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SAFIR

Work Package 6

DELIVERABLE 6.3.2:

Walloon Region Pilot

Document date: 2005/09/30

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Deliverable D 6.3

Document name : DELIVERABLE D6.3.2 : Pilot of the Walloon Region

Release (Status): final
Date: 30-09-2005

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Organization(s):	Walloon Region-DGPL, GFI
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Document Reference:	WP6_D 6.3.2 _Pilot_WalloonRegion_v00 04.doc

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WPx_Dx.x.x_vxx.rr_free.doc


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rr stands for **release** during the step of document creation. Two digits for iteration (01 to n).
Start the first release with the number V00.01
free free text (for example, short title or subject)

Document Summary

Keywords: e-Government, applications, speech enablement, Governmental service Providers

Abstract: This document summarizes the preparation of the pilots (consultation and update) for the Walloon Region. It explains from where we start (the existing situation before SAFIR) and where we plan to arrive (Web information distribution about sport sites in the Walloon Region via voice commands). We also focus on the partnership with the other "sport institutions" (like ADEPS, the Ministry of National Defense,...) who are involved in the project thanks to the Focus Groups.

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Document History

Document This document is only valid on the day it was printed.
Location The source of the document will be found in the Control section of the xxx Stage File (filepath).

Revision History Date of this revision: 2005-09-30
Date of next revision:

Version	Revision date	Summary of Changes	Organization	Name
00.01	25-08-2005	First version	Walloon Region	Damien Paque
00.02	29-09-2005	Second version	Walloon Region	Jean-Pierre Kinnaert
00.03	30-09-2005	Review of the document	GFI	A. Lefèvre and L. Mangelinck
00.04	30-09-2005	WR final draft version	Walloon Region	Damien Paque

Approvals This document requires the following approvals.
Signed approval forms are filed in the project files.

Organization	Name	Signature	Date of Issue	Version
Walloon Region	Jean-Pierre Kinnaert			
NBT				
SAFIR technical steering committee for wp2				
SAFIR technical steering committee for wp3				
SAFIR technical steering committee for wp7				
SAFIR project management				

Distribution This document has been distributed to:

Organization	Name	Date of Issue	Version
WP6 members	Through SAFIR QuickPlace		
WP leaders	Through SAFIR QuickPlace		
SAFIR project management	Through SAFIR QuickPlace		

Confidentiality Only mentioned persons / Inside the WPx / Inside the consortium / Public

Version	Confidentiality level.
01.00	Only mentioned persons / Inside the WPx / Inside the consortium / Public




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1 Executive summary

This document is the Deliverable that summarizes the different actions run during the preparation phase for the Walloon Region pilot building (WP 6.3).

Deliverables of WP 6 can be seen as the continuation of the series of deliverables within WP 1 of the SAFIR project, concerning the citizens and the selected users (see definition in Introduction – *cf.* § 2). They describe the methodology and the outcome of a series of interview sessions that were held in three public organizations partner of the SAFIR consortium (Brussels (Belgium), Vratsa Region (Bulgaria) and Walloon region (Belgium)) for defining their user's requirements. Their objectives are to prepare the pilots building to respond as well as possible to the needs of the implied actors.

The particularity of the Walloon pilot is the link with the WP5 since it intends to be a demonstration platform of the integration of the ontology layer in the SAFIR technology.

Thus, for the Walloon Region, two pilots are required:

- a consultation one (for the citizens) which will be developed in WP 8.1 using the ontology layer coming from WP 5;
- a decentralized update one (for the selected users) which will be developed in WP 10.3.

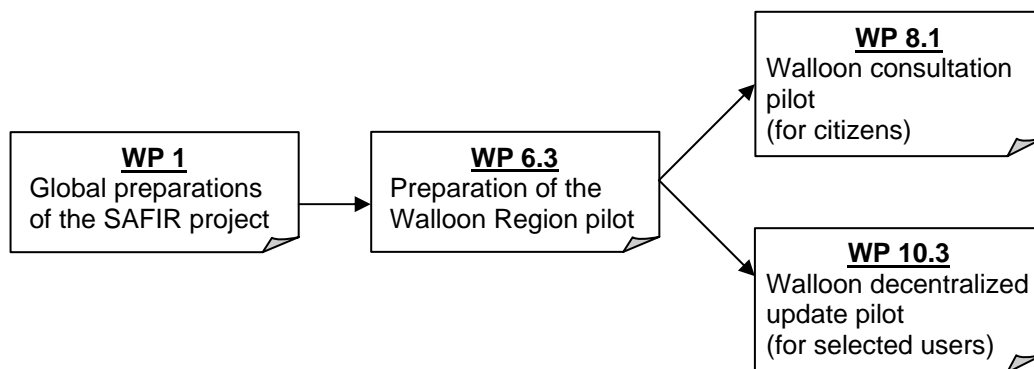



Figure 1.1 – Succession of WP's for the Walloon Region pilot

In these pilots, we have to face several problems:

- The cooperation problem between several public services;
- The interoperability problem between several databases;
- The security aspect of the data's publication to the citizens.

The risks linked to these problems will be analyzed at the beginning of the WP 8.1 and WP 10.3.

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2 Introduction

This document can be seen as a continuation of a series of deliverables within Work Package 1 of the SAFIR (Speech Automated Friendly Interface Research) project. For this analysis, the potential SAFIR users have been split into three separate user groups. These three user groups are:

- The generic users are citizens who access e-Government services at home (e.g. by connecting to a "Smart Home Service Operator").
- The selected users group is constituted by the governmental service providers that provide e-Gov information to citizens and professional users.
- The third group consists of the special users who are governmental employees. They are working e.g. at the police or at fire departments.


Thanks to this splitting, it has been envisaged to build some pilots in different domains in order to validate the SAFIR technologies in confrontation with different needs and usages. The general methodology used to prepare those pilots (work of WP 6) is summarized in section 3.

The specific methodology used by the Walloon Region for the building of his pilot is then summarized in section 4. In this section, we focus:

- on the participation of external actors (who would be seen as "selected users" for this pilot) who are involved in the project thanks to work meetings (the Focus Group);
- on the methodology followed to (re)model the database which will be used as the basis for the pilots.

The main section of the document is the section 5 which describes in more detail the Walloon pilot. This one will be in fact split in two pilots: one specific for the citizen consultation and one specific for the selected users update. Different technical aspects are therefore discussed here because the needs and the usages of those two kinds of users will be different. So we will analyse here:

- the architecture aspect: the pilot for the citizen (WP 8.1) will be only focused on the database consultation but will imply the possibility to query the information via voice commands thanks the use of an ontology layer, while the pilot for the selected users (WP 10.3) will allow them to consult and actualize the information in the database thanks to specific update procedure;
- the security aspect: it's envisaged to gather in one unique gateway all the information about sport infrastructures in the Walloon Region and it's therefore important to secure its access. Indeed, some data's (for example those about allowances given to one sport site) won't be freely distributed to all users;
- the "production vs. diffusion" aspect: as the data's will come from different partners and for security reasons, it will be important to differentiate those two environments in the pilot in order to separate the technical characteristics of each one.

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3 Methodology for Work Package 6

The objective of the Work Package 6 is to prepare the pilots which will be built later in the SAFIR project to demonstrate the use of the technologies it has brought. Three partners of the SAFIR project consortium have been retained to accomplish this task:

- The Brussels Region (Belgium – WP 6.1): its objective is to show the possible usage of voice commands to hold up to date the information of a Geographic Information System where are founded spatial and alphanumeric data's on a specific territory;
- The Vrasta Region (Bulgaria – WP 6.2): its objective is to show how SAFIR technologies can be used to help the development of such a country, essentially in the field land;
- The Walloon Region (Belgium – WP 6.3): *cf.* suite of this document.


To succeed in the building of those pilots, it has been decided to use some specific tools that permit the "formalize" the work to do.

- At the beginning, a choice has to be made about a tool for modelling the databases that will be used as support for the different pilots. UML (for Unified Modelling Language) has directly appeared as the tool(box) for this task. In fact, it brings a set of diagrams that permit to formally follow the modelling phase for a new system;
- It was also important to find a "tool" to facilitate the discussions between the different actors involved in the pilots. For that, it has been decided to follow the methodology of the Focus Group. A Focus Group is in fact a specific meeting gathering people concerned by a subject to permit them to exchange their points of view about it and to analyse the possibilities to advance in its development.

With those tools, the methodology followed to model the systems used in the three SAFIR pilots can be summarized as follow:

- Firstly, it's important to "know" the different possible usages of the future database. This can be done by gathering the specialists of the concerned domain (principle of the Focus Group) in order to allow them to exchange their vision about it.
- Secondly, it's necessary to "structure" those usages. This can be done thanks to Use Cases (one of the UML tools) which permit to "put on paper", in a formal way, the different actors involved in the domain of the database and their interactions with each other;
- Thirdly, with the Use Cases, it's possible to identify the object classes of the future database and their relations with each other. This task is generally done with what we call a Conceptual Model (which can also be done with a specific UML diagram).
- Fourthly, with the Conceptual Model, it's then possible to build the Deployment Model that represents the relational tables and links which will be implemented in a Relational DataBase Management System (RDBMS).
- And fifthly, it's possible to transform the Deployment Model in a suite of SQL scripts which can be used to build the structure of the future database.

For the SAFIR project, it has been decided to use the software "Enterprise Architect" which is helpful for the realisation of the four lasts tasks we have just described.

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4 Methodology used by the Walloon Region

4.1 Global context

4.1.1 *Walloon Region and DGPL*

The Walloon Region (through the Cartographic Service of the “General Directorate of Local Authorities” – in French “*Direction Générale des Pouvoirs Locaux*” or DGPL) was accepted as one of the partners for the SAFIR project in order to work on a pilot to test its new technologies in an actual domain.

DGPL's main role concerns the supervision of the public sector at different regional levels as the provinces, the municipalities (local administrations) and any public body working in an in-between level. As a public organization, its major mission concerns the public services to the citizens. Since many years, its initiatives aim to improve the quality of those services:

- providing allowances to local administrations for projects in the field of ICT (Information and Communication Technology);
- launching an e-Government initiative in respect of the “good practice” in the other Belgian regions and in Europe;
- implementing a diffusion infrastructure for geographic information in the Walloon Region. In this sense, DGPL (through the Cartographic Service) is implied in the European “INSPIRE” project which work on the normalisation for spatial information diffusion.

4.1.2 *Description of the existing database*

The Walloon Region pilot for the SAFIR project is dedicated to the Sport Infrastructures and based on one existing database called “Cadastre of the Sport Infrastructures”. This database was built at the beginning to gather in one place significant information about sport infrastructures in the Walloon Region. This first system permit to get both:

- alphanumeric information (stored in a MS Access database). Information could be founded here about the persons in charge of the infrastructures, the practicable sports,...;
- geographic information (stored on a layer of “pricked off points” in a Geographic Information System – GIS). This information could be used to localise the given infrastructures.

This database use was essentially focused on decision making and management. In fact, the DGPL (through the Division of the Sport Infrastructure) is responsible for giving allowances to persons in charge of those infrastructures. In order to realize this successfully, it's important to have a general and objective vision of the actual situation in the Region. By example:


- to give allowances to a sport infrastructure which wants to build a new sport hall, it could be interesting to know if this infrastructure has already been helped in the past;
- to give allowances for a new sport infrastructure, it's important to know if there are no other sporting sites of this kind in the neighbourhood,...

To hold up to date this database, each time allowances were asked for a given infrastructure, an inquiry form (*cf.* annexe I) was sent to the person in charge of it to get a “more actual vision” of its situation and be able to update information linked in the database if necessary. But the problem is to hold up to date all the infrastructures of the Walloon Region and not only those for which allowances are asked...

4.1.3 *DGPL's services implied in the SAFIR project*

Two DGPL's services are implied in the SAFIR project for the development of the Walloon pilot:

- the DGPL/DBIS – Division of the Sport Infrastructures which is responsible for the initial database. It's in fact this service which has to hold up to date information in the database thanks to forms sent to persons in charge of infrastructures asking allowances;
- the DGPL/DIRS – Cartographic Service which is responsible of the management and distribution of some geographic information for the Walloon Region (e.g. localisation of sport infrastructures for the “Cadastre of the Sport Infrastructures”) and which will work on the technical development of the pilot for the SAFIR project.

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4.2 Identification of the actors to be involved

4.2.1 *General users distinction coming from WP 1*

“The first objective of the SAFIR project is to give an equal opportunity to individuals and groups of European citizens to access, through easily usable devices, existing authorized content without having to be ‘PC literate’ using the simplest human interfaces, i.e. voice and view” (cf. official Web Site of SAFIR). In WP 1, a general distinction was made between three types of users who could be interested by those new technologies issued from the SAFIR project:

- the “generic users”: they are citizens who access e-Government services at home (e.g. by connecting to a “Smart Home Service Operator” – cf. D.1.3.1);
- the “selected users”: they are providers of governmental services who are responsible for the information management and diffusion;
- the “special users”: they are governmental employees who are working in the governmental field force, e.g. at the police or at fire department.

For the Walloon Region pilot, only the two first groups will be taken into account:

- the generic users (citizens) for the information consultation (in WP 8.1). Those users’ general needs have been studied thanks to interviews done nearby some “volunteers”. It’s therefore important to extract from those the different points that could be “relevant” for the applications of the Walloon pilot;
- the selected users (external actors who will work with the DGPL on the new “Cadastre of the Sport Infrastructures”) for the information update (in WP 10.3). Those users’ needs have here been studied thanks to specific meetings (“Focus Group” – cf. § 4.3) where each participant can explain his point of view and what he expects from his participation in the SAFIR project.

4.2.2 *Identification of the partners for the Walloon Region pilot*

Besides the Ministry of the Walloon Region (through the DGPL), there are other institutions who are responsible for or involved in sport infrastructures in the Region.

4.2.2.1 *The ADEPS*

This association is under the Ministry of the French Community (another level of authority in Belgium which is responsible e.g. for social and youth services, culture and sports). ADEPS is one of the main sport organizations for the South of Belgium and there are actually 17 sporting centres ADEPS located both in the Walloon and Brussels regions.


4.2.2.2 *The AES (“Association des établissements sportifs”)*

This association regroups several sport infrastructures from the Brussels and Walloon regions. Its main objectives can be summarized as follow:

- Mission of consultancy for the sport centres (officially recognized or to be recognized) and for the French Community Government;
- Support in creating or performing the sport infrastructures management;
- Contribution in the promotion of the sport performance at any level;
- Participation in other initiatives in direct or indirect relation with the regulation (cf. Decret of 27/02/2003) organizing the official recognition and the funding of local sport centres.

4.2.2.3 *The AISF (“Association Interfédérale du Sport Francophone”)*

This Association is officially recognized by the Ministry of Sports of the French Community Government. His main objective is to give access to a public (i.e. sporting people, coaching people, referees, club managers, volunteers) as large as possible to the sport in general and to any sport related information. Nowadays, 58 federations are effective members of the AISF, regrouping 6000 sporting clubs, 665000 sporting members and 100000 volunteers.

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4.2.2.4 The FRSEL (“Fédération Royale des Sports de l’Enseignement Libre”)

The FRSEL is a Non Profit Association (in French “*Association Sans But Lucratif*” or ASBL) which works for the sport development at an educational level. His main objective is to promote the physical activities at school (outside the scope of the sporting courses), creating and officially recognizing sport centres in the schools of the “Free Education System”.

4.2.2.5 The Ministry of National Defence

The Belgian Army proposes some of the military sport infrastructures at disposal for sporting clubs (not directly to the citizens at the moment). Within the Infrastructures Division, the information related to those sport infrastructures (geographical or not) is exchanged through an intranet system named “INFRANET”. One of this Ministry’s actual priorities is to improve the Information Process Management to give better possibilities for the information access and to permit a better management for its gather and update.

4.3 Identification of the User Requirements of all the actors

4.3.1 Focus Group principles

As the institutions we have just described are also concerned in the management of sport infrastructures in the Walloon Region, the DGPL has decided to contact their officials (*cf.* annexe II) at the beginning of the SAFIR project to introduce “them” (their data’s and their needs) in the pilots and to propose them to become partner (as “selected users” – *cf.* § 4.2.1) in the Walloon Region pilot. In order to realize this successfully, it was decided to organize meetings using the methodology of “Focus Group”.

Focus groups are among the most widely used research tools in the domain of social sciences. However, despite the recent popularity, there is some confusion as to the nature of a Focus Group and how it is distinguished from other methods of group interviewing, such as “brainstorming” or “Delphi groups”. According to Kitzinger (1994), “*Focus Groups are group discussions organised to explore people’s views and experiences on a specific set of issues*”. But what distinguishes the Focus Group technique from the wider range of group interviews is the explicit use of the group interaction to produce data and insights that would be less accessible without the interaction found in a group (Morgan 1988).

4.3.2 Meetings summaries

4.3.2.1 1st Focus Group


A first Focus Group has been organized on 23/09/2004 during which two global points were presented:

- an introduction about the SAFIR project and the implication of the DGPL and other possible external actors in it;
- a synthesis of the actual situation of the “Cadastre of the Sport Infrastructures in the Walloon Region” (i.e. database historicity, its actual and future goals and needs, possible internal and external extensions thanks to the participation in the SAFIR project,...).

After this, a phase of awareness was made to show to visitors that the use of SAFIR technologies can facilitate citizen’s life (*cf.* scenario of WP 1 – § 4.4.1), and that their implication in the Walloon pilot could be a good thing for enriching information about sport in the Walloon Region.

4.3.2.2 2nd Focus Group

A second Focus Group took place on 21/10/2004. After the first one, we have seen for each participant the wish to participate at the building of a common Information System in the scope of the SAFIR project. The objective of this new meeting was to identify the (actual or potential) users’ needs for the Walloon pilot. If the internal needs for the DGPL were already known (thanks to Division of the Sport Infrastructures), it was not true for the other actors’ needs. Therefore, this meeting has allowed the representatives of the other institutions to explain what are their role for sport infrastructures in the

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Walloon Region and which data's and system they have to manage and eventually to distribute them. It has also allowed to write out a list of needs for all the participants (*cf.* annexe III).

Three fundamental aspects were already listed:

- help for decision making and management;
- communication for sport events (exhibition, tournaments,...);
- search for information about sport infrastructures.

Three basic needs have also been extracted from the discussions for domains where vocal commands could be a real added-value:

- data's verification by inspectors "on the field";
- information encoding by "authorized persons" (i.e. the selected users – *cf.* § 4.2.1);
- information consulting by the citizen.

4.3.2.3 3rd Focus Group

A third Focus Group was organized on 29/11/2004. This meeting was essentially focused on the needs of the participants. Two fundamentals elements were extracted from the precedent meetings:

- It's important to have information with a good quality before distributing it. Therefore, each partner will have to take care of the update of its information with precision and regularity when the pilot will be put online;
- It's also important to have structured information for the distribution based on the different levels for the diffusion (local, regional, national and international).

Besides those first points, the list of the actors' needs was "translated" in what we call in UML (*Unified Modelling Language* – the modelling methodology – tool chosen for the SAFIR project) the "Use Case". Four Use Cases were then identified for those needs (*cf.* § 4.4.2) and presented to the different partners. Thanks to those Use Cases, each one has had the possibility to describe the needs that best correspond to its expectations and where he thinks the added-value of vocal commands could be interesting for him. At the beginning, the only source for getting information was the inquiry form made by the Division of the Sport Infrastructures (*cf.* § 4.1.2), but this form was only focused on internal needs for the DGPL. It's why this form has also been discussed during this meeting to see if it is possible to go on using it (before the set on line of the decentralized update pilot – *cf.* § 5.3.2) for gathering information from all the partners and better responding to their global needs.


4.3.2.4 4th Focus Group

A fourth Focus Group took place on 10/01/2005. This meeting has the objective to continue the identification of users' needs starting with the existing database and to detect other needs that would be filled in with the pilot. As every partner has received and looked at the DGPL inquiry form, it was possible, during this meeting, to discuss about several technical points to transform it in a global one that could be acceptable for all. In fact, this form could go on to be used to keep the database up to date until the finalisation of the pilots (and essentially, the update pilot). Thanks to the "transformation" of the form, information will already correspond to global needs (thus not only internal to the DGPL) and it will not be necessary to look for "external" information (external for the DGPL) later.


4.3.2.5 5th Focus Group

A fifth Focus Group has been organized on 10/03/2005. At this meeting, different points have been started on to permit to conclude the reflection about the preparation of the pilot (WP 6):

- The point has been made about the situation about each partners' needs;
- The new database model (that was made thanks to the Use Cases elaborated in the first meetings) has been presented to the partners;
- A synthesis has been made about data's available in each institution and their technical aspect (description of those data's, their format, their access possibility,...). This kind of information is obviously important if a common system is envisaged around the different institutions for accessing all the data's concerning sport infrastructures in Walloon Region;

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- A presentation of the ontology about sport infrastructures (link with WP 5) has also been made to permit all the partners to become familiar with this aspect of the pilot.

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5 Description of the Walloon Pilots

5.1 Identification of the use Cases to be implemented via SAFIR Technologies

5.1.1 From a general scenario to specific Use Cases

At the beginning of the project (cf. WP 1 Deliverables), a global inquiry has been done in order to see and analyse where voice commands can be an added value for the three identified kinds of users (cf. § 4.2.1). As conclusion of this inquiry, a global scenario was thought to demonstrate the possibilities of the new technologies and the pilots built under SAFIR technologies:

“...Imagine a stressed father, John, coming home from a hard day's work. To make his day "perfect", his car broke down and he had to take a cab to get home. His wife, Helen, also worked for half the day as an accountant in the near grocery store, the rest of the day she took care of the household. Their two children Mike and Susan were in school all day long. Therefore, John decides to take his family out to a nice event, to spend a fun evening together and forget about all the stress. Instead of looking through several papers or the yellow pages, making lots of phone calls or browsing the web in order to get information on what's on this evening, John goes to his living room where he has a small device connected to his television. This device connects him to all the services offered by his home town, and it can simply be controlled by giving voice commands. So John asks the device to list all events that take place in his home town tonight. Within seconds the device shows a list of all events (including cost, capacity, duration) on the TV screen which are suitable for the family, e.g. concerts, sport events, theatre performances, musicals, movies, etc. After a short discussion between the family members, they decide to visit tonight's ice hockey match at the stadium. John tells the device to book four tickets for the match, which are then automatically debited to his credit card. Because John's car broke down, he also instructs the device to tell him the shortest route and the schedule for public transport to the stadium. At the same time, he makes an appointment for getting his car repaired at the nearest car garage. The tickets for the match and public transport are already ordered and billed by the small device. They do not need to be picked up or printed out because they are stored electronically on John's SmartCard, which he now removes from the small device and puts in his wallet. Finally, the family can leave the house to enjoy an exciting evening, without having to care about anything else.

Imagine you could carry out any governmental task as easy as you could do this. This device named "Set-Top Box" would assist you in processing any governmental issue in your own living room, directly on your TV screen. No more visits, no queues, no stressed service personnel at your local authorities. Long winded form filling would belong to the past, as you are guided through the process with a spoken dialogue and instant help.


Previous research in the area of human-machine interfaces has shown that users significantly preferred the multimodal (visual and voice) interaction over the unimodal (only visual, or only voice) interaction.

Multimodal systems were faster to use. Another outcome of this research was that users of multimodal systems were much more inclined to use and recommend a multimodal system in the future....”

Thanks to this global scenario, general usages for the entire SAFIR project were extracted. But those usages have to be refined for each domain in which a pilot has to be built in order to respond as good as possible to their specific needs. For example, if we read back the above scenario, we can say that the application which will automatically debit the father's credit card is not the same (and therefore has not the same needs) as the one which will give him information about sports events near his home.

To respond to those different aspects, specific usages for the future sport infrastructures database have been identified during the preparation phase with the help of external actors (cf. Focus Groups – § 4.3). To facilitate the analysis, it has been decided to “structure” those different needs and to group them into four generic categories. For each one, a Use Case has been built in order:

- to formalise the needs with a specific UML tool built for this kind work. Indeed, Use Cases are frequently used at the beginning of a new project because they permit to clearly identify the different actors involved in the project and their interactions before going further;

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- to facilitate the future work of the database “remodelling” (cf. § 4.5). Indeed, thanks to the Use Cases, it’s possible to clearly define the different requirements the system has to fulfil. It’s why the Use Cases are used as a “vital lead” during the all development phase.


5.1.2 Presentation of the first general Use Cases

Below are presented the four categories identified with, for each one, the Use Case describing the actors and their interactions:

- Managing sport infrastructures



Figure 5.1 – Use Case for the management of sport infrastructures

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- Practicing sport:

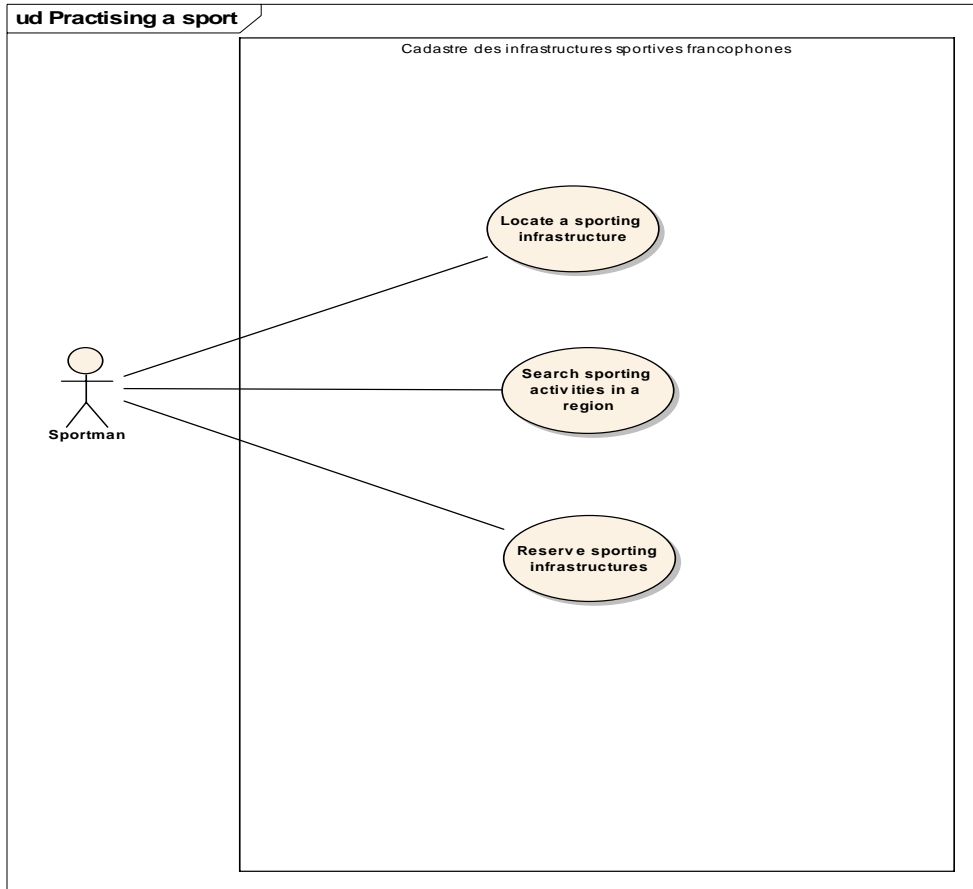


Figure 5.2 – Use Case for the practice of sport

- Organizing sport events:

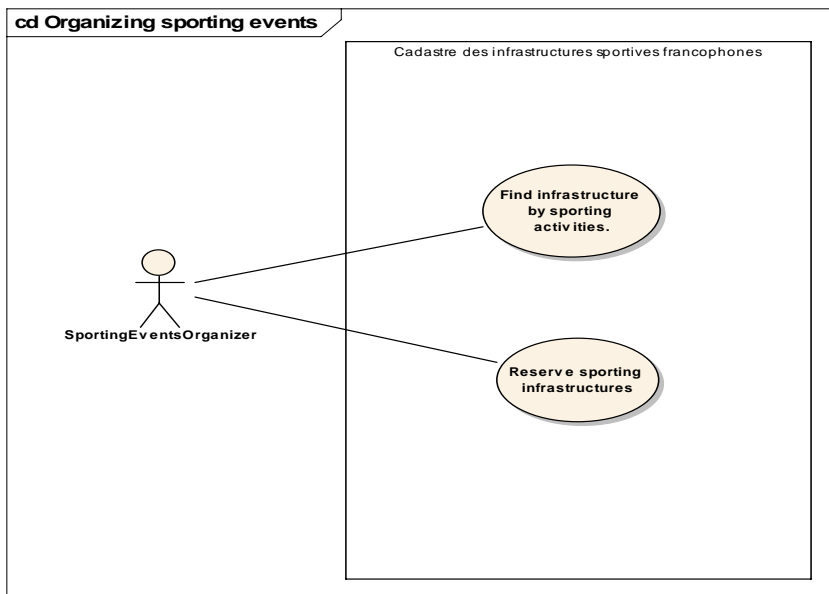



Figure 5.3 – Use Case for the organization of sport events

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- Promoting sport activities:

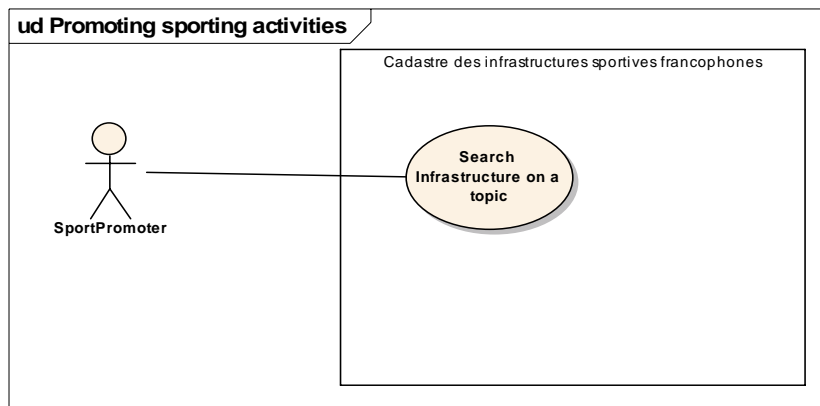


Figure 5.4 – Use Case for the promotion of sport activities

It's important to remember that the objective of those first general Use Cases was to model the actions we have firstly envisaged for the different actors when the pilots will be online. But, the work in the WP 6 has shown that several technical requirements will prevent some envisaged actions to be implemented. For example, the second Use Case ("Practicing sport" – cf. figure 5.2) illustrates the possibility for a sport-man to reserve a sporting infrastructure for his training. The implementation of such an action seems to be very difficult because it will ask a too big number of connections (for the network system) between the local sport infrastructures and the diffusion database (as for consultation as for update).


We also can see, with those first Use Cases, that the use of the database will certainly be extended comparatively to its use before the start of the SAFIR project. Indeed more than only a tool for decision making and management for the DGPL, the Cadastre will now also become a tool for helping citizens in their day to day life (for example, when he looks for a place near his house to practice his favourite sport). We found here the key for the consultation pilot (WP 8.1).

Moreover, like we will see later in the next paragraphs, information will be more accurate and complete thanks to collaboration with external actors. Those can be institutions like ADEPS, AES, AISF, FRSEL, Ministry of National Defence (who are included in the Walloon pilot tanks to the Focus Group – cf. § 4.3), or directly the persons in charge of sport infrastructures. In the future, it's envisaged that those two kinds of partners will themselves become responsible for the update of their own information in the database. We found here the key for the decentralized update pilot (WP 10.3).

5.2 The Walloon Pilots

With the advancements in the work of WP 6.3, it has quickly appeared that two pilots could be made for the database of sport infrastructures in the Walloon Region:

- one for the citizens (WP 8.1 – database consultation). Those one will be able to access "general" information (for example, about the localisation of the nearest infrastructure that permits to practice a given sport, but not about allowances accorded to them) only for consultation. The database will therefore be put online thanks, firstly, to dynamic web pages generated from the database content and, secondly, to a specific application made to permit vocal commands (cf. development of the Set-Top-Box in the WP 1 Deliverables).
- one for the selected user (WP 10.3 – decentralized database update). Those one will have a complete access for consultation for all data's and, moreover, will also have the permission to update the information for one specific "dataset" if they belong to the correspondent group in charge for its management. As explained in the past paragraphs, the selected users are essentially the partners who have participated to Focus Groups and the persons directly in charge of the sport infrastructures. In fact, those users will become in the future responsible for the information concerning the infrastructures for which they are in charge (for example, it's the ADEPS who will be responsible to hold up to date the information about sport training courses for the sport infrastructures which give this possibility to citizens).

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5.2.1 Consultation pilot (WP 8.1)


The first pilot has to allow the citizens to consult information about sport infrastructures in Walloon Region simply by interacting with their television and using voice commands. At the moment, this type of information is split between the different institutions (*cf.* Focus Group – § 4.3) and it's therefore not easy for the citizen to have a global view for his researches in this domain. Thanks to the SAFIR project, those institutions have gathered and decided to build a unique gateway for accessing information about sport infrastructures in the Walloon Region. With this gateway, the citizen will be able to access transparently and in a “natural way” (thanks to the implementation of the ontology layer – *cf.* WP 5) information of one kind which is managed by one of the Focus Group's partner (by example information about school sport events managed by the AES) as information of another kind which is managed by another partner (for example, the localisation of those infrastructures managed by the Cartographic Service of the DGPL).

Different steps have been thought for this WP (*cf.* Technical Annex):

- Architecture definition of the pilot.
- Finalization of the Use Cases which are linked to the database consultation. It's important to start here with the Use Cases and scenario's elaborated in WP 1 and 6 (*cf.* § 4.5).
- Definition of the different information sources (from Focus Group's partners) to enrich the actual database.
- Modeling and implementation of the atomic Web Services for database consultation. Indeed, to allow the ontology layer to work, the database has to be queried by Web Services. To facilitate this step, it has been decided to build what we have called “atomic Web Services” to first generally query the database. After that, other specialized Web Services would be added and “chained” to the firsts one to allow the system to respond to specific queries coming from the citizens.
- Implementation of the ontology based Web Services to allow the citizens to query the database in a “natural way”. In fact, when the citizen will query the database with vocal commands through SAFIR technologies (like the Set-Top-Box), it's necessary that the sentences he has said would be “translated” in SQL statements that will be serialized and understandable by the system. For example, if he says: “Where can I practice tennis near my house?”, the system has:
 - firstly, to ask to the citizen what is his address;
 - secondly, to transform this address in (X, Y) coordinates (thanks to the “*Coordonnées Lambert*” Web Service);
 - thirdly, to query the database with a correct SQL statement basing on the actual database model.
- Definition and implementation of access rights for the citizens to allow them to access “in consultation” information that can help them in their “researches” about sport infrastructures (for example about the situation of the nearest infrastructure that permit a citizen to practice his favourite sport). But this access has also to be restricted for other kind of information (for example, no access for allowances information).
- Creation of the final application specific to Set-Top-Box allowing activation of the database consultation using SAFIR technologies (voice and ontology layer). It's important to say that the Walloon consultation pilot will be the only one that will propose an application with the STB.

5.2.2 Update pilot (WP 10.3)

The second pilot has to permit the different partners (who are called “selected users” in the SAFIR environment – *cf.* § 4.2.1) to access and manage data's for which they have an (or some) update(s) to do. The objective of this pilot is in fact to give at each partner the responsibility to keep up to date the information for which he's in charge. As all information will be in future accessible from one only gateway, it's important to think about the possibilities for data's exchange between the different partners and about the security for the updates. Indeed, if the person in charge of the training courses (from the ADEPS) has to introduce a new session for one local infrastructure, he must also have the access rights “in update” for

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database tables in relation with this kind of information, but not for the others. Therefore, we find here the important point for the secured information access.

Different steps have also been thought for this WP (*cf.* Technical Annex):

- Finalization of the extension of the database content due to specific requirements and usages defined during the Focus Groups. As at the beginning the database model was only thought for internal DGPL's needs, there was no place in it for other data's. It was therefore necessary to "extend" this model to gather in it all information coming from the DGPL's partners.
- Preparation and execution of the data "integration". Indeed, it' will be important to see how to migrate data's coming from all the partners to the global database, and after, to see how to integrate those data's in the global model in order to treat them "on the same level" for the update aspect.
- Definition and implementation of the updates procedures. As in the new database there will be information coming from different partners, it's necessary to define how this information will be held up to date. Two important points have here to be treated:
 - Firstly, each partner has to have the update access rights (through a Specific Authentication Mechanism) that allow him to manage the information for which he's in charge but has also to have no update access right for the other information which are under the "responsibility" of other partners;
 - Secondly, it will be important to see how the updates will be made. As we will see in the next paragraph, the solution could be to use a command file written in XML that will be sent regularly to the production database to update the records of infrastructures that have recently been modified.


5.3 Specialisation of the Use Case

In the previous paragraphs (*cf.* § 4.4.2) we have seen that four Use Cases have been built to describe the global using of the Walloon pilot. But, with its "splitting" and its specialisation (*cf.* § 5.2), it appears that:

- some of the needs identified in those first Use Cases won't be implemented. For example, with the identification of technical network problems (*cf.* § 4.2.2), it has been decided to give up the possibility to directly reserve a sport infrastructure through the pilot. But if the official website of a particular site permits it, it's envisaged to put the link to the external web page in the information returned by the pilot to allow the user to profit of this "local facility";
- the identified needs can now be separated according to the pilot they are referenced to. For example, the localisation of sport infrastructure by a sport-man (*cf.* figure 5.2) could be linked to the consultation pilot while the information update related to an infrastructure (*cf.* figure 5.1) could rather be linked to the decentralized update pilot.

In order to respond as good as possible to the different needs of the two pilots, it has been decided to use two kinds of Web Services:

- the first one will be called "atomic Web Services" and will have the objective to "generically" query the database. Indeed, the query can always been translated to a JDBC connection to the database where we only have to put good parameters in the SQL query clauses. It's here envisaged to see those parameters as the results coming from the treatment made by the ontology layer;
- the second one will be called "specific Web Services" and will have the objective to specialize the first one in order to find the good information corresponding to the criteria's sent by the user (i.e. which tables and which columns to put in the SELECT clause and which conditions to put in the WHERE clause).

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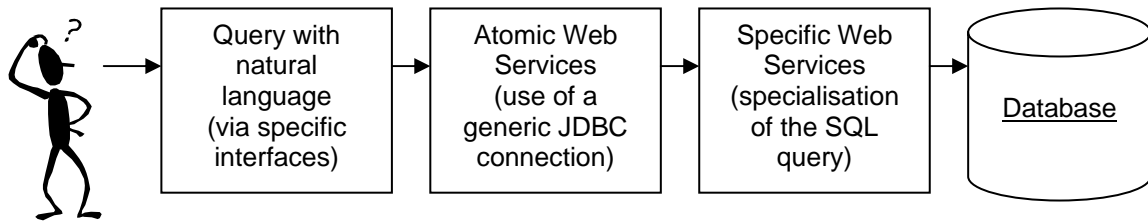


Figure 5.5 – Chain of Web Services

5.4 Data Modelling of the INFRASPORTS database

Thanks to Focus Group (*cf.* § 4.3) and identified Use Cases (*cf.* § 4.4.2), actual and possible future needs for the DGPL and other actors have been identified. This made necessary to “remodel” the old database to respond to those new needs and to be in adequacy with the “stretching” of the database scope. Indeed before SAFIR, the database was stocked on MS Access and its model was very simple because its use was only internal in the DGPL. After the identification of the new needs, it has been very quickly noticed that it was necessary:


- to change the system (i.e. the Relational DataBase Management System – RDBMS) to manage the database. The choice for the Walloon pilot has gone to Oracle because:
 - it has a better robustness for the database management (no possibility for data recovery, data dumping, records locking... in MS Access);
 - it allows more portable applications (thanks to the application server and the fact that Oracle can be installed on different platforms);
 - it allows the storage and the management of geographic information.
- to build a new model for the database that respond to all the identified needs. To succeed in it, the chosen modelling tool for the SAFIR project (Enterprise Architect) has been used. This permits us, firstly, to build a new Conceptual Model and, secondly, to transform it in a Deployment Model that could be introduced in the specific Oracle database instance built for the Walloon pilot (*cf.* annexe IV).

5.4.1 Transfer from MS Access DB to Oracle DB

After this modeling step, it was necessary to export information present in the old MS Access database in the new Oracle one. This has been made thanks to Perl programs that took as input text files coming from MS Access and transform them in SQL files that could be directly introduced in the Oracle instance. But, for this transfer step, it was important not to forget the requirements of WP 5 focused on data quality. Indeed, no quality rules were present in the MS Access database neither for the insert nor for the update of (new) information. So it was possible to find:

- some consistence errors. By example, it will normally be only one record for one sport infrastructure but some of them correspond to more than one record in the database. In fact, sometimes, in place of updating the existing record when new information is arriving, a new record was created in the database and, therefore, plays a role of “double”;
- some lacks of information. By example, for the localisation of an infrastructure (*cf. infra*), it’s mandatory to have at least the postal code and the street name of the building, and, for some records, this information is missing.

Thanks to the transfer from the MS Access database to the Oracle one, we were able to correct some faults automatically. By example, if we knew for an infrastructure its locality name and its street name, it was possible, thanks to a Web Service elaborated in the Cartographic Service of the DGPL (called “*Listes des rues*”), to find its correct postal code that can be used after for its localisation. But we also have to notice here that some initial faults can’t be corrected automatically (for example if a street name doesn’t exist anymore) and moreover that automatic corrections could also introduce new errors in the database (e.g. if the Web Service returns a list of street names and “chooses” a wrong one for the correction). Therefore, a manual phase of validation for the database contents will still be necessary.

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5.4.2 Geographic information

Before the start of the SAFIR project, alphanumeric information (in the MS Access database) was linked to geographical information (on a specific spatial layer in a GIS – cf. § 4.1.2). With the transition to the new system, it has been decided:

- for the localisation of the sport infrastructures: to use the existing information and systems from the Walloon cartographic services;
- for the management of this geographic information: to use the fullness of Oracle for the spatial management. Indeed, this RDBMS permit to store geographic information as the other alphanumeric data's in particular columns and to use them for specific spatial analysis.

Since 1991, a global project (called in French “*Programme Informatique de Cartographie Continue*” or PICC) has been launched in the Walloon cartographic services to build a Continuous Cartographic Informatics Map starting from the vectorisation of aerial photography. This reference map (which has a high accuracy level – their scale is on 1:1000) allows the user to find spatial information about the streets, the plots of land, the buildings,... About those lasts, it's interesting to notice that a “splitting” has been built based on their occupation and/or their function. So, for what concerns the Cadastre of the Sport Infrastructures, it could be possible to add a distinction for this particular kind of infrastructures and to use this information as a spatial data in the Walloon pilots. In fact, it has been extracted from the needs list (cf. Focus Group – § 4.3) that it's important to be able to localise sport infrastructures no more only for help to decision making and management (for example, to know how many infrastructures permit to practice one sport in a given area – internal need for the DGPL) but also for information consultation (for example, to allow a citizen to know where are the nearest infrastructures that permit him to practice its favourite sport – external need for other external actors).


But as the project is always running, the PICC doesn't cover all the Walloon Region and thus it's not yet possible to use this information in the Cadastre. Therefore, it has been decided to use another source of information to localise the sport infrastructures before the first complete cover of the Region by the PICC. In fact, thanks to the address of those infrastructures (which was already present in the old database), it's possible to find their correspondent geographical coordinates X and Y (in the Belgian Lambert cartographic system) using a Web Service (called “*Coordonnées Lambert*”) elaborated for other specific applications at the Walloon Cartographic Services. It's just important to notice that the localisation is (obviously) pointed on the street and not on the actual situation of the asked element. Therefore, it would be a certain distance between the (X, Y) sent by the Web Service (which at the “street entry” of the element) and the (X, Y) of its spatial centre.

This Web Service asks as input:

- two mandatory parameters: the postal code and the street name. This street name has to be spelled in the same way than the correspondent name in the NAVTEQ database (a database registering all the streets in Belgium). If it's not the case, a first Web Service has to be used before (the “*Listes des rues*” – cf. § 4.5.1) to “correct” it;
- and one optional parameter: the police number. If this parameter is not given as input for the Web Service, the point will be localised at the beginning of the street.

In the old MS Access database, different situations were present:

- some infrastructures' addresses were “complete”, that is all information (street name, postal code and police number) were known. For those, the Web Service could therefore send an “accurate” information for the infrastructure localisation (providing obviously that the police number and other information were initially true);
- other have only the street name and the postal code. For those, the localisation is pointed at the beginning of the street. If this one is not long, the lack of accuracy is not so serious but it won't be the case if the infrastructure is situated on a big avenue. So it's important, in the future, to think to enrich the address data's (e.g. via the decentralized update pilot elaborated in WP 10.3 – cf. § 5.3.2);
- other have only the street name and the locality name but not the postal code. For those, it's possible to update the information and to find the correct postal code using the first Web

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Service (“*Listes des rues*”) as we have explained in the past paragraph. After, it’s possible to use the second Web Service as in the precedent cases;

- other have the precedent information (street name, postal code and/or locality name, plus police number eventually) but the Web Service don’t send any response because the fault in the street name was “too big” or because the correspondence between the street and the postal code was incorrect. For those, it’s unfortunately at the moment not possible to obtain the localisation information for those infrastructures;
- finally, other have no street name in the address information. As this information is the one which is mandatory (as the locality name can be used to obtain the postal code if it’s not present), without it, it’s not possible to use the “*Coordonnées Lambert*” Web Service and thus to obtain the localisation information directly for the related infrastructures.


5.5 Test on Web Service

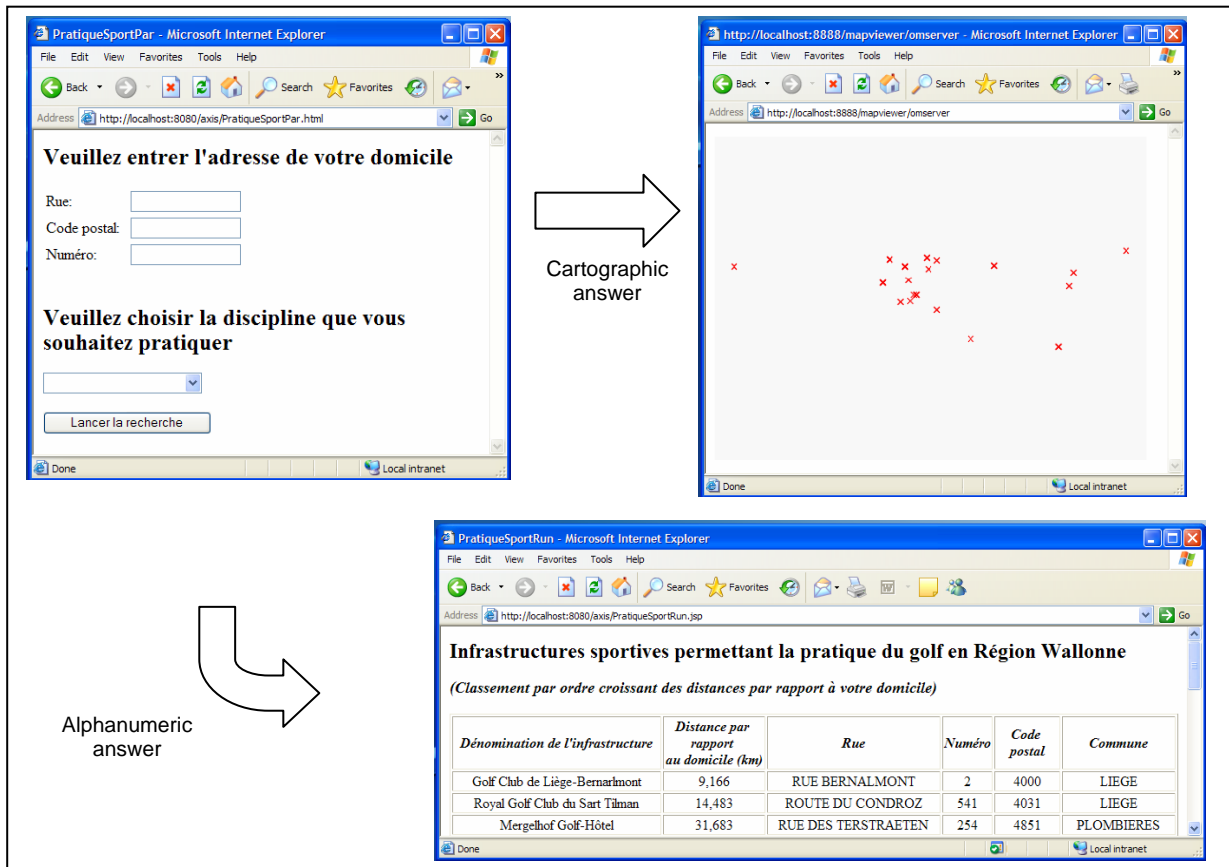
A “Consultation Test Web Service” has been built to evaluate the precedent preparation phases and to prepare the next work steps (focused essentially on the implementation of the “atomic Web Services”). We can summarize its functioning as follow:

- in a first step, it invokes the Oracle database (via a JDBC connection) to find information (i.e. the denomination, the address and the coordinates – X and Y in the Lambert Cartographic Belgian System) of all infrastructures responding to criteria’s sent by the user. We can notice that, at the moment, the criteria’s have to correspond exactly to the terms in the database (“I want to play golf, I have to type ‘Golf’ in the box for the research criteria”). But with the help of the ontology layer (*cf.* WP 5 Deliverables) of it will become possible for the user, in the future, to send those criteria’s (interactively first, with vocal commands after) in a “natural language”;
- in a second step, it calculates the distance (“as the crow flies”) between the founded infrastructures and the address filled in by the user (as another criteria for the query). This address is also “translated” in (X, Y) coordinates thanks to a new invocation of the “*Coordonnées Lambert*” Web Service (*cf. supra*) to allow the system to calculate the distances. To facilitate the reading of the results for the citizen, the infrastructures are sorted in an increasing order of distance from the input address.

The Test Web Service will then respond to the user with 2 screens:

- The first one will present to the user alphanumerical information about the different sport infrastructures where he can practice the sport he has given as parameter of the query;
- The second one will present him a map where he will find (thanks a dynamic map request) each sport infrastructure responding to his query parameters. To facilitate the localisation of the selected infrastructures, a base map can be superposed to this.

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Veillez entrer l'adresse de votre domicile

Rue:
 Code postal:
 Numéro:

Veillez choisir la discipline que vous souhaitez pratiquer

Lancer la recherche

Cartographic answer

Alphanumeric answer

Infrastructures sportives permettant la pratique du golf en Région Wallonne
 (Classement par ordre croissant des distances par rapport à votre domicile)

Dénomination de l'infrastructure	Distance par rapport au domicile (km)	Rue	Numéro	Code postal	Commune
Golf Club de Liège-Bernalmont	9,166	RUE BERNALMONT	2	4000	LIEGE
Royal Golf Club du Sart Tilman	14,483	ROUTE DU CONDROZ	541	4031	LIEGE
Mergelhof Golf-Hôtel	31,683	RUE DES TERSTRAETEN	254	4851	PLOMBIERES

Figure 5.6 – Screenshots of the Test Web Service

5.6 Technologies


5.6.1 Global architecture of the Walloon pilots

From a technical point of view, two generic environments have to be defined to respond to the different needs of the two pilots we have just described (cf. § 5.2):

- a “production” one that will gather the local partners’ databases and generalize them in the structure of DGPL initial database.
- a “diffusion” one that will content the validate data’s for the pilot and which will be accessible:
 - from citizens for database consultation (limited to the “opened information”). This consultation will be done thanks to Web Services which will be stored in what we call “a repository” in order to describe them in an interoperable way;
 - from selected users for database consultation (for all information, “opened” and “secured”) and update. Here appears the problematic of the access rights.

It has been decided to use the same database model for those two environments; this model is the one which was built after the Focus Groups discussions (cf. § 4.3.2.5).

Figure 5.7 illustrates the envisaged architecture for the pilot deployment:

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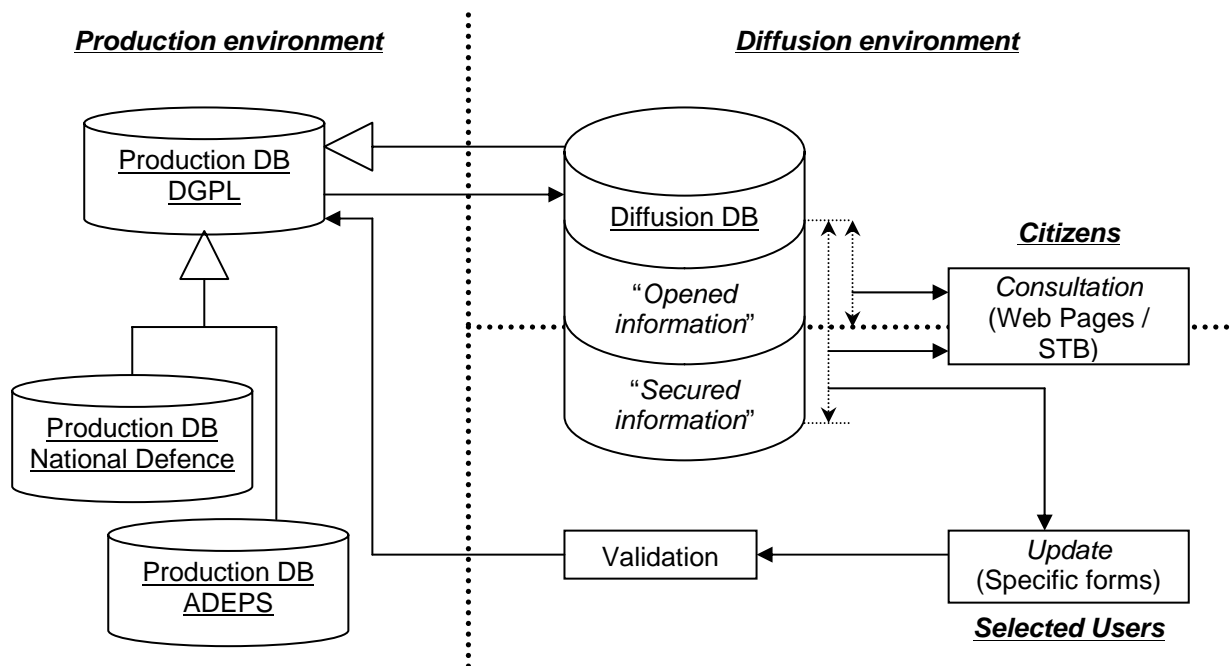


Figure 5.7 – The global architecture

5.6.2 Production and Diffusion Databases


A problem will obviously appear with the definition of the two environments we have just defined because they are to be synchronised regularly (if an update is made for one infrastructure in the database of the ADEPS, it has to be “reproduced” in the diffusion database for the citizens). As it has been decided during the Focus Groups that the database models have to correspond to each other, the synchronisation has only to be done for the data’s. We can therefore envisage two “architecture solutions” to implement the collaboration with the partners:

- The first one (*cf.* § 5.4.2.1) is to keep the databases of the institutions in their places and to build an Information Transfer System based on XML between them for permitting the citizens to reach all information transparently from only one gateway;
- The second one (*cf.* § 5.4.2.2) is to build a global database gathering all information coming from the different partners and to give the access to this database at each of those partners thanks to the gateway.

5.6.2.1 Separation of the databases

If the partners keep their database in their place, we could think about a synchronisation with Web Services in a distributed databases architecture and, therefore, on a solution with a managed replication of the information between both environments.

For this solution, the global architecture (*cf.* Figure 5.7) will be specialised as followed:

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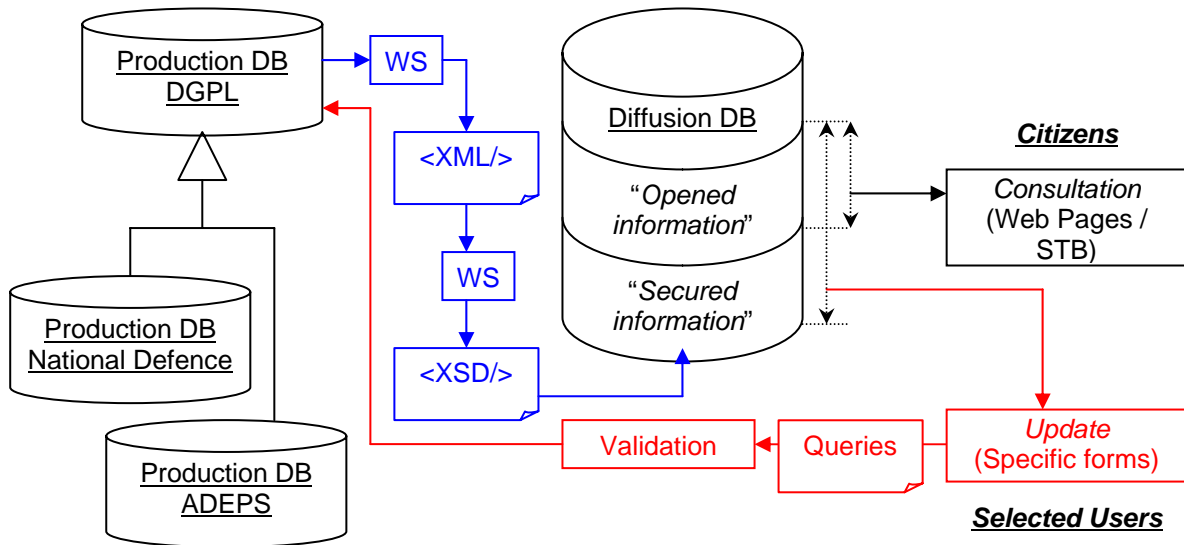


Figure 5.8 – Specialisation of the architecture if separation of the databases

5.6.2.2 Synchronisation from Production DB to Diffusion DB:

A Web Service for extracting data's in XML format is created by the side of the production database. The XML generated file follows a XSD schema that corresponds to the transfer model of the system. This XSD schema is in fact an extension of the reference one in the sense that we will add to it the possibility to generate a metadata layer (describing, for example, the structure of the results contained in the XML file). Those metadata will be used by the Web Service for the data's import by the side of the diffusion environment to correctly translate the XML file in SQL insert, update or delete statements. The execution of this second Web Service would be commanded by a specific component (like a listener) configured to work at regular intervals. In order not to disturb the functioning of the pilot, it's envisaged to let it work in the night when nobody has to access the database.

5.6.2.3 Synchronisation from Diffusion DB to Production DB:


In this way, an update has to be made in both environments when a selected user has to introduce (after consultation of the diffusion database) one or several modification(s) for information he is in charge. Before updating the record in the production database, a human validation phase is necessary to control the quality of this update. The solution is to stock all the updates made by a selected user in a command file and to send it automatically to the production environment at each synchronisation step.

We can find different advantages for this solution:

- It permits to keep the information by each of the partners (it will be therefore easier for them to hold it up to date and to manage it) but this information will nonetheless be integrated in the global schema built for the pilot;
- Thanks to the use of XML and information transfer with Web Services, the solution is appropriated for a heterogeneous environment system with, for example, the use of different RDBMS for the partners;
- Thanks to the use of XML files for the information transfer, the Web traffic would be limited. Therefore, even if frequent updates have to be done, those transfers wouldn't overload the network.

But this solution has also some difficulties to solve:

- The implementation would be difficult due to the use of Web Services. It will be important to take care of the security of those and to build a robust management for the synchronisation faults between the two environments;

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- A specific update policy has to be thought because the information could be shared between the different partners. Seeing that, for example, a person is registered in the internal DGPL database and is also registered in the ADEPS database, how could we make the synchronisation in the “federated” production environment to permit to keep the information coming from the two partners?

5.6.2.4 Fusion of the databases

If the partners decide to transfer all of their information to a global database, the solution will consist in a fusion of the production and diffusion environments. For this solution, the global architecture (cf. Figure 5.7) will be simplified as followed:

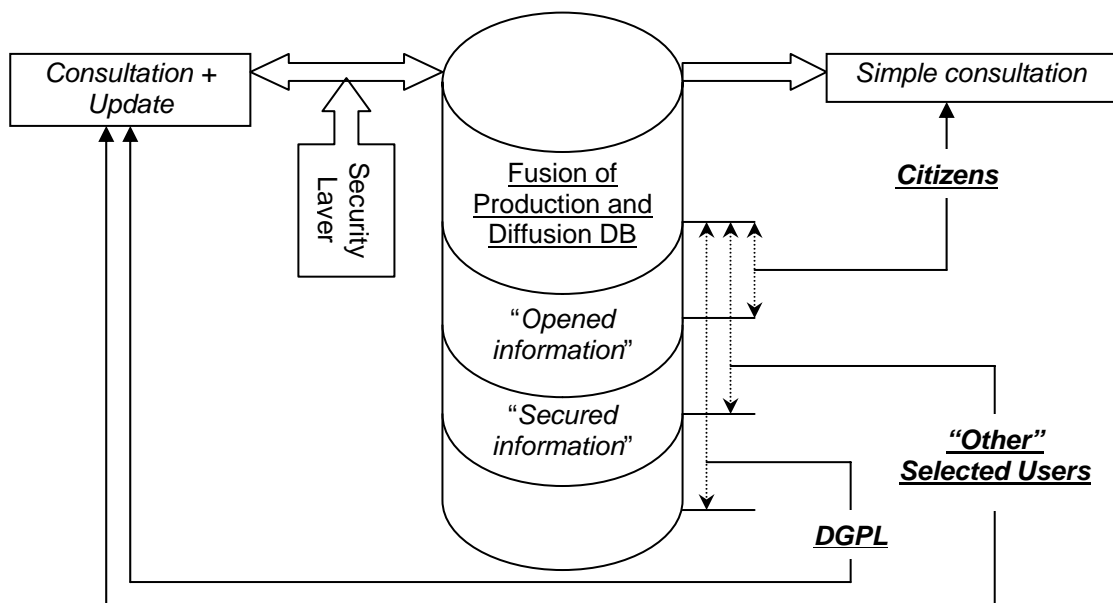



Figure 5.9 – Specialisation of the architecture if fusion of the databases

This solution seems obviously more simple than the precedent one. In fact, as all the data's will be in the same database, it won't be necessary anymore to use a “Synchronisation Mechanism”. As soon as an update is made in the database, this one will be visible for all the citizens and selected users. But some technical problems could appear here:

- If this solution is retained, the “fusion database” could be located in the DGPL. But this will provoke some problems for the database access from external partners. Indeed, the DGPL network, more than being behind a physical firewall that blocks all external access, has not been built to support constant information exchange and, therefore, after the setting on line of the pilot, we will take a lot of risks of network overloading;
- To solve this first problem, we can think to locate the fusion database in another place than the internal DGPL environment, in a hosting secured place. But another problems could here appear:
 - As the production and the diffusion environments would be on the same level, a block for one will provoke automatically the block for the other;
 - There is also some risks that some juridical problems append with the gathering of all data's partners in only one database. Indeed, it's possible that some of those data's are confidential for one of the partners and has not to be shared with the others.

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6 Conclusion

Work Package 6 can be seen as the intermediate step between WP 1 (which was focused on the global aspects for the realisation of the entire SAFIR project) and the WP which will work on the development of the pilots that will demonstrate the added value of the SAFIR technologies. This Deliverable summarizes the preparation steps (WP 6.3) for the two Walloon Region pilots (citizen consultation – WP 8.1 – and decentralized update pilot for the selected users – WP 10.3). Those pilots are focused on the Cadaster of the sportive infrastructures in the Walloon Region, Cadaster for which some data's were already present in a MS Access database of the Ministry of the Walloon Region (at the Infrasport service of the DGPL). To enrich this database and go on in the direction of the "opening", it was envisaged to contact the other Walloon institutions in charge of the management of sport infrastructures in order to propose them to take part in the project and in the elaboration of the pilots. Thanks to specific meetings (called "Focus Groups") which have gathered all those people:

- a possible integration of data's coming from the different institutions has been envisaged in order to give the access to the sport infrastructure information via one unique gateway;
- different possible usages for the future database were extracted.


With the results of the Focus Groups, it has been possible to propose some global Use Cases in the field of the specific domain where the Walloon pilots are present. Those Use Cases have then allowed the building of the Models of the new database and its relational structure. With the envisaged partnership with the other institutions in charge of sport infrastructures in the Walloon Region, those models have to take into account the needs and the possible integration of their data's and not more only those coming from the Infrasport service of the DGPL.

To succeed in the building of the Walloon pilots, different requirements have to be fulfilled at a technical point of view:

- It's firstly important to analyse which kind of architecture will be necessary to permit, at the same time, the citizen database consultation through voice commands and the ontology layer and the selected users database update through specific update procedures;
- This separation between the citizens' and selected users' usages leads to the security aspect as the first one will have less possibilities (only consultation for "opened" information);
- The access to information stored in the database will be done through Web Services (atomic and specific). To be interoperable at this point of view and to secure their use, it will also be important to build a repository which will gather all those Web Services and present them for eventual other application.

As conclusion, we can say that the preparation of the Walloon pilots has permit to extract:

- The possibilities they can bring. For example, the pilots will permit to lead to a partnership between different institutions in charge of the same kind of domain in order to facilitate the information access for the citizen via SAFIR technologies (it's what we called the G2G – "Government to Government" and G2C – "Government to Citizen");
- The difficulties to solve to succeed in it. For example, the pilots have to take into account the difference between the simple database consultation for the citizen and the database update for the selected users through the implementation of a security layer.

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