Ecosystem infrastructure for smart and personalised inclusion
and PROSPERITY for ALL stakeholders

D301.4 GUADALINFO Public Access Points to ICT, offering access to the P4A tools and Infrastructures

Project Acronym	**Prosperity4All**
Grant Agreement number	**FP7-610510**
Deliverable number	**D301.4**
Work package number	**WP301**
Work package title	**WP301 Communication, Daily Living, Health and Accessible Mobility**
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Status	**Final**
Dissemination Level	**Consortium**

Delivery Date **10/07/2017**

Number of Pages **20**

Keyword List

Guadalinfo, ICT centres, Public access points, DSpace, RoboBraille, AsTeRICS,

routing guidance system, navigation systems, accessibility, enhanced functionalities

Version History

Revision	Date	Author	Organisation	Description
1	06/06/2017			Create table of contents
2	07/06/2017	Gerardo Romero/Luis Navarro	GUADAL	Prepare first draft version
3	28/06/2017	Gianna Tsakou	SILO	First draft Revision
4	19/07/2017	Stefan Schürz	LFTL	Second draft Revision
5	25/07/2017	Gerardo Romero/Luis Navarro	GUADAL	Final version

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Executive Summary

This document tries to show the relevance of the Guadalinfo ICT Centres in the P4A project and how through these ICT Centres end users have access to the P4A infrastructure.

Furthermore, it shows the relevance of the DSpace for SP3 profiles and how it work for users or entities with tech needs in the accessibility area.

1 Introduction

This document describes the work and outcomes of the task „D301.4 Guadalinfo Public Access Points to ICT offering access to the P4A tools and infrastructures.The integration and deployment of two modules from the DS, to offer new advantages to Guadalinfo's users is explained

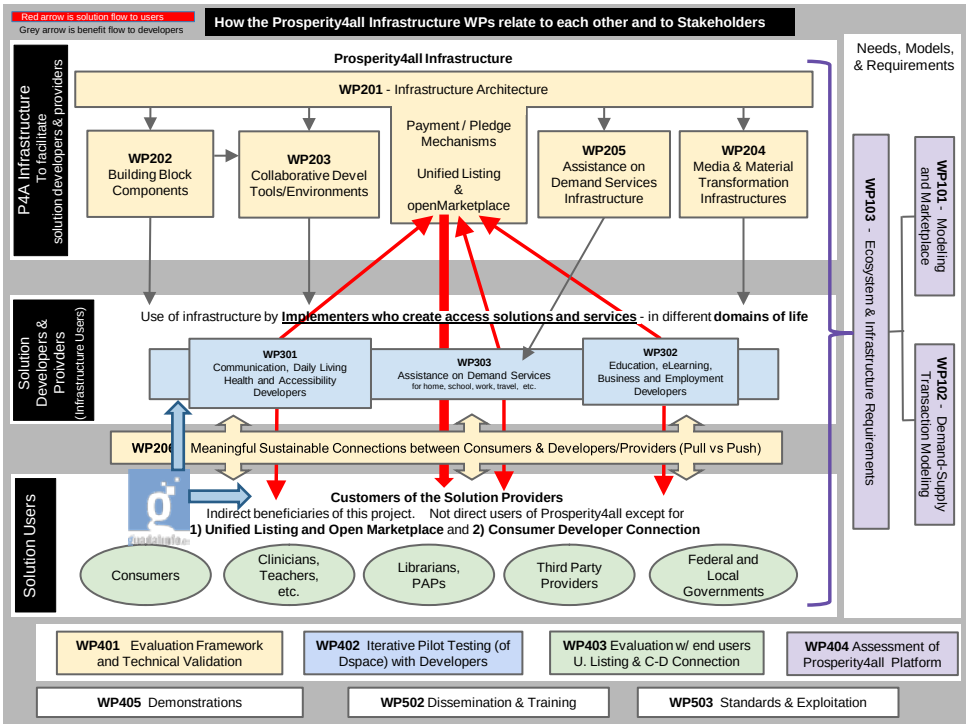
The selected modules, allow users with different disabilities to control the mouse of the computer with their heads or to translate the visited web pages into Braille or mp3 format.

2 Contribution to the global architecture

Guadalinfo is located just between Developers and End Users. In this architecture of P4A, Guadalinfo has integrated two SP2 solutions from the DSpace. Figure 1 shows the interconnection between work packages and Guadalinfo's location.

After the role as solution implementer, Guadalinfo will be a facilitator to the citizenry to have access to the DS, through dissemination in telecentres. Presenting to the end users the DS, SP2 tools and infrastructures. With this undertaking, GUADALINFO aims to create a more inclusive network for users with different capacities.

Figure 1: Overall Picture of Prosperity4all



Guadalinfo location in the definition map of the P4A project. Between developers and end users.

2.1 AsTeRICS module

T202.2 AT Specific I/O Modules (SENSUS):

The AsTeRICS module, was developed in task T202.0 „Specific I/O Modules“, this module using a webcam allow the user to control the PC with head movements. The AsTeRICS (see www.asterics.eu) project created a flexible construction set for creating assistive technologies that are highly adapted to the user. The adaptation and integration of the AsTeRICS Runtime Environment was useful to adapt specification and design in order to support the Linux platform and adhere to the notion of accessibility for all.

The AsTeRICS facial recognition module for a webcam, allows users with reduced mobility to use the mouse with short head movements. The existing hardware modules are used and the mouse module was available through an API. Now it is running under the Guadalinex OS (Ubuntu based). Available on more than 8.000 computers for more than 30.000 daily different users.

2.2 RoboBraille module

The RoboBraille module, was developed in the task T202.0 „Specific I/O Modules“, and integrates a multi-language GPII transforming infrastructure available in the DS. RoboBraille is a web and email-based service capable of converting documents into a range of accessible formats including Braille, mp3, Daisy and various e-book formats. Guadalinfo only implemented the online conversion tool for web pages into .mp3 or Braille files.

The process of converting documents into alternate formats media is highly specialised and quite expensive. For users with casual conversion needs, such conversions are simply too complicated and too costly. The RoboBraille service allows to our users to convert freely a variety of document formats into alternate media including digital Braille, digital structured audio book s, mp3s. This module is implemented in Guadalinfo’s website, and it is possible to translate all the existing information on Guadalinfo’s website.

Furthermore, Guadalinfo is a great LivingLab, and has an open door to:

- ICT developers and entrepreneurs, to have access to the DS in Guadalinfo's Centres
- Guadalinfo's users to use the P4A modules integrated in our OS and website.
- From the Guadalinfo project, the users can get more information about the P4A project and the DSpace as a source of ideas, innovation and developments to integrate it in their daily work.

3 Description of solution

3.1 Before participating in P4A

At Guadalinfo since the beginning, users with disabilities were of great priority. There was a project “T-orienta” that distributed a great amount of specialized HW and developed some SW applications.

HW:

- Braille lines
- Adapted Mouses
- Tactile monitors
- Adapted keyboards
- Etc.

SW:

- Virtual keyboard with predictive text GNU/Linux
- Ink-Braille transcriptor for GNU/Linux.
- Orca improvement for GNU/Linux.
- Eviacam, mouse base on short head movements.
- Etc.

Some of those HW components were obsolete and the SW applications were discontinued, so it was absolutely necessary to find new solutions for the users, and the DS was a perfect place to find new modules.

3.2 Enhanced with P4All modules

Searching new solutions to replace the “lost applications” and the obsolete HW, the DS provided a great number of enhanced accessibility features. The new challenge for the selection was to investigate those modules to be integrated under GNU/Linux. After a first filter and taking care of the users needs, the final decision was to integrate two different solutions: one for Guadalinfo’s website, and an application to include in the Guadalinfo’s OS.

The mouse provides an additional tool to users with reduction of mobility, some of our users have severe disabilities in arms and legs, and they cannot even use adapted mouses. Short head movements are possible for this users.

Advantages of this solution vs the application before:

- Enhance the precision.
- Only needs a common webcam.
- No other additional HW, no other kind of sensors.
- With an update of the OS, it is possible to use this solution in all the Guadalinfo’s Centres.

The second solution, was selected because of the lack of resources for blind people, to navigate comfortably into the Guadalinfo’s website, according to their needs and preferences. It’s so easy for them to use this tool, and the possibility to download the converted text into Braille or mp3 format is also a great advantage. The bigger effort, was made in the text to convert selection. The original development doesn’t pick out among banners, buttons, links, etc. So some changes were made, to avoid the conversion of not interesting parts.

This tool is also been used for other kind of users, old people, not totally blind users, and users that prefer to convert the text into mp3 files.

4 Interaction with DSpace

As SP3 member of the P4A project, we were searching for new modules to implement in our environment. The project Guadalinfo has two important tech parts:

- The Guadalinfo's web site (www.guadalinfo.es)
- Guadalinfo GGCloud OS.

Searching in the DSpace tool, looking for solutions that can provide enhanced accessibility features, an interesting module that could replace an old application that was included in the Guadalinfo's OS was found. A head controlled mouse requiring additional hardware was also found. This application was discontinued and was not updated anymore.

The Developers Space provided us a new solution, the AsTeRICS mouse module. After a deep analysis of the solution, the developer team (SP2 member) was contacted. The Developer Space gave us the opportunity to find descriptive and technical material related with this solution. So we saw that there was so many things to modify, the AsTeRICS module was developed for Windows OS, but not for Linux OS. Guadalinfo's OS is based on Linux. The collaboration between the developer teams yielded a perfect adaptation of the module into the Guadalinfo's OS. Now the application is working properly in the Guadalinfo centers

Without the Developer Space it would have been impossible or quite expensive, to include this solution in our OS.

In the Developer Space we found a second solution, the RoboBraille module. All the needed information about the module was available in the DS. By the help of the developer, the RoboBraille solution is now available for the users in the Guadalinfo website.

5 Integration work

5.1 AsTeRICS:

AsTeRICS (see www.asterics.eu) project created a flexible construction set for creating assistive technologies that are highly adapted to the user. In this activity the useful software for input components such as digital and analog I/O, computer vision and speech input sensors of the AsTeRICS project will be extracted and packaged to fit the proposed unified APIs. Existing hardware modules like the HID emulation device will be separately made available to developers through a unified API.

The selected module, was the facial recognition module. The base technology of the AsTeRICS project was focused on Windows, so an adaptation to Linux was needed. Asuitable version of the AsTeRICS facial recognition module for Linux, was implemented which is running under our Guadalinex OS (Ubuntu based).

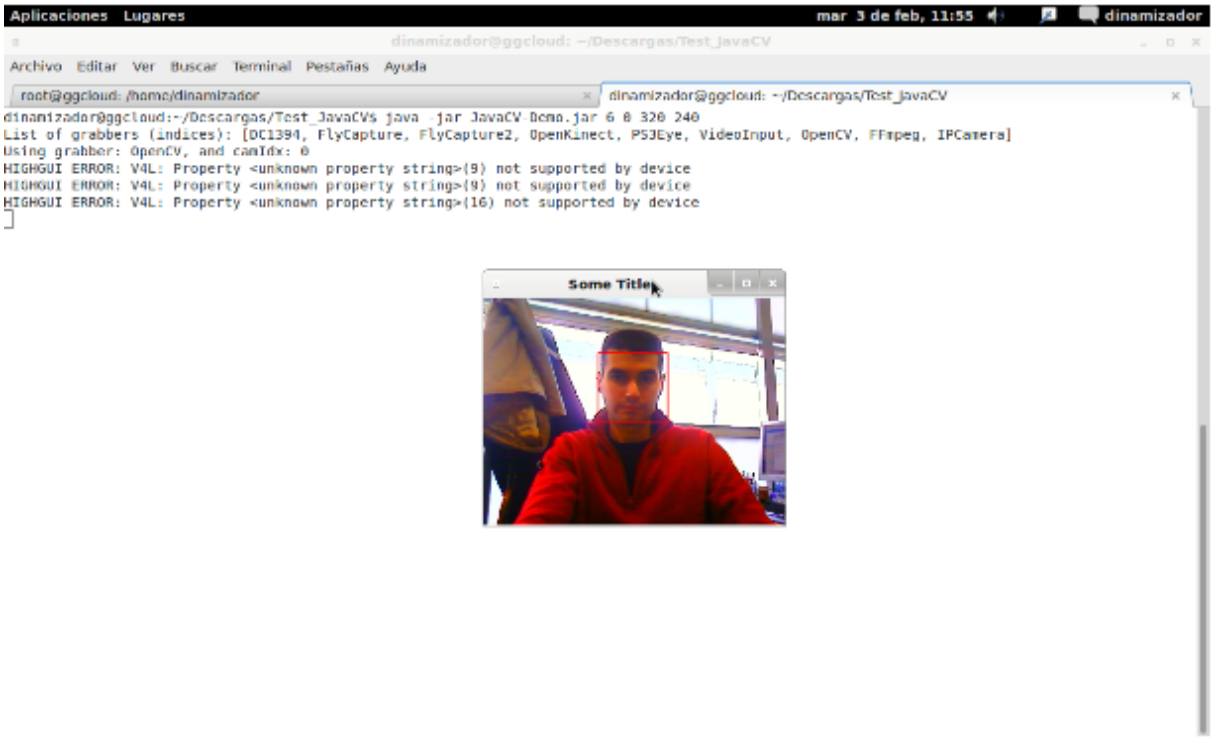


Figure 2: AsTeRICS Screenshot Running the AsTeRICS module, during the adaptations into the Guadalinfo's operative system.

For AsTeRICS the runtime environment and the plugins have been implemented in Java, due to the fact that many plugins using native C-code for system access, this system also depends on Windows. This was a little problem for Guadalinfo's OS, the Java version was updated and the module worked properly.

Some of the interactions with the developer teams show the integration work: (emails with technical information available in the annex II)

1. The very first moment of the project, was to collect information about needs:
   „*But of course there are some technical requirements.*
   Which operating system do you use?
   Do the terminals have a camera?
   Currently the majority of our system is windows-based. But we will be able to provide the module to track the head movements for Linux as well.
   To get a better imagination simply try it out:
   Download the AsTeRICS system at http://www.asterics .eu/
   Install the setup
   Start the program ARE.exe
   Click on "start Demo"
   Select "CameraMouse" by pressing space when its marked red"
2. Testing the face tracker in Guadalinfo's OS:
   „Could you help us and run the test program on your Linuxbox with the Logitech Webcam you use?
   1) Download the program from http://fhe.technikum-wien.at/~deinhofe/Test_JavaCV.zip
   2) Unzip the file
   3) Change to the unzipped directory and run the following command from a terminal
   java -jar JavaCV-Demo.jar 6 0 320 240"
3. There was some exception about Java minor version, and the developers helped quickly to solve it, „The program is compiled for Java Runtime Version 1.7. Would it be possible for you to either upgrade to OpenJDK 1.7 or additionally install version 1.7?" and finally using the Java version 1.7.0_76 everything was ok.
4. The collaboration yields into a successful integration:

   „Thanks a lot, this is good news!
   It should also work with Java 8, in case you prefer to install the current version. Pease note that we still have to improve the algorithm and integrate the technology into the AsTeRICS framework. But the most important thing is that your Linux and your camera will be supported."
5. Some other questions about technical issues were treated until everything worked properly. It can be found in the annex II.

5.2 RoboBraille:

RoboBraille is a web and email-based service capable of converting documents into a range of accessible formats including Braille, mp3, Daisy and various e-book formats. The service can furthermore be used to convert otherwise inaccessible documents such as scanned images, pdf files, Microsoft Office PowerPoint and Word documents into more accessible formats. We show the technical development to integrate the Robobraille application in the Guadalinfo's website.

5.2.1 Requirements

Identificator	Requirement	Description
RF-001	Generate the Braille file in the website	The system will allow any user, authenticated or not, to download a file with the translation into Braille of the visited page.
RF-002	Generate the audio file in the website	The system will allow any user, authenticated or not, to download a file with the conversion to audio format the text of the visited page.

5.2.2 Diagram of classes

The logic of the portlet, was implemented with three classes.

RobobrailleController works as the porlet's controller, it receives the parameters of the website title, the contents and if the user will download the Braille or the audio files. With this information, the RobobrailleBraille or RobobrailleAudio functions get the file, that inmediatly will be send to the user.

RobobrailleBraille implements the integration with Robobraille's web service. This is explained in the next point.

RobobrailleAudio covers the same functions than the RobobrailleBraille but produces and audio file instead of the Braille file.

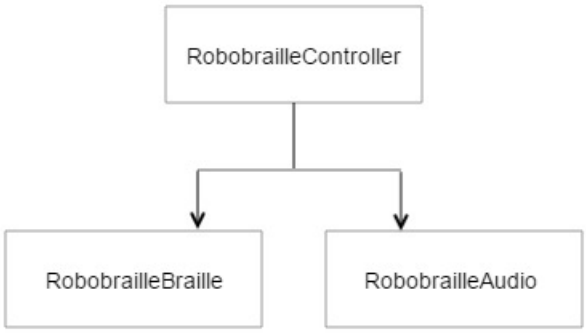


Figure 3: Diagram of classes for the selection between a conversion to .mep3 file or to Braille file.

5.2.3 Integration with the web service

First of all, to integrate the portlet with Robobraille, Hawk's credentials were needed and provided by the service support. The final configuration for the Hawk protocol:

Hawk Auth ID: d5334639-83ab-e611-82ec-ea33c6274881

Hawk Auth Key: ffd0d100-82de-4d03-af6f-01eea1c09463

Algorithm: sha256

None: aleatory alphanumeric chain

Timestamp: timestamp Unix actual

For both kind of files, Braille or audio, the work flux is the same and it is implemented in the classes RobobrailleAudio y RobobrailleBraille:

- First a call to /api/{braille|audio}/GetJobId giving the selected format for the translation/conversion. The web service will give up a jobId, alphanumeric ticket. This ticket identifies a job and the process is executed in the Robobraille server.
- Once with the jobID, is called the /api/{braille|audio}/GetJobStatus and the jobId is a parmeter. The web service returns a 0 in case of error, 1 if the process finish or 2 if the process is still running. If send a 2, waits for a second and execute again this step to a maximum of 30 times.

If the received code is 1 (finished process) it calls to the /api/{braille|audio/GetJobResult giving the jobId as a parameter. And the web service will send the file to be send to the user.

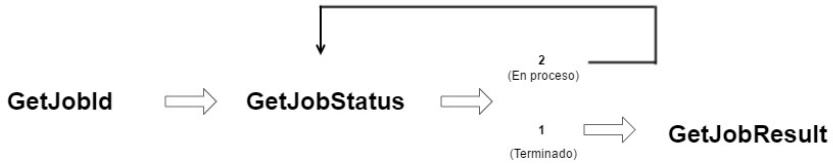


Figure 4: Flux The work flux for the conversion to .mp3 or to Braille, the system verifies the whole process until it send a JobResult.

The problems were fixed thanks to the collaboration between Sensus and the Guadalinfo's tech team. An effective good communication is the best way to solve any problem when you are working with solvent partners.

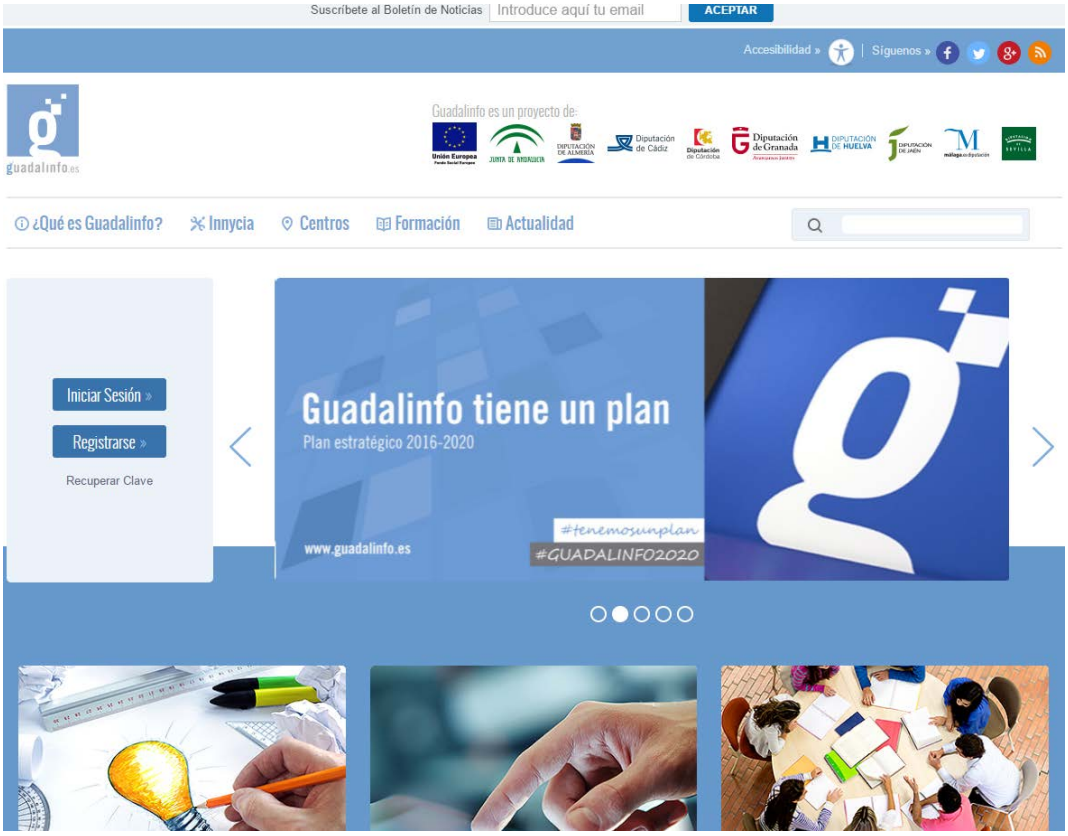


Figure 5: Guadalinfo's Website The "Accesibilidad" button allows to the Gudalinfo site visitors to have access to the RoboBraille service.

Figure 6: Accessibility Button The "Accesibilidad" button in the main menu of the Guadalinfo's site.

The accessibility button is available for users.

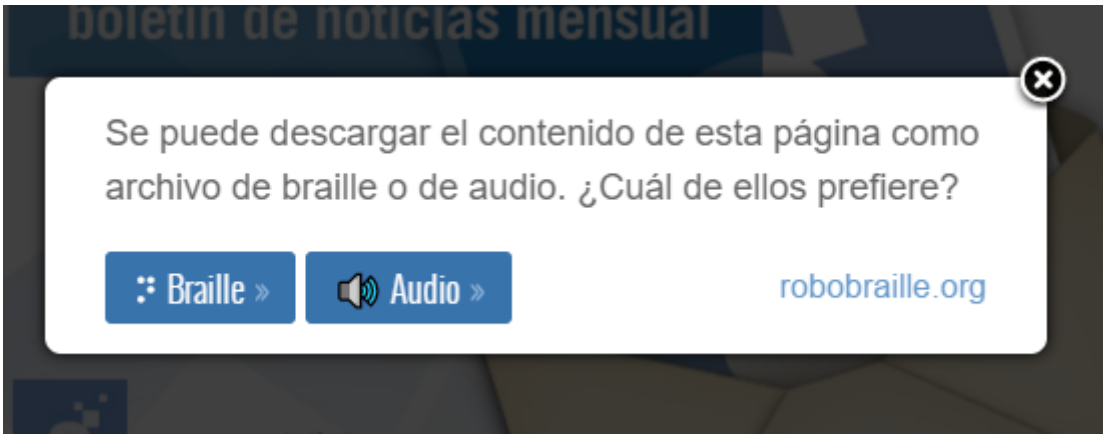


Figure7: The selection menu to translate into Braille or .mp3 format. This popup, allows to the users to choose between the translation into Braille or into .mp3.

The provided documentation included specifications and implementation of a stand-alone version of the document transformation engine as well as a specification and implementation of a set of interface components to allow third parties to integrate existing systems with the document conversion service. This ability has proven to be essential for maintaining confidentially and security behind corporate firewalls, but also for government agencies who face the same problem with social benefit information which they need to make accessible both to consumers and to employees while maintaining strict control of the

information. This was the Guadalinfo case, the main servers of the project, are located into special protected CPDs, they belong to the Junta de Andalucia.

6 Lessons learned and Discussion

The Guadalinfo's experience, using the DSpace is quite satisfactory. The great challenge was find and integrate existing modules in the DSpace into an Open Source environment. After detect some Guadalinfo's users needs, find solutions in the platform was highly satisfactory.

Despite of some solutions were not Open Source SW, all the information available in the platform allowed us to know wich solutions could be adaptable to Linus OS or not. In this situation finally we have included two modules from the DSpace:

As mentioned before, we have use two modules:

1. AsTeRICS: It is possible to find it inclusion in our Guadalinfo OS (http://guadalinfo.emergya.es/ggcloud/old/ggcloud-guadalinfo-client-i386-update1.1.iso). The open source application is available for all our users. Also available, there is a video where is possible to watch some users in our centres, using the application (https://youtu.be/gcuXSRqB2SA).
2. RoboBraille: After the adaptation, the Guadalinfo's website can be converted into .mp3 or Braille formats. The solution is available in the Guadalinfo's website. www.guadalinfo.es

The close cooperation with the developers was an advantage for using the DSpace. The opportunity to have access to innovative solutions and to the developer teams, is especially necessary to share the existing developments. In our case it would have been quite complicate to develop the selected solutions for our users. An add value of the Developer Space is the great amount of information on it. Is possible to find detailed information about each solution. Technical information, "How tos" to implement the solutions, contacts, etc.

We have learned that only a platform with usability, contents and the developer's contact available in the Developer space, can offer solutions to implementers and in the same time can disseminate existing modules and solutions from developers. Another kind of platforms doesn't offer this possibilities free of charge

Of course a close interaction with the responsible persons, was decisive to achieve the goal of a correct integration in Guadalinfo's environment. The close collaboration with the developers was the only way to have a successful result.

Some expert suggestions encouraged us to work on changes like a more usable location for the buttons, new icons, better visible, etc. Even this kind of collaboration is possible thanks to the DSpace.

7 Conclusions and future work

This deliverable describes the work done in task 301.4. The implementation of two solutions for the Guadalinfo's project was defined in WP301. This two implementations are project enhancements and accessible features to improve the experience for Guadalinfo's users.

The Developer Space, and the great contribution of the developers, are an unique platform to search and share existing developments that contribute to improve the community of developers and integrators of accessibility applications.

The Developer Space has good usability and is very well structured. The access to the information is clear, the content is easy to find, with a great amount of technical information, even source code documentation.

The experience using the Developer Space, has been satisfactory. It will be an interesting tool for us in the future. We will search on it for new solutions and modules.

The experience using the Developer Space platform was also quite satisfying because of the accessibility tools, which are quite innovative and useful.

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Annex I: Glossary

Abbreviation	Full form
AAL	Ambient Assisted Living
ACS	AsTeRICS Configuration Suite
AoD	Assistance on Demand
API	Application Program Interface
AsTeRICS	Assistive Technology Rapid Integration & Construction Set
AT	Assistive Technology
C4A	Cloud4All
D	Deliverable
DoW	Description of Work
DSpace	DeveloperSpace
GUI	Graphical User Interface
GPII	Global Public Inclusive Infrastructure
ICT	Information and Communications Technology
IDE	Integrated Development Environment
ISO	International Organization for Standardization
IT	Information Technology
KPI	Key Performance Indicator
P4A	Prosperity4all
R&D	Research and Development
SP	Sub-Project
UI	User Interface
UX	User Experience
WP	Work Package