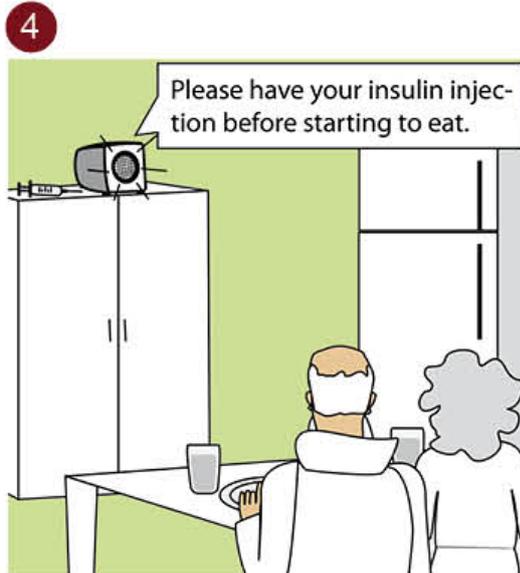


Since Alois has been retired he is a rather lazy person. He spends a lot of time in front of his computer playing strategy games or surfing the Internet. Alois and his wife Gertrud live in a nice house with garden. However, Gertrud, who is 2 years older than Alois, does most of the housework on her own. They both have diabetes for more than 8 years. Gertrud prepares meals according to their diet, but sometimes she forgets to give herself the insulin injection before eating, and her husband has to remind her.

Dr. Hibbert informs Gertrud and Alois about the supportive ICT-services AALuis offers. Both of them understand that those are just for their own comfort and that they are not affected in their daily routines and can remain living in their house. As the problems of Alois and Gertrud are quite common to third-agers, AALuis offers personas to provide some basic modules that can be easily adapted to single persons and their special needs. In an interview Dr. Hibbert asks Gertrud and Alois some standardised questions to figure out which personas fit best.



After installing the AALuis system in their home, a well-trained advisor explains Alois and Gertrude the functionality and advantages of the system. An example: Gertrud hardly used her blood glucose meter because she cannot read the output values properly. Instead of having to read the measured values, the information is now given via loudspeakers which have been installed recently to make Gertrud and Alois hear the telephone ringing in the whole house.



The same speakers remind Gertrud and Alois to have their insulin injection before every meal, whenever they both sit down at the dining table around eating times and before going to sleep.



To remind Alois of his need to go for a walk, AALuis provides an avatar for his computer which looks a bit like his granddaughter. Additionally the avatar reminds Alois to take his beta-blockers enhancing his heart-activity and to measure blood pressure regularly. The measured parameters are transmitted to the monitoring center and Dr. Hibbert can easily compare Alois' health values.



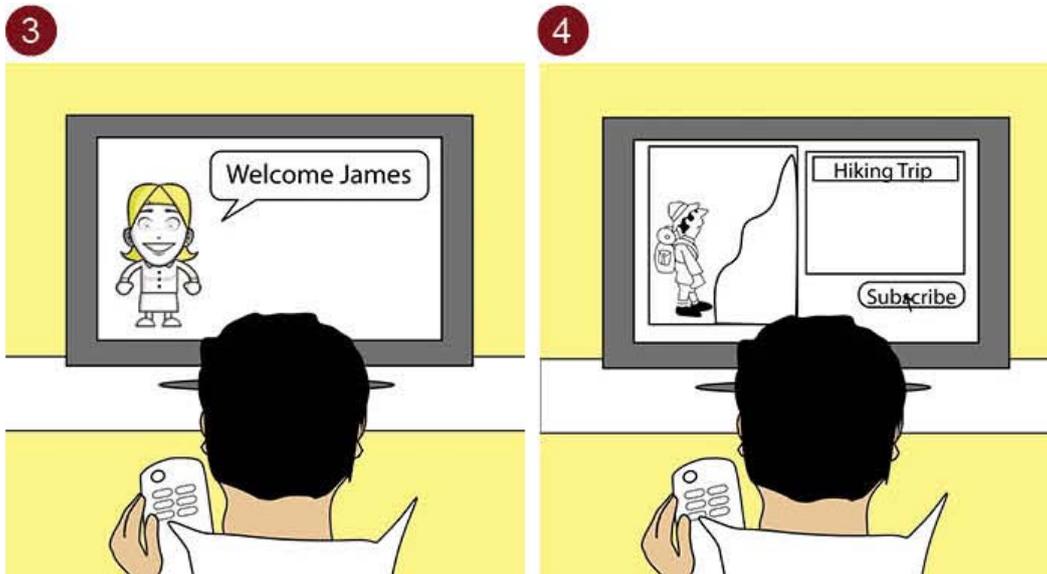
The GPS-sensor and the accelerometer in his watch or phone respectively measures his activity and sends it to the control system. When Alois does his exercise well, he earns access to a new level in one of his preferred strategy games. Whenever Alois went for a walk and comes back he gets some applause from the granddaughter-like avatar to give him some positive feedback.

## 3.1.3 EUP\_3: James, 68



James is 68 years old. He has been retired for 3 years and he has been living alone in his small apartment since his divorce 15 years ago. He is generally in good health, although he needs glasses to read newspapers. James has always been an active person. However, since his retirement he found that he is spending less and less time with other people and gets bored more often.

He complained about this to his son Eric, who signed him up with a social network service for older adults where collective activities are organized. Access to this service is offered through many different channels: smartphones, internet, tablet apps, etc. James chose to enable the service on his TV. He is used to the remote and teletext that he has been using for many years, and he never cared much for computers.

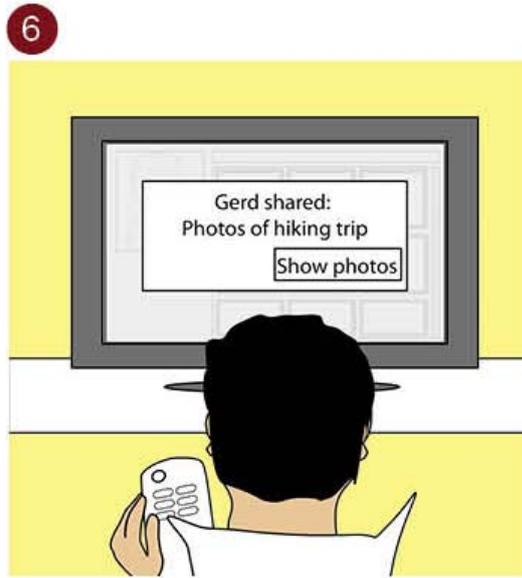


Whenever James wants to access the networking service, he just switches the channel to the social network service and selects it. An animated avatar, representing a friendly hostess, welcomes him. James found this very amusing during the first days of use, even talking back to the hostess, but these days he just wants to quickly see social events coming up.

The service “learned” that James is already an advanced user and keeps avatar messages short and to the point. James lists the upcoming events. He sees that one of the events is a hiking trip. He decides to subscribe for it.



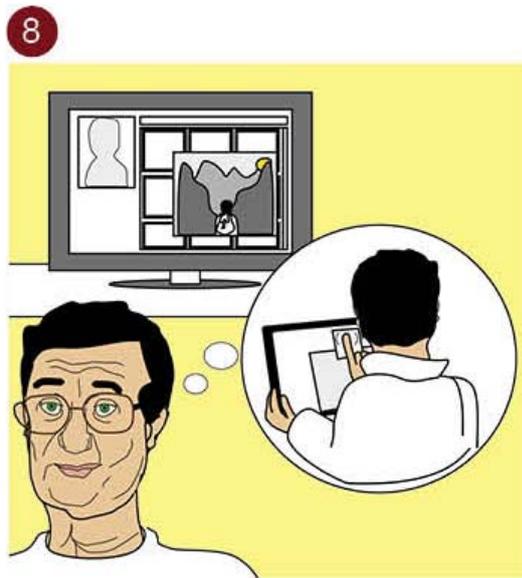
5  
Some days later James and other subscribers meet for the hiking trip. They spend a great day together in the mountain nearby. Some participants take photos and later on some connect themselves at the social network service.



6  
One day James sees that he has got a message regarding the hiking trip. One of the people who were there is informing him that he placed a couple of photos from the event on the picture sharing service. James selects the photo sharing service and finds the photos. He browses through them easily with the remote control.



7  
Later that afternoon, Eric pays him a visit. James offers to show the shared photos of the hiking trip. His son turns on his tablet computer and connects to the home network. He can now interact directly with the TV in his preferred way. Because the touch-screen is synchronized with the TV, James and Eric can now use the tablet computer to browse the photos on the TV.



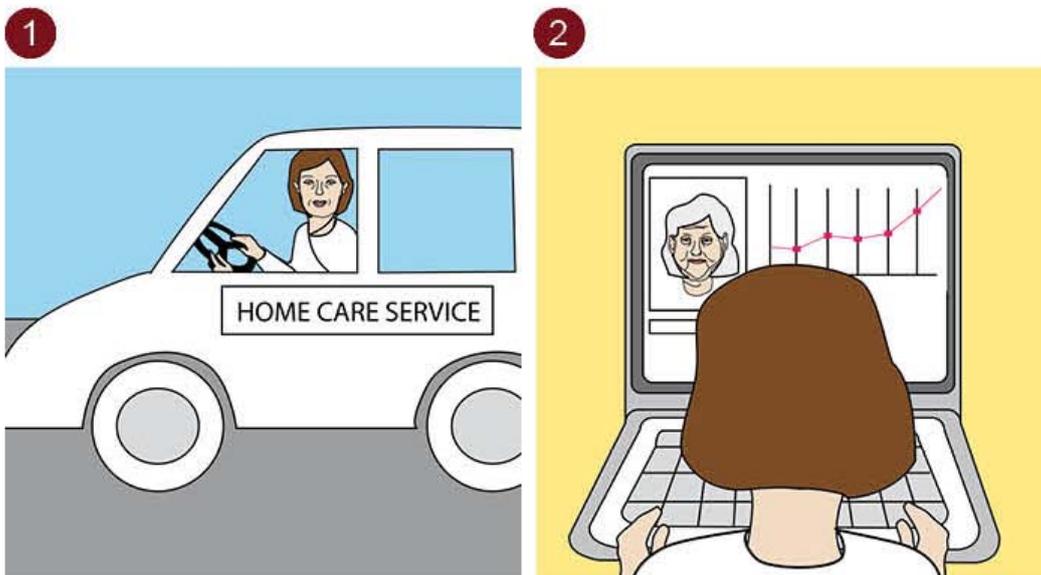
8  
James realizes that he likes this way of interacting with his TV services and asks his son if he could get a device like that to use in the future. Thanks to AALuis the replacement of the remote control in favor for a tablet is no problem.

### 3.2 Scenarios out of the service providers' perspective (SP)

The most important stakeholders of AALuis are service providers that try to offer solutions to a broad range of end users. These services shall support older end users to remain living independently at home, to reduce loneliness and to decrease health problems. In these scenarios potential advantages of AALuis are presented firstly from the point of view of caregivers (SP\_CG) and secondly from the point of view of a monitoring center (SP\_MC). The fifth scenario in this section is from the point of view of service developers (SP\_DEV).

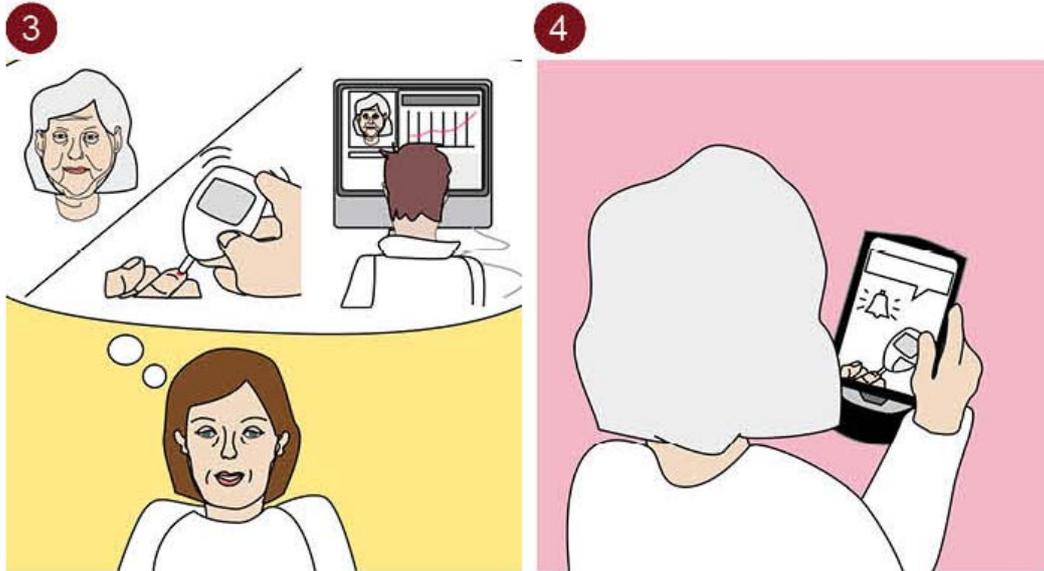
#### 3.2.1 SP\_CG\_1: Health Monitoring Service

### Health Monitoring Service



Angela is home care nurse and offers her clients medical support at home. A lot of Angela's clients suffer from chronic diseases (eg. hypertension, chronic arrhythmia, diabetes). She visits her clients on different time intervals, some clients are visited every day, others once a week or bi-weekly. Furthermore Angela represents home care nurses in a Services Innovation Group, where new service possibilities are explored and discussed.

During client visits Angela measures the accordant vital signs to evaluate if everything is alright and gives some advice. Because the conditions are chronic it is difficult to give an indication on just a single measurement. It will be much more accurate if the doctor has a clear view on the development of the previous weeks. However, the software of the monitoring centre is not compatible with the application of the doctors' and so she has to send the data manually.



Angela discusses the possibility of enabling clients to monitor their health on a daily basis and to save health data in a central database which can be directly supervised from a monitoring center. For the clients Angela cannot visit frequently health thresholds could be defined and if a measurement exceeds these thresholds an alarm could be generated to the monitoring center.

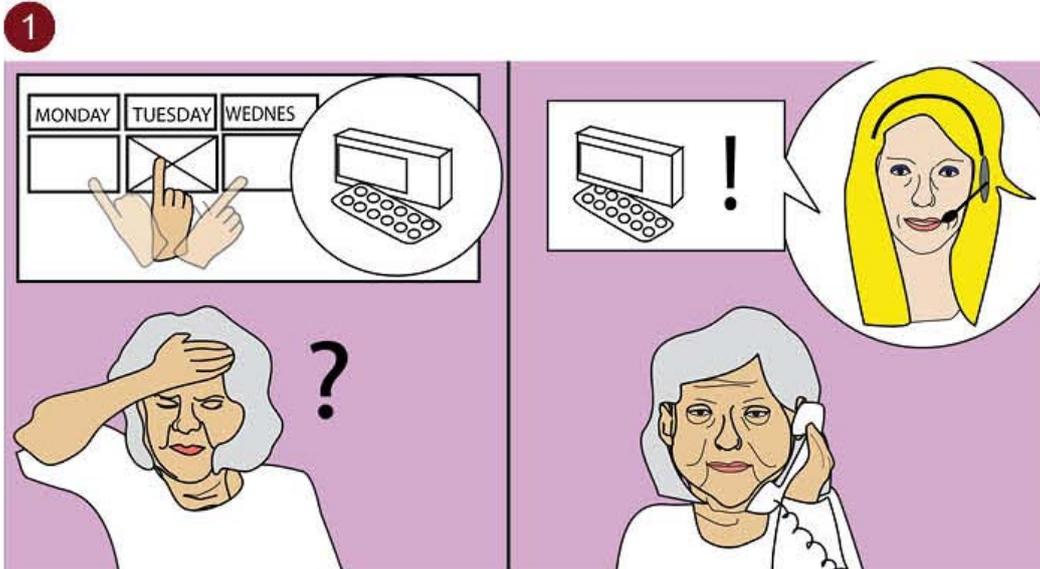
Clients individually or with support from Angela will take measurements regarding their chronic disease themselves. The measurement data will be transferred to the clients health record. To assure measurements are taken frequently, measurement reminders can be defined and prompt the clients accordingly.



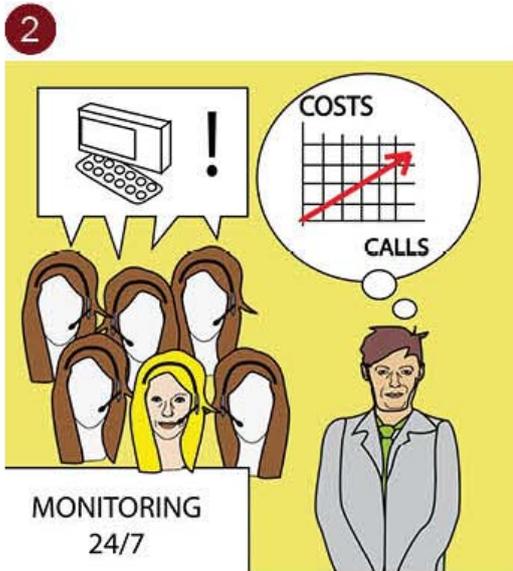
Ease of use and flexibility on user interfaces are crucial to meet the way elderly could monitor their health themselves on a regularly base. The measurement device (eg. blood pressure monitor, gluco monitor, weightscale) connects automatically to an accordant pc, tablet or mobile phone. On the desired device there will be an application which enables the client to perform and send measurements. Additional video material could be available on the device to assist the client to take a measurement properly. By using this AALuis **Health Monitoring Service**, Angela and the doctor have the possibility to detect upcoming health problems much earlier and can react accordingly in good time.

### 3.2.2 SP\_CG\_2: Medication Reminder Service

## Medication Reminder Service



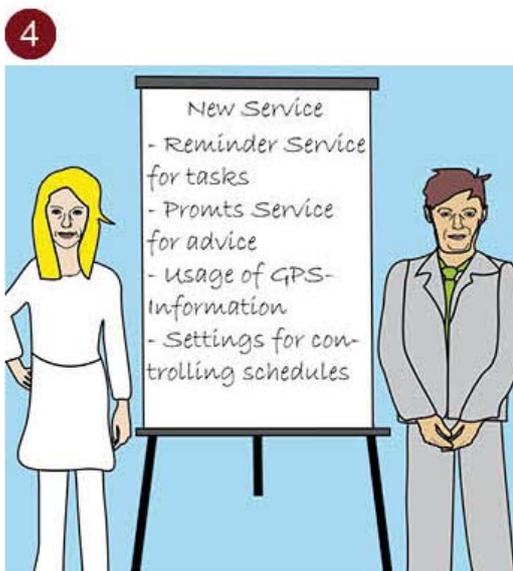
Jennifer is working at *Care@Home*, a provider of homecare services which is 24/7 available. During the day Jennifer handles various calls, from regular homecare questions to emergency calls requiring immediate action. Problems vary, but often concern age-related forgetfulness, Mild Cognitive Impairments and increasingly to some type of depressive symptoms. If their need for assistance is not met adequately, it could mean having to transfer the customer to a nursing home. The professional staff can support the customers overthere, however staying at the nursing home is very expensive and often not necessary as there are often rather small problems e.g. taking medication frequently.



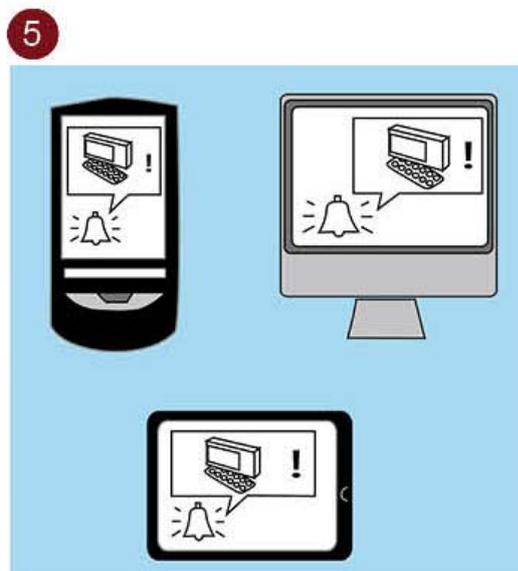
Eric, the manager of the centre, aims to optimise the usage of the centre's capacity. He knows that there are a lot of innovative technologies available which could enable the monitoring centre to expand the services offered to their clients. Eric is exploring new business opportunities for some time now but it seems new products are highly technology driven and proprietary. Additionally, as Eric knows from his customers, they are rather care-stigmatized.



At a seminar Eric finds out about the AALuis platform which enables him to offer numerous services from comfort to care. Eric is enthusiastic about this approach because he and his clients can keep their freedom of choice and don't have to make substantial investments in technology while being bound to one supplier. Since AALuis offers interfaces that can be implemented by any care centre software, it should be very easy to connect to *Care@Home*.



One of the main benefits of AALuis the flexibility to add other services if necessary. For example, if a client uses one AALuis service and starts suffering hypertension, an AALuis bloodpressure management service can easily be added and is automatically implemented within the care centre as well. For their new services Jennifer and Eric construct four rough scenarios.



One use case of the Reminder Service is to remind customers at their medication. With the new **Medication Reminder Service** a medication scheme (day/time/medication type/dose) is provided by one of the care consultants of *Care@Home*. The reminder application can be used on a cell phone, touch screen, home phone or television screen. This creates flexibility and freedom of choice for end-users.

### 3.2.3 SP\_MC\_1: New Good Morning Service

## New Good Morning Service



Julia works as a social innovation manager in a telecare team of a monitoring centre. Some years ago the centre has introduced the Good Morning service that has become very successful. Within the service, operators call clients in the morning between 6 and 9 o'clock for a short chat to ask if the older person has gotten out of bed, got dressed, has any plans for the day, and so on.

However, this puts quite a burden on the monitoring centre in the morning and Julia is looking for a more community oriented approach. She wants to connect small sub-groups of older persons already contacted with their original service, making them part of a 'Good Morning Coffee Community'. After some investigations she finds the AALuis platform providing the technical infrastructure for her idea.

3



Together with Eric, the manager of the centre, Julia elaborates the necessary information channels. By utilising the AALuis Middleware the new service remains independent of any concrete user interface. This allows the users to choose their preferred UI. So the monitoring centre is relieved of the concern of defining the right user interfaces.

4

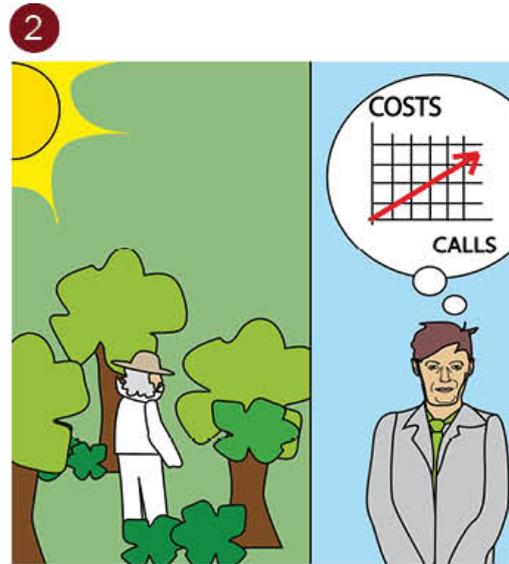


Instead of being called by the monitoring centre Erwin, Martin and Stuart now get in contact directly using a touchscreen table. Erwin gets up, dresses and prepares himself a coffee. When arriving at the table, Erwin sees Stuart's 3D coffee cup picture already there. Erwin gets a one-line message from Stuart: 'Morning Erwin: check the football news!' Erwin touches on the newspaper icon and starts to read the personalized news. Later on Martin's coffee cup appears on the touchscreen table as well and Stuart asks him via video chat if he is alright. Yesterday, Erwin got up very late. The monitoring centre did not recognise his coffee-cup on the table and called him to check if he was fine.

## 3.2.4 SP\_MC\_2: Intervention Service



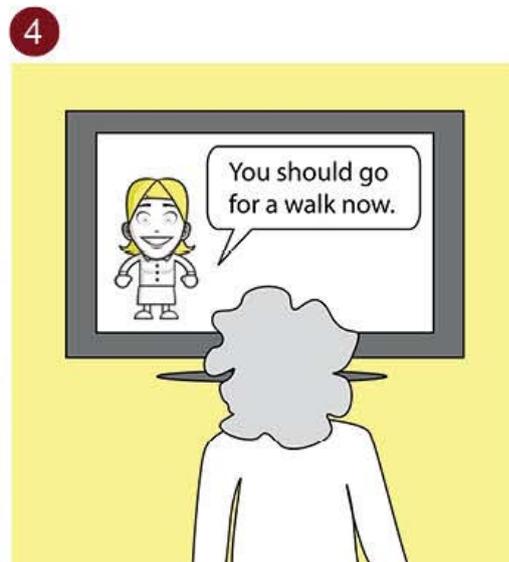
The monitoring centre *WeCare* targets elderly people who live independently and already receive homecare assistance. For this group especially loneliness and correlated problems are reported. Interventions in form of frequent phone calls to these elderly can stimulate social and healthy activities.



Eric, the manager of *WeCare*, is aware that there is no budget for these frequent phone calls on a longer term. After some investigations he finds out about AALuis, a platform where new services can be easily plugged into a range of various user interfaces. Offering an intelligent avatar-based digital personal assistant (see TV screen at Figure 4) is a method that could help to combine personal contact with cheaper digital forms of interactions.



Together with his colleague Nancy who is a service developer, they elaborated this service idea. Nancy refers to the AALuis documentation where is explained easily how to define the data structures and input/output channels. These can then be plugged into the AALuis Middleware, allowing the users to choose their preferred UI for the new service. So Nancy and Eric are relieved of the concern of defining the right user interfaces – these can evolve separately.

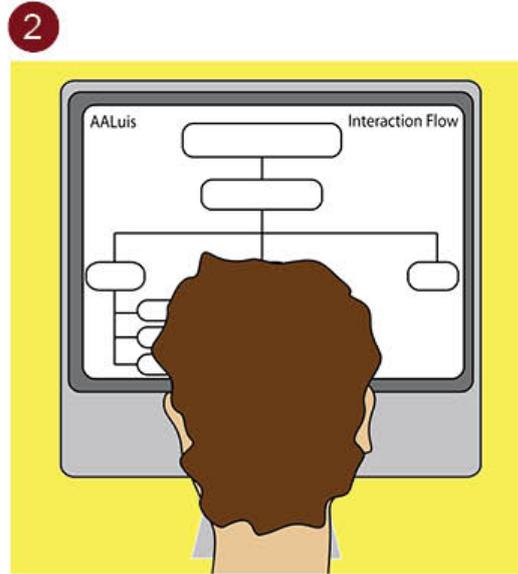


What Eric especially likes is that also new upcoming devices can be supported quickly. Mainstream tablets can also offer the new service so AALuis may help to reduce the average age of the end users. Up to now, elderly people often become clients of the monitoring centre after significant problems have already occurred. New lifestyle features could help here, too.

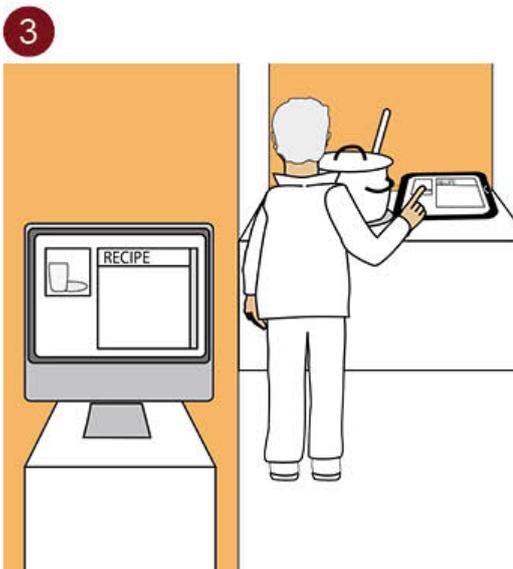
### 3.2.5 SP\_DEV\_1: Brian, Service Developer



Brian works for an organization providing various services that aim to improve quality of life for elderly. His job is to implement services and to make sure they work on all devices their clients use. In order to make his job easier, he relies on the AALuis middleware to connect the developed services to various user interfaces that have been developed by other people. A new service that Brian has been working on is designed to help elderly users keep track of their diet.



Healthy Diet consists of a database saving recipes and algorithms to recommend recipes that are healthy and correspond to user's preferred food. After implementing these two things, Brian builds a basic interface and data structures. He also defines the basic interaction flow that helps UI developers to make a consistent UI across a broad range of platforms.



At the end, the user has the possibility to access *Healthy Diet* from various devices. This is especially important for this particular service, as users need to report their food frequently after eating. This usually happens in various contexts e.g. at home, in public space or when visiting friends. Thanks to AALuis they don't have to learn a new user interface every time they access a different device.

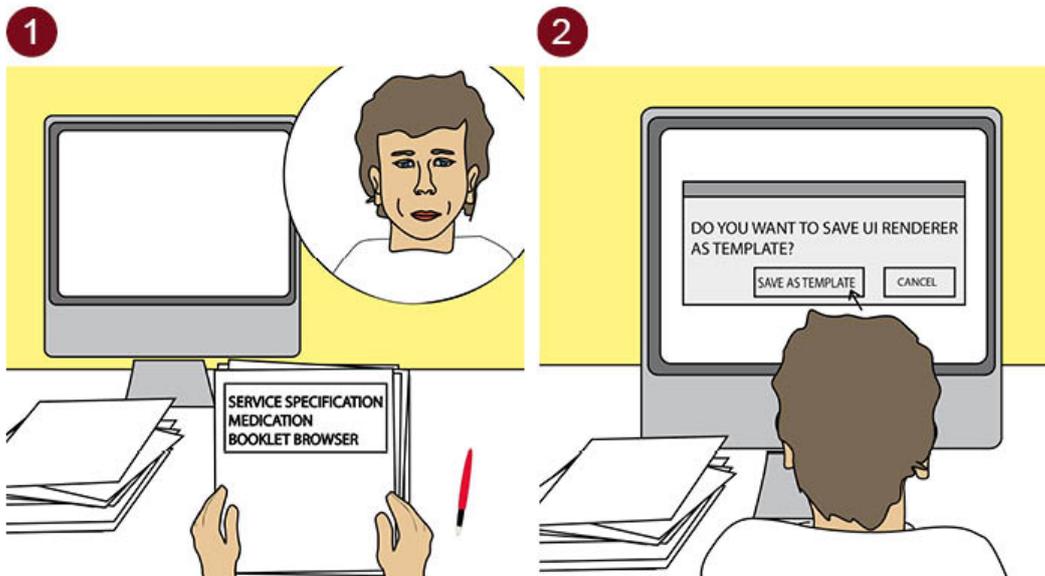
The service also works offline and synchronises automatically when the user connects to a network. So if a user enters accordant diet information on the go the online database updates itself as soon as possible and provides the information on all devices.

### 3.3 Scenarios out of the user interface developers' perspective (DEV)

Another group of AALuis' stakeholders that should benefit largely from the new middleware are user interface developers. AALuis wants to help them to easier satisfy special needs of older people and to access a broad range of services with newly developed user interfaces.

#### 3.3.1 UI\_DEV\_1: Robert

##### Robert, UI Developer



The UI developer Robert receives the specification of a new service, the medication booklet browser. The specification of the service declares the information that will be exchanged during the service provisioning and the functions that will be called. The working steps of Robert are now:

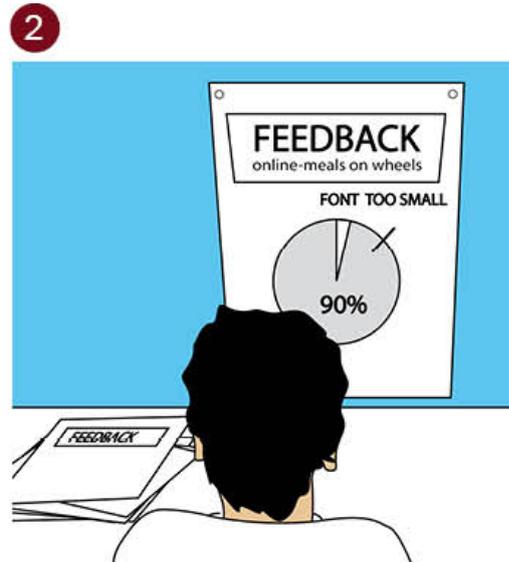
- Assign I/O data to information classes
- Assign each information class to a group of UI elements
- Create UI renderer for each target device

The first two steps are only needed once. Robert received the information classes and the service specification and will re-use the assignments to UI element groups. The developed UI renderer will serve as template for future UI renderers. It depends on the target technology, e.g. Android, and device properties. In this case, Robert installs the Android IDE and implements the application providing the service on a specific device. For the next services he will use this application as template.

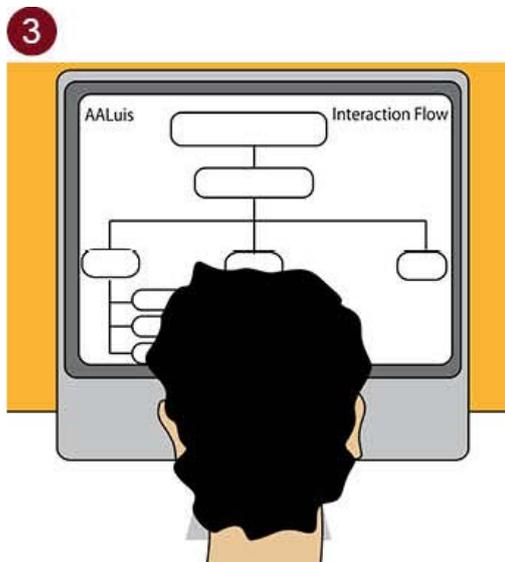
## 3.3.2 UI\_DEV\_2: Albert



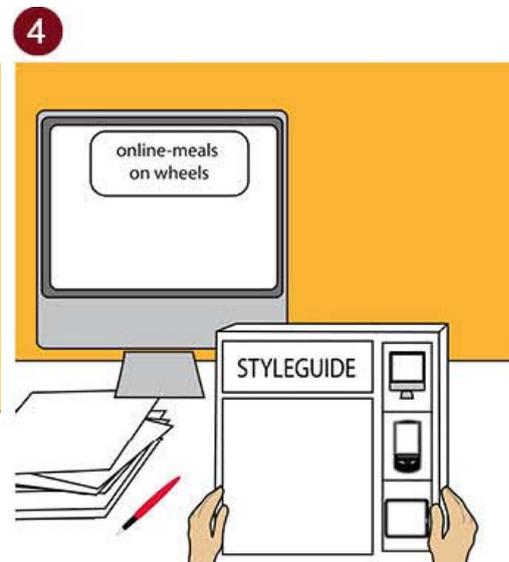
Albert, a software engineer, is part of a development team at *servIT* providing IT services to health care providers. He has a strong background in user interaction and interface design, and is responsible for the front end developments of the company's *meals on wheels* service. Like all the services in *servIT*'s portfolio, it is based on the *universAAL* middleware.



While *meals on wheels* is a great success, negative feedback from users with bad eyesight occurs with increased frequency. *ServIT* decides to create a special UI for this group of people. As this special user group is not exclusive to the *meals on wheels* service, Albert wants all services to benefit of the new UI. Since this would mean a multiplication of additional effort for each service, he uses the *AALuis User Interface Layer* which can be connected to all services.



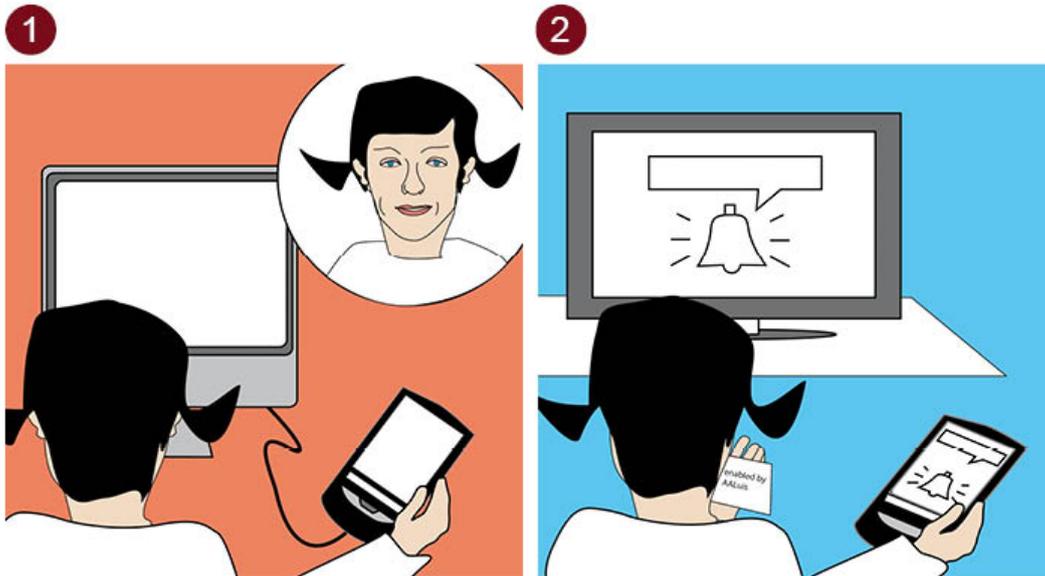
On the AALuis homepage he downloads the *AALuis Layer Starter Package*. He follows the documentation and is able to deploy the AALuis layer easily. Albert describes the user interaction of the *meals on wheels* service in terms of the *AALuis User Interface Layer*. The online developers WIKI, is of great help for this task. He takes the newly described service for a test run and AALuis created a generic user interface for the service successfully.



In cooperation with the health care providers, who know the needs of the newly addressed user group, Albert creates a style guide for people with bad eyesight. Based on this and an open source example user interface, Albert creates the new user interface. This is usable also for all other services that are connected to the AALuis Middleware.

### 3.3.3 UI\_DEV\_3: Alma

## Alma, UI Developer



Alma is a mobile devices enthusiast. She wants to use her preferred mobile operating system for AAL services in the home environment. As her resources are limited she tries to find a way to adopt existing services for her mobile device. Since her father already uses *UniversAAL* based services on a TV, she decides to implement the user interface and reminder functionality on her smart phone, using the device's native notification services.

On the AALuis homepage she downloads a sample UI. After reading its source code she creates a user interface description, based on the device she intends to use. She implements the AALuis interface capable of the minimum requirements of the service, and is now able to receive notifications on her phone, originating from her father's reminder service.

## 4 Conclusion

The scenarios presented in this deliverable describe potential services and situations where AALuis could support the various target groups of the project. This does not mean that they will be realised in the presented way. Further elaborations of features, services and user interface might emerge in the specification phase of the project. The goal of the project is to offer a new solution of connecting services and user interfaces easily to raise the spread of helpful AAL services and to support innovative ideas in both areas. As a consequence, these activities will allow older adults to remain living independently at home for a longer time and to support them by pursuing their interests. The presented scenarios serve as examples for this and for the corresponding necessities in the background.

## **Appendix A Examples of first written scenarios**

### **A.1. Mary (75)**

Mary is a 75 year old senior living on her own. Her husband Peter unfortunately died 2 years ago. She managed to live on her own quite well but Mary recently has started to develop some physical disabilities (difficult to walk the stairs, some balance problems etc.). Although moving around is becoming a bit more difficult, Mary has a strong wish to stay in her own home.

Alex, Mary's son, is living in a small town 50 kilometres away from his mother. He understands the wish of his mother to stay in her own home but is also worried something will happen to her. And more important that she is not able to call for help.

Alex contacted the regional homecare organisation to explore the possibilities of someone looking after his mother and supporting her if necessary. The care consultant advises Alex and Mary to start using a mobile alarming application with an integrated fall detector. The system is based on the AALuis platform where a wide range of services is available. With the alarming application Mary is always able to push a button and call for help. But if she is unconscious after a fall and therefore not able to call for help by pushing the alarm button the fall detection system will automatically generate an alarm.

The alarm will be sent to the monitoring centre and a two-way speech connection between Mary and the monitoring centre agent will be available. Because it is a mobile application, Mary can also use it when she goes outside the house. Therefore a GPS functionality is available which sends the positioning data with the alarm. The monitoring centre has every information about Mary, and will warn Alex or the neighbours to bring help. If Mary is not responding the monitoring centre agent will also be able to call the hospital or a nearby homecare nurse.

All the AALuis solutions are modular accessible and do not need to be bought at the same time. Because these services are connected to the AALuis layer Mary is free of choosing the interfaces she wishes to use. (TV, Ipad, Touchtable, Mobile, etc.).

### **A.2. Eva and her mother Gerda (80)**

Eva's mother Gerda (80 years) lives alone in her household. Because of the distance to their own home she can visit her only on weekends which is true also for her sisters. Although Gerda gets along very well, she can move and need some outside help only for household activities and for medical care, Eva has an increasingly bad conscience, to leave her mother at home alone.

Unfortunately Gerda is a little forgetful, so it may happen that she faces her locked front door, because she has forgotten the key. But what if she forgets to turn off stove, or the water? Also that her mother, who gets up often at night could fall in the apartment and could not stand up by herself, does worry Eva.

Eva would also like to know more about Gerda's health situation, such as high blood pressure or other health values. She also would like to be sure whether Gerda takes her medicines regularly. Eva wonders if she can leave her mother in the future alone at home or if she must organize a 24-hour care or a nursing home place. On one hand her mother does not want this on the other hand both solutions are very expensive.

With the help of Hilfswerk Eva learns that there are existing technical possibilities to facilitate a longer stay at home and give the relatives more security. AAL is the key word for this. And at present in the AALuis project, a very simple user interface is tested. She registers her mother as a test user.

### **A.3. Alex, IT developer**

Alex is an IT developer and his company *InnovIT* is dedicated to the application of Information and Communication Technologies (ICT) to the fields of public health, quality of life and social services.

The company is very interested in AAL services and decides to use the *universAAL* Developer Depot to create new AAL services. For that reason, developers follow the instructions provided at the Developer Depot. The first step is to download Eclipse with all the required extensions described at the Developer Depot and install the AAL Studio from Developer Depot. After that developers could choose in Eclipse this specific kind of new project called "New AAL project" that help them out to start.

Alex wants to develop a Nutritional Service and selects the option "New AAL service" that allows developers to browse through a list of service templates and selects a specific one that fits with the service he wants to develop. The necessary skeleton files for developing the service are set up as files in an Eclipse project. Besides the Eclipse IDE provides a workspace for storing all *universAAL* services, so Alex can manage all projects related with *universAAL* easily.

After one month of using the service, Peter (the end user) receives an invitation to fill-in a questionnaire for giving his feedback. He decides to accept this invitation and give his feedback about his experience with the Nutritional Service and its usefulness to him. Peter fills in an online questionnaire regarding his experiences with the service. As a developer of the service, Alex receives this feedback and analysis reveals a missing functionality mentioned by the John. He considers it important and starts working on it. First of all, he searches in the online repository from *universAAL* (Developer Depot) for some resources that can help him in the development of the new functionality in the Nutritional Service.

### **A.4. Tara and John, care service providers**

Tara works as a social innovation manager in a residential care setting. She is concerned about the group of elderly that live in semi-independent in small units a few hundred meters from the nursing home. These elderly (for various reasons) need some support with daily life, especially to keep a healthy pattern in their daily routine. Problems vary, but are often related to age-related forgetfulness, MCI and increasingly to some type of depressive symptoms. If their need for assistance is not met adequately, it could mean having to transfer them to the nursing home. Using nursing home staff to help get them through the day is possible, but only in limited because of lack of availability. Working together with John who is a service developer, she plans a new service using and extending the ICT infrastructure already in place for the PA.

Tara and John scope the new assisted living services supporting these elderly, aiming to do so without increasing the need for staff. They intend to make use of the data services already in place for the personal alarm system, including medical information and scheduler services. Some extensions to the data service will provided by the supplier of the open monitoring platform used for the personal alarm service. This supplier has informed John about to the existence of the AALuis interface layer, which could be of use.

Consulting the AALuis reference manual, John and Tara construct four data structures with input-output scenarios for their new service. They intend to make them pluggable into the AALuis interface layer. This way a variety of user interfaces (given that they can also connect to the interface) will become available for their service. One of their goals is that elderly with varying preferences and capabilities can choose en use interfaces that suit them.