Making public administration's software public: The Andalusian Software repository

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Introduction

Since 2003, the Andalusian regional government is pursuing a comprehensive strategy to bring its citizens into the information society. Free/Libre/Open Source Software (FLOSS) is an important tool within this strategy. In 2005, the regional government also decided to make the software it owned available as FLOSS by means of a repository.

Andalusia is an autonomous community of Spain. Located on the southern part of the Iberian peninsula, it is Spain's most populous region with almost 7 800 000 inhabitants (17.8% of total population), and ranks second for area.

This case study will provide an overview of the uses to which the Andalusian government is putting FLOSS. The focus will be on the repository which the administration is using to manage its software more efficiently and share it with the public.

According to the interviews with people in the Junta, IT personnel in the Junta had known and used FLOSS for many years in the server environment (mail, files, web, and proxy servers) as well as security tasks such as firewalls. They were very satisfied with its performance. When the Junta set up its first web servers in 1996/7, these were running Apache on GNU/Linux from the start. FLOSS had therefore been present in the Junta for quite some time; but it only became more widely used when political decisions on FLOSS were made.

The idea of using FLOSS as a tool moved up through the hierarchy until it reached a level where political decisions were made. It appears that another very significant influence was that of the neighbouring province of Extremadura, which in 2002 started a large-scale project of using FLOSS in the educational sector.[1] There were contacts between the two regional governments, though these usually took place at the personal level.

Legal basis

The Andalusian government made a point of establishing a firm legal basis this journey. This is a marked difference to the case of Extremadura, where legal measures were put in place only after practical action had been taken[2]. Within the Junta, matters of ICTs belong with the *Consejería de Innovación, Ciencia y Empresa*, the ministry of Innovation, Science and Enterprise.

The Decree 72/2003

The legal basis of Andalusia's FLOSS is provided by a decree on “Impulse Measures for the Knowledge Society in Andalusia”, issued by the Junta on March 21, 2003. This decree is a sweeping and ambitious document. It states its rationale as that of catching up with other regions of the developed world:

> “Andalusia, which [...] missed the train of the industrial revolution and which for this reason still suffers from symptoms of backwardness, is today in a position [...] to take advantage of a second opportunity: to incorporate itself [...] into the knowledge society, in a second process of modernisation [...]”[3]

It aims

> "[t]o put the new technologies at the service of all Andalusian citizens, in order to reach a higher quality

1 for a detailed description, see the MERIT case study on Extremadura. Available at http://ec.europa.eu/idabc/en/document/1637/470.

2 For a case study on Extremadura, see http://ec.europa.eu/idabc/en/document/1637/470.

3 Decr. 72/2003, Introduction. BOJA 55/2003, p. 6024.

> of life, as well as greater social and territorial equilibrium, and to enlarge our industrial base while simultaneously increasing its competitiveness."

High on the list of priorities is the inclusiveness of this process, which, as the decree states, should be conducted *"in a way that guarantees social and geographical cohesion, to avoid digital divides that may exclude social or regional groups from these advances."*[4]

The decree's goals are, among others:

- to enable citizens to access Junta's services via the Internet
- to adapt the health and education sectors to the demands and potentials of the information society
- to ensure that all citizens have access to ICTs

Aiming to bridge the digital divide, it mandates the use of FLOSS in schools and Internet centres, as well as the fostering of knowledge about FLOSS. Teachers are to receive improved training in informatics, and ICTs are to be integrated into teaching practices.[5]

According to Art. 31 of the decree, all hardware bought by educational institutions has to be compatible with FLOSS operating systems. These computers will be pre-installed with all the FLOSS that is necessary for their intended uses. The computers that the Junta makes available in public Internet centres will use FLOSS. To promote the use of FLOSS, the Junta will establish an Internet help service to give advice for installation and use of such software.

The decree reflects the ministry's conviction that FLOSS has a high technical quality. More importantly, it enables the administration to implement large-scale projects that would be prohibitively expensive if proprietary software were used, mainly due to license fees.

It was further pointed out that FLOSS in most cases makes it much cheaper for citizens to use ICTs than proprietary software. Using such software for public services means that citizens are not forced to incur expenses for software licences in order to to use the same software as the administration. He uses to the example of a student, who can use the same software on her home computer as she does at school, without having to bear costs other than for the hardware itself.

The order of Feb. 21, 2005

An order titled "Order about public availability of the software of the Junta de Andalucia and its autonomous agencies" was adopted on Feb. 21, 2005. Based on Decr. 72/2003, the order aims to make the software to which the regional government holds all rights available as widely as possible, for the benefit of the public.

It lays the basis for a repository in which software is published to which the Junta holds all rights. Art. 1 states that all software in the repository will have "the character of free software", which in turn is defined along the lines of the FSF definition[6] in Art. 2. Source code and documentation are published along with the software binaries. However, Art. 5 makes it possible to withhold software from the repository "for justified reasons" (which are not specified any further in the text).

Though the 2005 order is aimed at the administration itself rather than at the educational sector, it is based on the same convictions about the advantages of FLOSS and its development model. The decree states that FLOSS enriches knowledge, can be improved upon by anyone, and makes

4 Decr. 72/2003, Introduction. BOJA 55/2003, p. 6024.
5 Decr. 72/2003, Introduction. BOJA 55/2003, p. 6024.
6 see http://www.gnu.org/philosophy/free-sw.html

cooperation with other public administrations easier.

As to future legislation, a decree on interoperability is currently being finalised by the Junta.

Promoting the spread and use of FLOSS

Guadalinex

Based on Decree 72/2003, the Junta set about preparing a customised GNU/Linux distribution, tailored to the needs of Andalusia. This distribution is called Guadalinex.

It is an adaption of Extremadura's gnuLinEx system (see below for details on this cooperation), though it is based on the Ubuntu GNU/Linux distribution rather than the Debian system used in neighbouring province. As reasons for this preference, the Guadalinex website states the long release cycle of Debian, and the fact that it is more complex than what Guadalinex requires.[7] The name “Guadalinex” credits neighbouring Extremadura's gnuLinEx (itself a contraction of “Linux” and “Extremadura”). It also makes reference to the Guadalquivir, Andalusia's biggest river.

There are two versions of the operating system which are publicly available: Guadalinex Base (or simply Guadalinex) is the default system, while Guadalinex Mini is optimised for older hardware. On top of these two versions, there are three varieties that are aimed at very specific environments. Guadalinex Centros de Día is used in day-care centres for the elderly; Guadalinex Bibliotecas targets public libraries; and Guadalinfo is for public Internet centres.

The variety Guadalinex Edu is specially prepared for classroom use. Normal users interested in the educational applications can download an educational supplement for their Guadalinex Base installation. The portal www.guadalinex.org offers advice and information on the project and the larger GNU/Linux world.

Those in the administration see numerous positive consequences of using Guadalinex in the educational sector. In the short term, users have at their disposal a broad range of high-quality application at very little cost. In the long term, it is hoped that the generation that is now being educated will not view technology as something that you simply put on top of your desk, but as something in which one can participate. For these children, technology will not be an esoteric subject matter (as often perceived by older generations), but something one can learn, understand and tinker with. As perceived by the government, FLOSS opens up possibilities for a much richer education in technology than is possible with proprietary software. Those interviewed hope that the use of FLOSS in education will give bring forth a generation of highly qualified professionals, who have learned to deeply understand technology and software from an early age.

Cooperation with Extremadura

Though certainly a pioneer, Andalusia is not the first or only region in Spain to become a high-profile FLOSS user. Experiences from Extremadura were very important for Andalusia, as they provided a reference of an approach of promoting FLOSS on the same scale. When deciding to use FLOSS as a tool, the administration was encouraged by the experiences that the neighbouring province had had with adopting FLOSS on a large scale.

With the administration of Extremadura nearby and open to cooperation, Andalusia was able to base its own efforts on the other province's experience. In 2003, a protocol was signed on cooperation between the two regional governments. Although their respective GNU/Linux

7 Guadalinex website: http://www.guadalinex.org/guadapedia/index.php/Guadalinex

distributions are not identical in their technical base (gnuLinex is based on Debian, Guadalinex on Ubuntu), they feature the same user level applications. Furthermore, both provinces jointly organise the yearly "Free Software World Conference", which they take turns in hosting.

Andalusia and Extremadura were in communication about FLOSS from the beginning of their respective considerations, though this communication happened mostly at a personal level. In his view, Extremadura managed to attract more attention, as the government there focused mainly on the educational sector. In contrast, Andalusia uses a broader approach, with a larger number of users and computers involved.

Shortly after Decree 72/2003 laid down the legal foundations for Andalusia's FLOSS strategy, the Junta took another significant step by signing a cooperation protocol with the government of Extremadura. On April 11 2003, the governments of the two provinces agreed on a "Protocol about the cooperation in matters of the use and spreading of FLOSS and, in particular, LinEx".[8]

Both Juntas agree that technological advance should be directed *"towards the solidary sharing of knowledge"*. The protocol explicitly looks to FLOSS as a condition for self-determination:

> *"To [improve the standard of living] administrations, citizens and enterprises must be protagonists of their own future. It is not enough for them to be consumers of technology; they have to know how it works, how it is made and how it can be adapted to their needs. Otherwise, their technological development would be dependent on others, and, as a consequence, their ability to decide about their own future would disappear."*

The preamble further states that citizens should not be forced to use proprietary software to interact with public administrations. It also considers that unlimited access to the source code of applications, together with the possibility to improve and share it, *"optimises public investment"*.

In this protocol, the government of Extremadura agrees to make the source code of its gnuLinEx distribution available to the government of Andalusia. It also commits to sharing its experience with integrating FLOSS into the educational system, public administrations and private enterprises, as well as with *"digital alphabetisation"*.

The government of Andalusia, on its part, commits to using the LinEx system as the basis for its measures to comply with Decree 72/2003, promoting FLOSS not merely as a tool for certain tasks, but as an instrument for sharing knowledge. Both Juntas will cooperate in developing new applications (to be licensed under the GPL), and in promoting FLOSS to their citizens.

Use of Guadalinex

In Andalusian schools, 240.000 computers out of 400.000 are running the distribution. 110.000 are linked together in a single network, with 1500 servers. The government claims that this is one of the world's biggest GNU/Linux installations.

There are also 637 "Centros Guadalinfo", Internet centres serving municipalities with less than 10.000 inhabitants. They are organised in collaboration by local, provincial and regional authorities. These centres not only provide Internet access to their 230 000 registered users, but also offer education about new technologies and other activities. They are very active, with 29 000 activities of various kinds having been organised there since 2003. The computers are pre-installed with the Guadalinfo edition of Guadalinex.[9] In addition to these, more than 500 public libraries have computers running the Guadalinfo variety of Guadalinex.

8 The text of the protocol is available online at http://www.juntadeandalucia.es/averroes/actualidad/andared/protocolo.php3
LinEx is the name of one variety of Extremadura's own GNU/Linux distribution, based on the Debian system/

9 Guadalinfo website: http://www.guadalinfo.net/faq_lista.php

The repository

The repository was in effect established by order of Feb 21 2005, which states that the government of Andalusia is to make publicly available the software it owns. This is to happen by means of a repository. The idea for such a repository first came up around 2003. The repository was announced in February 2006.[10]

The project is set up to comply with the Decree 72/2003, by promoting the spread and use of FLOSS. The repository is to make the government's software available to anyone who may find it useful. In the preamble to the 2005 order, the government states that

> "advantages of giving free character to the software which is owned by Andalusia's government are the enrichment of knowledge, the improvement and clean-up of the liberated software itself and the reinforcement of possibilities for cooperation with other administrations. In addition, opening up what has been developed promotes better quality and does not generate additional cost for the administration [...]."

A core motive for setting up the repository was to promote the sharing and reuse of software within the administration itself, in order to avoid duplication of effort and use the government's IT budget more effectively. By providing a point of exchange, it is supposed to stimulate a flow of software between different administrative bodies: Some may produce software, others may adapt it and improve upon it and feed it back into the repository.

Beyond improving efficiency within the administration itself, the repository is seen as providing a strong impulse for regional technology development, since enterprises and other public administrations s can use the same software as the Junta. Enterprises that develop software for the Junta do not have to invest time and money into re-inventing the wheel. Firms can favourably position themselves in fair competition, since as producers of the software, they are those who know it best. This benefits local enterprises and Spanish firms in general, leading to a winning situation for all. The Junta also considers that the project makes processes more transparent and increases security while optimising efficiency.[11] Though these are the stated goals of the project, the administration considers it important to remain flexible with regard to how to achieve them.

Implementation

In the Junta, each ministry has its own informatics service. Therefore within the Junta. there are a numerous informatics departments with a correspondingly large number of employees.

This lead to a lot of duplication of effort in the past, especially where software procurement was concerned, with different ministries developing similar things in parallel. To mitigate this problem, there were regular coordination meetings of the heads of the various ministries' informatics departments. In one of these meetings, the idea came up to share software between ministries.

At the Spanish national level, there are various working groups in which the autonomous communities participate. The Andalusian government was part of a group discussing possibilities for the reuse of public sector software. Though a FLOSS repository was considerably ahead of what was discussed there, it ran in the same vein.

A first task was to analyse the software the Junta already had. As the technical set-up of the repository was not particularly complicated, it was the cataloguing work that took the most time.

10 Repository website: http://www.juntadeandalucia.es/repositorio/

11 Press release by the Junta de Andalucía: http://www.andaluciapress.com/vernoticia.php?cod=39470

Software in the repository is ordered according to the IDABC software taxonomy[12]. The people setting up the repository also looked at initiatives like Adullact[13], and at SourceForge[14]. for inspiration Each ministry now has a person who is responsible for uploading projects into the repository, assigning categories, uploading documentation and source code. Before an application is made available on the repository, its quality is checked, and it is clarified who holds the rights to the software.

Legal aspects

There were no substantial legal obstacles to the repository project. The potentially troublesome question of rights to the software did not arise, as the decision to publish the government's software under a free licence only affects software to which the government holds all rights. This usually means software which has been developed for the administration, either internally or by a contractor. It does not include third-party software which the government is using, but does not hold the copyright to (e.g. Microsoft Windows).

A clause giving the Junta all rights to the software and its source code has been part of development contracts since at least the early 1990s. It was probably included because the people responsible for the contracts had a background as developers, who knew that without the source code and the rights to modify and redistribute it, the software would be of limited use for the administration. This clause was probably sought by the technical personnel of the Junta, rather than by the legal department.

Now, all contracts also contain the information that the software is destined for the repository. There is little opposition from firms to this, indicating acceptance of the idea. None of those interviewed recall that this clause has ever lead to procurement problems: *"I've never heard that the software companies told the Junta, 'we're not participating in your tender, because the terms of contract don't suit us'"*.

Licensing

In order for the software in the repository to become FLOSS, it needs to be placed under an appropriate licence; no final choice has been made so far as to which one to use. The Junta is presently considering the EUPL in its version 1.0 for this purpose. At the time of publication of this study, the ministry's legal department is analysing a translation of the text.

Putting a licence on the software in the repository requires additional work, such as putting licence headers into the source files. As most of the software already existed when the repository was set up, the licence headers have yet to be added in most cases. This means that technically, most of the software in the repository is currently not under a FLOSS licence. The inclusion of the license headers will be part of the next milestone for the repository, in May 2007.

It should be noted that some software in the repository may require the use of proprietary libraries or platforms.[15] As an example: An application such as AMATEL[16] may be FLOSS, yet it only works on a (proprietary) Microsoft Windows operating system.

12 see http://ec.europa.eu/idabc/fr/document/3499/5737
13 http://adullact.org
14 http://sourceforge.net
15 see http://www.juntadeandalucia.es/repositorio/softwaremap/trove_mas.php
16 http://www.juntadeandalucia.es/repositorio/projects/amatel/

Technical aspects of the repository

Hard- and software

Table 1 shows that the repository is set up using fairly standard software applications, all of them available under free licences.

Function	*Software used*
Operating system	GNU/Linux: Ubuntu 5.10 “Breezy Badger”
Repository software	GForge
Web server	Apache
Scripting language	PHP4
Mail server	Postfix
FTP server	ProFTPD
Database server	PostgreSQL
Authentication	OpenLDAP
Version management	CVS, Subversion

Table 1: Software used for the repository

Inside the Junta's intranet, a private server uses rsync to put a copy of the database and the directories onto the public server. Other Andalusian public administrations which are part of the Junta can put their software into the repository via the Junta's Intranet. Users from the Internet access the public server via http.

The hardware consists of two servers, both with an Intel Xeon 2.8 Ghz processor and 1Gb RAM.

Functionalities that have been added make it possible to map visits, and to display news (such as press releases about the repository). There is also an interoperability mechanism, which allows exporting of the repository information such as metadata and software to other repositories. The basic RSS syndication service available in GForge was modified to provide separate RSS feeds for each category, so that users can choose according to their interests. There is also an export of metadata in XML according to the specifications of the Spanish Ministry of Public Administration.[17]

Structure

The repository is divided into an internal and an external part. The external repository is the part that is accessible to the public. It acts mainly as web interface for the storage area. A PostgreSQL database provides information about software in the repository, which is stored at file-system level on a machine running GNU/Linux. The internal repository is only accessible from the Junta's intranet.

The external part of the repository is publicly accessible. Some applications can be downloaded right away; for others, an informal request to the Junta is required. According to the repository's website, this is necessary to identify the user and have her accept the conditions under which the

17 The XML structure is described at http://www.juntadeandalucia.es/repositorio/export/interoperabilidad.php

software is provided.[18]

The internal part utilises the full capabilities of GForge. Those responsible within each ministry can upload software, using an interface similar to that of the "visible face" of SourceForge In the internal part, there is also more information about the projects, such as which ministry has what number of applications in the repository.

The repository is not designed as a platform for collaboration between developers, but rather aimed at enabling the reuse of existing software. The internal repository does not try to build a developer community, except for horizontal projects within the administration. For the external repository, there is a growing need to provide a space for developer communities. One perspective is to develop e.g. educational software together with other Spanish regions.

Only persons belonging to the government of Andalusia may have authenticated access to the repository. Authentication works via the Junta's corporate LDAP system. The system assigns roles to users, depending on which they may contribute to existing projects or create new ones.

Until now, the repository does not accept contributions from outside the Junta. Local administrations have been wanting to contribute, but the repository was not yet set up sufficiently to deal with their questions. Enabling this remains a task for the future.

Usage

The repository currently (Feb. 19, 2007) contains 62 applications that are accessible to everybody. 175 programs are provided only to other public administrations, while 11 are reserved for use within the government of Andalusia itself. With an overhaul of the repository scheduled in the near future, the number of applications is likely to drop; but at the same time, the quality of the documentation and the source code provided should increase. The geographical distribution of visits to the repository can be tracked live on the World Wide Web.[19] Table 2 lists the applications which are downloaded most frequently.

18 http://www.juntadeandalucia.es/repositorio/softwaremap/trove_mas.php
19 Repository website: http://www.juntadeandalucia.es/repositorio/map/index.php

Application	*function*	*Number of downloads*	*uploading ministry*
AMATEL	Analysis of satellite images	589	Consejería de Medio Ambiente (Environment)
PLANES ESPECIALES	Staff management	499	Consejería de Justicia y Administraciones Públicas (Justice and public administrations)
APLOPD	Secure management of citizen data	422	Consejería de Justicia y Administraciones Públicas (Justice and public administrations)
Agenda Web	Web-based activities planner	414	Instituto Andaluz de la Juventud (Youth)[20]
Port@firmas	Electronic signatures	180	Consejería de Medio Ambiente (Environment)
Visual Behave Fuego I	Prevention of forest fires	172	Consejería de Medio Ambiente (Environment)
siroco	Document management	161	Consejería de Innovación, Ciencia y Empresa

Table 2: Applications downloaded most frequently from the repository

Though the site statistics are currently not very reliable, the following numbers indicate the scale of usage that the repository is seeing. From Sept. 1 2006 until Feb. 18 2007, the repository site received more than 17 600 visits. Apart from a drop during the Christmas season, there were between 150 and 200 visits each day, with more than 80% from individual visitors. Though by far the most visits originate from Spain, a significant share comes from Spanish-speaking countries of Latin America, namely Mexico, Venezuela, Colombia, Ecuador, Peru, Bolivia, Argentina and Chile.

Three of the applications in the repository currently have an active developer community. These are AMATEL (for analysing satellite images), which is also currently the most downloaded application; Enebro, a cartography application for handheld computers; and Seneca, which is used for managing educational institutions.

Costs and benefits

Setting up and running the repository is an additional task for the IT service of the ministry of innovation, science and enterprise. One person was hired to administrate the repository. This person does not upload the information/software to the repository; this is handled by each ministry for its own software. Rather, he acts as a contact point for user's requests and performs maintenance work.

The greatest part of the costs are caused by the work of collecting the data from each ministry, assessing the software available at each one; and by keeping the information up-to-date.

Requests for downloads of those programs in the repository which are not made available to all are currently attended to by those ministries which contributed the program in question. Though this

20 part of the Conjsejeria para la Igualdad y el Bienestar Social (Equality and Social Welfare)

requires some human resources, it is not much additional work.

A small contract of EUR 30.000 was awarded for the technical work of building the infrastructure, which consisted mainly of adapting a GForge installation to the administration's needs. At the contracting company, a maximum of three to four people worked on the project. If there had been qualified personnel within the administration, the same could have been achieved with even fewer resources.

The biggest part of the cost for the repository was related to taking stock of the software which the administration already owned and used. Prior to the inventory, the Junta did not really have a concise overview of its software. The inventory was quite beneficial in itself, as different ministries can now see what others have already developed. This often leads the different ministries to realise that their needs are quite similar. It is now possible to distribute existing software more widely and reduce duplication of effort, which leads to less money being spent on development.

Though the ministry of Innovation, Science and Enterprise issues recommendations with regard to technical matters such as the programming languages used, these are not binding, and accordingly not necessarily adhered to.

Those interviewed say that now the administration can do more with the same budget. Since the software it uses is tailored to its needs, it can work more efficiently. Another advantage is that public money spent on services instead of software licenses stays in the region. This especially benefits small and medium enterprises.

Presently there is a tender for improvements to the repository, for EUR 120 000. Among other things, the management of the repository will be automated to a higher degree.

Remaining tasks

Though the repository has been up and running in its basic form for some time, there are numerous issues to be addressed.

Remaining tasks are to complete the metadata about the software in the repository, and to gather and compile documentation and source code for the software. The process for managing formal requests for software also needs to be optimised, and the technical infrastructure needs to be improved. Quality control needs to be strengthened, and the upload process should be streamlined. The administrators plan to add a forge server for development behind the repository's private server.

In the longer term, there are considerations to make it easier for users of the Andalusian repository to access software in other repositories. Another idea is to enable contributions from outside the Junta. The aim is to make the repository a source of reusable components. But the first priority is to get all the Junta's software uploaded, a task which is far from finished at this time.

Evaluation

Though hard numbers are difficult to come by, all those interviewed consider Andalusia's use of FLOSS to be beneficial for businesses. That there are numerous activities around the repository. A network of firms is springing up to provide services related to the software in the repository. The money spent on these services by the administration remains in the region, rather than flowing out of the country.

It is now easier to break big projects down into small modules. This way, small, highly specialised firms, which would not be able to handle the whole project by themselves, can participate in the administration's tenders. Furthermore, firms can now acquire knowledge about applications they did not know about before. All the while, the Junta is saving money as the duplication of effort is greatly reduced.

Some technical shortcomings of the repository are currently being remedied. Those interviewed think that the communication of the project should have been organised. This could have helped to reduce the amount of cultural opposition within the administration.

It is the software inventory conducted for the repository that has had the most impact on the way software is used in the administration. The repository is fostering a culture of cooperation; but besides having the tool (i.e. the repository) itself, it is important to build awareness within the administration, both of the repository and of the advantages of sharing software. Having legal norms in the background helps, such as the decree of 2003, the order of 2005, and an upcoming decree on interoperability.

Resistance and support

As the technology behind the repository is rather simple, and there were no legal obstacles, the main challenges turned out to be cultural ones. The idea of publishing the Junta's software under a free licence did not meet with opposition so much as with fears and concerns, both within the Junta and among businesses.

Before the repository was started, the Junta consulted the local enterprises about it, many of which had developed the software in question. Their reaction to the proposal of a repository was positive, including seeing their work published as FLOSS. All of those interviewed for this study concur that there was no substantial opposition to the project from software companies. Neither were there problems with respect to Spanish or European norms of procurement or competition.

There was a certain degree of resistance within the Junta that had to be overcome in setting up the repository. This was mostly because some of the ministries were hesitant to see their software published, or even to share it with others. There were no objections to the goal of software reuse and cooperation, but that some in the Junta were not enthusiastic about making the software available to the public.

Andalusia's experience shows that culturally, it is quite a step for the public sector to open its software. The repository project was met with some degree of reluctance. People may be reluctant to publish their software's source code due to a lack of knowledge, or due to insecurity if it is really useful to others. A ministry might be worried that its software is simply not good enough, and that publishing it in binary or source form might hurt its reputation. There were also concerns that another ministry might publish a similar application of better quality.

In communicating the project, initially the emphasis was put on liberating the software, rather than

on collaboration. This is being reversed now, so that the employees in different ministries see more clearly the benefits they get out of the project. Now the repository is being communicated as a place for cooperation between different parts of the Junta. In hindsight, it appears that a thoroughly considered communication strategy would have been helpful.

Now that the repository is up and running, people can see that it fosters the distribution of knowledge, and that it creates opportunities for businesses that were not able to work for the Junta before. The next challenge is to build an agile and efficient cooperation between the different parts of the Junta. This is technologically somewhat more difficult.

Tasks ahead

The administration considers that it is necessary to involve a greater share of Andalusian society, and to improve the knowledge about FLOSS in the general population. Within the Junta, the technical personnel knows FLOSS rather well; there are even some pilot projects on desktop migration. But outside the administration, people rarely know that there is software that, besides being available gratis, also works well. A substantial percentage of people use unlicensed copies of proprietary software, often without knowing it.

To improve this situation, the Junta is working on a campaign to get information about FLOSS, and Guadalinex in particular, to computer vendors, so as to increase the commercial availability of the software. Until now, store technicians are sometimes afraid that when they sell a computer with Guadalinex pre-installed, customers might have more problems with the software. But with a little additional training, they would be able to provide the same service as for Windows.

Those working on the repository are very much in favour of a European repository for public sector software. They argue that having a repository similar to the Andalusian one at the European level would make a lot of sense. The Junta's repository is capable of exporting metadata in XML, and could be linked with a European repository.

Conclusions and lessons learnt

The government of Andalusia has put in place a remarkably comprehensive legal framework with the aim of taking its citizens into the information society. Though centred around the vague concept of the "information society", these legal measures - as part of an overarching plan - appear helpful in letting citizens and businesses take advantage of the possibilities offered by computers and the Internet.

On a more general level, progress on the implementation of Decree 72/2003 is said to be going well, beyond the government's initial projections. FLOSS is a key element in putting this legal framework into practice. It ensures that the spread of computers is not constrained by the cost of software licences. More importantly, it lets users truly get involved with the technology they are working with.

The strategy also looks promising for businesses in the region. In theory, the widespread use of FLOSS should ensure that the value they add stays in the area, rather than being siphoned off to large software companies based elsewhere. This should, in return, lead to economic growth.

The repository is one of the most tangible outcomes of the Andalusian strategy. It provides a good example of both problems and benefits that public administrations stand to experience when adopting a FLOSS strategy. One important lesson is that successful implementation of even a limited project requires good communication, in order to overcome cultural obstacles both inside and outside the administration. While outright opposition may be rare, fears and doubts need to be addressed.

The Andalusian repository also shows advantages which are real enough. The most obvious is that, as reported by all those interviewed, the duplication of effort in software development has been reduced. Another point in the repository's favour is the pronounced interest from other public administrations, mostly in the Spanish-speaking world. This indicates that efficiency gains are not limited to the administration managing the repository; other public bodies, sometimes on other continents, may benefit as well, without significant added cost to the original administration.

It will be very interesting to observe how the Andalusian approach fares. Both the regional administration and independent observers should watch closely how, and to what degree, the intended beneficial effects materialise. For the moment, there appears to be a lack of solid statistics; given that the legal foundation for using FLOSS as a tool for the development of the information society has only been in place for a few years, and practical measures for an even shorter time, this is not surprising.

This effort is unusually ambitious, affecting not a limited set of users in an institutional environment, but millions of people across Andalusia. It will take a long time for all aspects of Andalusia's FLOSS strategy to come to fruition; this is why the solid legal base is particularly important to ensure that the course is maintained in the long term. What we are now witnessing is merely the beginning. Especially due to its massive scale, the Andalusian experience provides, and will continue to provide, a useful example for other public administrations across Europe and the world.

This case study is brought to you by the Open Source Observatory and Repository[21], a project of the European Commission's IDABC project[22].

21 http://ec.europa.eu/idabc/en/chapter/452
22 http://ec.europa.eu/idabc/en/home

Annex

Glossary

Art.	Article
Decr.	Decree
EUPL	European Union Public Licence
FLOSS	Free/Libre/Open Source Software. Software which may be freely used, studied, and adapted, and modifications of which may be freely released.
FSF	Free Software Foundation
ICTs	Information and Communication Technologies
Junta	government of a Spanish autonomous community, such as Andalusia

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