



TSBank

Time and Skill Bank for Active Aging

Project Number: AAL-CALL-2015-099

D3.3 – Web-based interconnecting service



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della Svizzera italiana

SUPSI

Project Identification	
Project Number	AAL 2015-099
Duration	27 months (1 st June 2016 – 31 st August 2018)
Coordinator	Gil Gonçalves
Coordinator Organization	IncreaseTime
Website	http://www.tsbank.eu/

Document Identification			
Deliverable name	Web-based interconnecting service		
Leader of the Deliverable	iTime		
Work Status	Finished		
Review Status	Accepted		
Deliverable Information			
Deliverable Description	Architecture of the web-based service		
Dissemination Level	Restricted		
Deliverable Type	Report		
Original Due Date	M17 – October/2017		
Versions of deliverable			
Version	Date	Author	Description
V-1.1	05-06-2017	Vitor Sousa	Introduction
V-1.2	05-06-2017	Vitor Sousa	Platform Architecture
V-1.3	05-06-2017	Vitor Sousa	Communications
V-1.4	05-06-2017	Vitor Sousa	Data Storage
V1.5	31-07-2017	Vitor Sousa	Back Office Management
V1.6	31-07-2017	Jaime Lopes	Authentication
V2.1	14-08-2017	Jaime Lopes, Vitor Sousa	1st Review (until Data Storage)
V2.2	04-09-2017	Jaime Lopes, Vitor Sousa	2nd Review (Back-office to Authentication)
V2.3	29-06-2018	Jaime Lopes	Final Review
Authorship & Review Information			
Editor	Vitor Sousa; Rafael Pereira; Jaime Lopes (iTime)		
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Reviewed by	Jaime Lopes (iTime)		

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Executive Summary

This document establishes the connection between the end-user needs for the technical development. The analysis of the user needs and scenario and use case developments will be used to document the envisaged solution with description of technical requirements and mock-ups development.

Document Context

Role of the Deliverable

This deliverable, part of the platform development process, presents the online-based server development. The report presents the architecture of the triangle Client, Server and Data, explaining more ahead how the communication between user and server are established, along with the presentation of the platform.

Relationship to other project deliverables

Deliverable	Relation
D2.5	<p><u>Title:</u> Base software</p> <p><i>The end-user requirements represents the guidelines on which the development team will be using to develop the Base Software of the platform.</i></p>
D3.4	<p><u>Title:</u> System content</p> <p><i>The software from D3.4 is the major outcome of this WP from where the Business Logic and Framework are explained in this present document.</i></p>

1. Project Description

1.1 - General Description

The core concept of the TSBank is to give the elderly a way to use their time and skills in a way that is useful to society, enabling them to be active and feel needed, which will greatly contribute to their well-being and reduce their dependence on the caregiving infrastructure. The matching process follows a series of steps to ensure a correct match is made:

1. The elderly register with the online tool via a simple interface and insert the tasks they are willing to help on, thus ensuring they are adapted to their capabilities.
2. People looking for a specific service looks in the platform, and the system matches their request with the available elderly support work, putting both in contact.
3. Once the support is done both parties are requested to vote/comment on each other, creating a "trust rating" that enables future help requesters to make a better selection.

The TSBank project is built upon the concept of helping the elderly help others, in the process improving their self-esteem and social engagement, which in turn improves their wellbeing.

While existing social networks can also be used to provide the proposed matching of volunteer work/needed service, such solutions are too generic and difficult to use for the suggested target demographic. The TSBank solution differs from them in that it is focused on the elderly and their volunteer work, allowing to have a greatly simplified interface and more efficient match-making capabilities.

1.2 - System Description

TSBank will develop, validate, and deploy an online platform – silverskills - that allows the elderly to volunteer their skills and time to perform work on a set of areas. People looking for support can then consult the platform for volunteer elderly that match the sought needs, and the platform puts both parties in contact.

The TSBank platform will be built on a modular system, where there's a single base core of features on top of which there are a series of modules dedicated to specific volunteer work areas. The platform can be expanded to include virtually any area for the elderly to volunteer on, while the TSBank project will implement three areas to serve as the start points for the system: Tourism, Pet Sitting and Consultancy. With these three modules, TSBank contributes for an increase of the quality of life, autonomy and participation in social life of elderly people. At the same time, it serves as a starting point for self-confidence in the use of ICT tools through the use of perception of knowledge and experience transfer by making skills and competencies visible in local communities, boosting elderly acceptance and perceived value of ICT solutions. Other important aspects of the system will be the usability and design, which will have to be developed according to the limitations of the elderly users.

2. Introduction

This document presents the online-based service for the platform developed under the TSBank project for active ageing.

This document has the objective to explain the architecture of the web-based service by explaining the communication process between the users, the storage of data, management back-office and the authentication service with the webpages to allow the users to access the service.

3. Platform Architecture

The platform architecture is the model representing the communication protocols existent on the TSBank project's platform. The Architecture is divided in two different sections, the Frontend by the presentation layer that is showed to the user and the Back-end service representing the data access layer for data storing. The diagram representing the architecture is illustrated below.

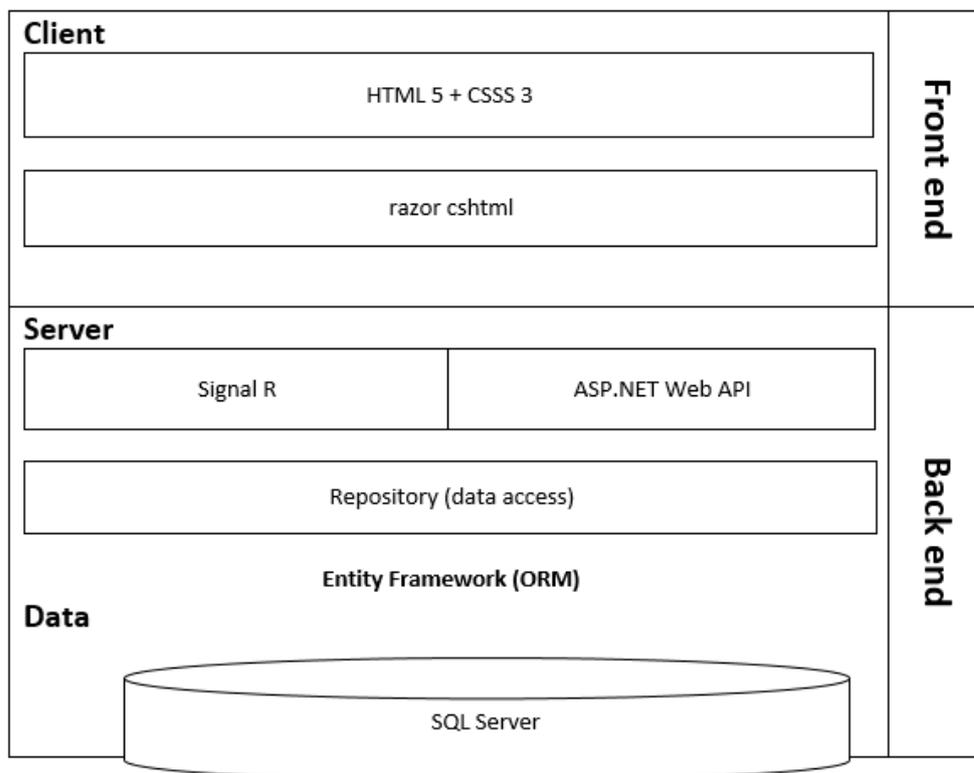


Figure 1 –Architecture Diagram

This diagram presents the reviewed version of the planned architecture defined in D2.5. As the platform is a web-based system, **HTML 5** is a markup language used in the platform for structuring and presenting the content online. The HTML 5 represents the latest version of this markup language. The HTML 5 is used on the modern websites with an updated syntax from the previous version.

The website content is written used the HTML along with **CSS3** – the current standard for CSS. The CSS is a language used by the software developers to describe the style of an HTML document and how they should be displayed to the users to represent a customised and attractive layout – user interface. The styles, as the term used, can be applied to different modules, including: Animations, Colour, Box sizing, Images, Fonts, Background, Text effects and others.

Razor cshtml is a programming syntax for embedding server code, based on the ASP.NET framework. Razor supports both C Sharp and Visual Basic, containing a list of some useful helpers used for the development of the platform as web Graphics, sending emails and validations.

On the other hand, on the server side, ASP.NET – a framework that makes it easy to build HTTP services including browsers and mobile devices; and SignalR – a library for ASP.NET developers that makes developing real-time web functionality easy. SignalR allows bi-directional communication between server and client (on the silverskills perspective, client is valid for any user, beneficiary or volunteers). More information can be found at Microsoft' official website for the Asp.NET¹.

To conclude the server side, the platform needs a repository for storage and a system to be used on the trade of communications. The system used on silverskills platform is the Microsoft SQL Server is a relational database management system, developed by the American multinational technology company. As a database server, Microsoft SQL Server is a software for storing and retrieving (communication) data as requested by other software applications — different communications can be made during the navigation on the website and it may run either on the same computer or on another computer or device using the same platform.

¹ ASP.NET official website - <https://www.asp.net/>

4. Communications

This chapter presents the communication processes present in the TSBank platform. The diagram for Communications of client and server are represented of the Diagram 2.

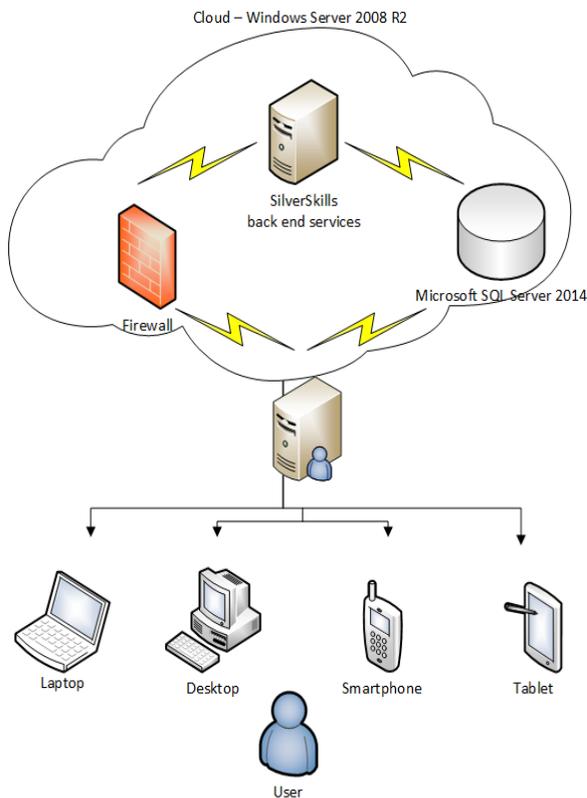


Figure 2 – Communications

The diagram represents the connection between the **User** requests from the platform and the **Operating System** where the development is stored **Windows Server 2008 R2**.

Each user needs a hardware device to access the website of the platform which can be a computer (laptop or desktop), a smartphone or a tablet. The information of the user will be uploaded and downloaded from the server which has the data repository – **Microsoft SQL Server**. The communications processes will be running continuously to allow communication of the different users that log in in the platform.

The requests from the user given by the user interface of the platform will be transformed in data packages and transmitted to the data repository of the platform, SQL Server, and the back-end service of the platform where the website is deployed. The **Firewall** is the middle process between the requests of information and the access to the information on the back-end service to ensure the security protocol is applied, ensuring that the traffic that is sent or received to the backend follows security protocols. Firewall prevents threats to attack the platform system such as Malware, Viruses, Payloads and Vulnerability that could put the data of user in danger as it could ended up exposed to such attacks. Firewall ensures a security protocol established for the platform and the system as it certifies different security benefits:

- Browse security and overall network security for the Operating System mainly to prevent unauthorised accesses and attacks;
- Computer security for ensuring the software and the respective device used by the user to access silverskills for not being exposed to intended or unintended malpractice.
- Mobile security is ensured. This benefit is very important nowadays as more people are storing personal information on their phones, such as emails, photos, business information or event bank account data. Mobile security is important to be controlled to protect not only the privacy of the user but also the intellectual property of the organization.
- Network Security involving authorization of access to data in a network, which is controlled by the network administrator. A protocol for the security is developed in the platform by the administrator to enable access to personal information with a personal email and password and also to make the distinction between private and public information.

The **Security Protocol** has been implemented in silverskills, **HTTPS** enables the encryption of all communications between your browser and the website. With a HTTPS connection, all communications are securely encrypted. This means that even if somebody managed to break into the connection, they would not be able to decrypt any of the data which passes between the owner of the account and the website. The generations of the passwords have recommended safety requirements to not be easy to get access by other users. The passwords are encrypted stored on the database to increase the transparency between the support team of silverskills and the users and also to place a strong safety measure into the system where the passwords are even more protected from someone who will try to get improper access. Regarding the data, all information is stored in an external server. This service provider will guarantee all the security related with all information of the users generated by them.

Regarding **privacy**, functions to confirm the email account and to recover password are implemented to ensure the privacy of the users. The cookies in the browser are used to keep the language predefined by the user. The possibility to lock the account for a specific period, not being available to inform users which will not be available to perform activities, increases the privacy of the user for not being contacted by other users during unappropriated time. If the user is determined to no longer use silverskills, the option to delete own account is available in the system. After the confirmation from the user to delete the account, the profile will be removed, and the actions of that specific user no longer will be linked to him/her. To increase the privacy of the users, the recommendation shared by the participants of the pilot trials in terms of choosing which personal data could be share or keep private in the profile was implemented. Currently in the system, it is possible to choose which data can become public and available to all the users, or rather stay as private data and disabled to the users.

5. Data Storage

The data of each user is stored at the SQL Server. The Microsoft SQL Server 2014 is a data management system that delivers a rich and reliable data store for lightweight Web Sites (Microsoft). For the TSBank purpose, the SQL Server is a product with the primary function of uploading and saving data as requested by the application.

For data storage, SQL Server 2014 supports different data types, including primary types such as Integer, Float, Decimal, Char, Varchar, binary, Text and more. Storage space allocated to a database is divided into sequentially numbered pages, each 8KB in size, while for physical storage of a table, the rows are divided into a sequence of partitions.

SQL Server can optimize the space used for RAM to minimize disk I/O.

6. Back-Office Management

The Back-office provides automated answers by the system to give during the users' experience on website navigation. The system should be developed in way that the user experience can be done in a fluent manner with a strong responsiveness to each action the user chooses. The Backoffice of the system includes these features:

- Provide assistance on filling the registration forms – both for client and volunteers, the system provides warning messages informing if some field to be filled by the user is missing, incomplete or it does not match the security measures recommended;
- Present only the information that the user has permission – the system must ensure that the data presented in website is only displayed according to authentication.
- Allow at any time the user to access his or her own data;
- Allow the user to edit his or her own data;
- Ensure a correct navigation of the links during navigation;
- Keep the private data only visible to the users which are allowed to see it;
- Maintain the chat for trading information a secure feature, on where only the messages trade between users can only be viewed by them for security reasons.
- The public data from each user, including the rating results, must be shown correctly to avoid communication issues between clients and volunteers;
- Matchmaking process must be accurate, presenting an appropriate list of suggested volunteers considering their location and skills.

Responsiveness and Security are the important aspects that are covered in development of the platform. The Platform is developed in a way that gives total responsiveness for any possible action the users performs without the system being crashed or that leads to an unexpected error or action. Moreover, the information sent and received are protected both from the Firewall system and from a robustly secured system implemented on the back-end service. The security model is explained in the following chapter.

7. Registration and Authentication

This chapter contains all the procedures taken into consideration to build a trustful platform to be used on the different devices.

Following the Framework described on the D3.1, the information regarding the management of personal data and the services (containing the creation, acceptance or denial, conclusion and review the history from the rating) demands a creation of the account.

The creation of the account on silverskills platforms contains the following security measures:

- **Sign Up**
 - **Name**
 - Must contain at least three characters.
 - **Email**
 - Must have an email format, i.e. [username@provider.domain](#)
 - The security model developed ensures that only one email is registered per account.
 - **Password Creation**
 - The password follow the security recommendations to not use a simple word or number, instead an extension of characters contained a minimum length of 6 characters, at least one upper and lower case character, one number, and one symbol such as "!#\$%.". This increases exponentially the number of possible combinations to define a password being harder to guess some of user's password. The tight security measure is also because the account is used not only on PCs but also on mobiles where normally have a large amount of personal files.
 - The password is encrypted to make impossible of an attack to steal the password information as once the password is encrypted this process is not reversible ensuring total security. Also the encryption ensures that even the administrators do not have access to view the password and enter or share this information. From these two aspects, the security protocol for the password generation fully covered.
 - **Contact**
 - The fields for location are country, state and city are all selected from a list stored on the back-end service avoiding any mistake on writing the correct name of these fields and then not being associate to any location.
 - **Legal constraints**
 - The fields for sign up a volunteer that are not mandatory to give as it belongs to sensitive data:

- Birthdate – it is presented the data format for not having any problem during the upload or some unintended situation regarding their age. The format is day/month/year.
- Photo – it allows to upload only files with picture formats
- Address and Phone.
- **Skills and Languages**
 - The volunteers select from a list of the available skills in silverskills their preferred ones and the languages that he can communicate for the same reason of birthdate.
- **Sign In**
 - **Email Confirmation**
 - The email of the user must be confirmed, ensuring that the person who is registering do not use an email that does not have access to make false profiles.
 - **Reset Password**
 - If the user does not remember the password used for registration, the user can reset the password by giving the email with which was used for registration and the system will send an email with a link for the user to reset the password.
- **Service Management**
 - **Chatting**
 - The volunteers can offer their availability for performing the service that has been requested by a client and still has not get an agreement with other volunteer, using the chat for offering the services – The authentication process guarantees that a volunteer cannot be chatting with a client about a service category that the volunteer is not been enlisted for.
 - On the other hand, a client will not be able to get in contact with volunteers that are not enlisted for volunteer activities of the same category that the client is looking after.
 - **Cancel a service**
 - Any user can cancel (only their) their services that are related to them.
 - **Complete a service**
 - The service is completed after the volunteer marked as completed.
 - **Rating**
 - The rating can only be given by both parties once the service is marked as completed.