

Consortium for studying, evaluating, and supporting the introduction of Open Source software and Open Data Standards in the Public Administration

Project acronym: COSPA



Work Package 4

Identification of target OS applications to use in the partner PAs, their customisation to fit the ODS, with specific attention to the use of proprietary tools by the other applications still in use in the PA

Deliverable 4.3

Experience report on the implementation of OS applications in the partner PAs

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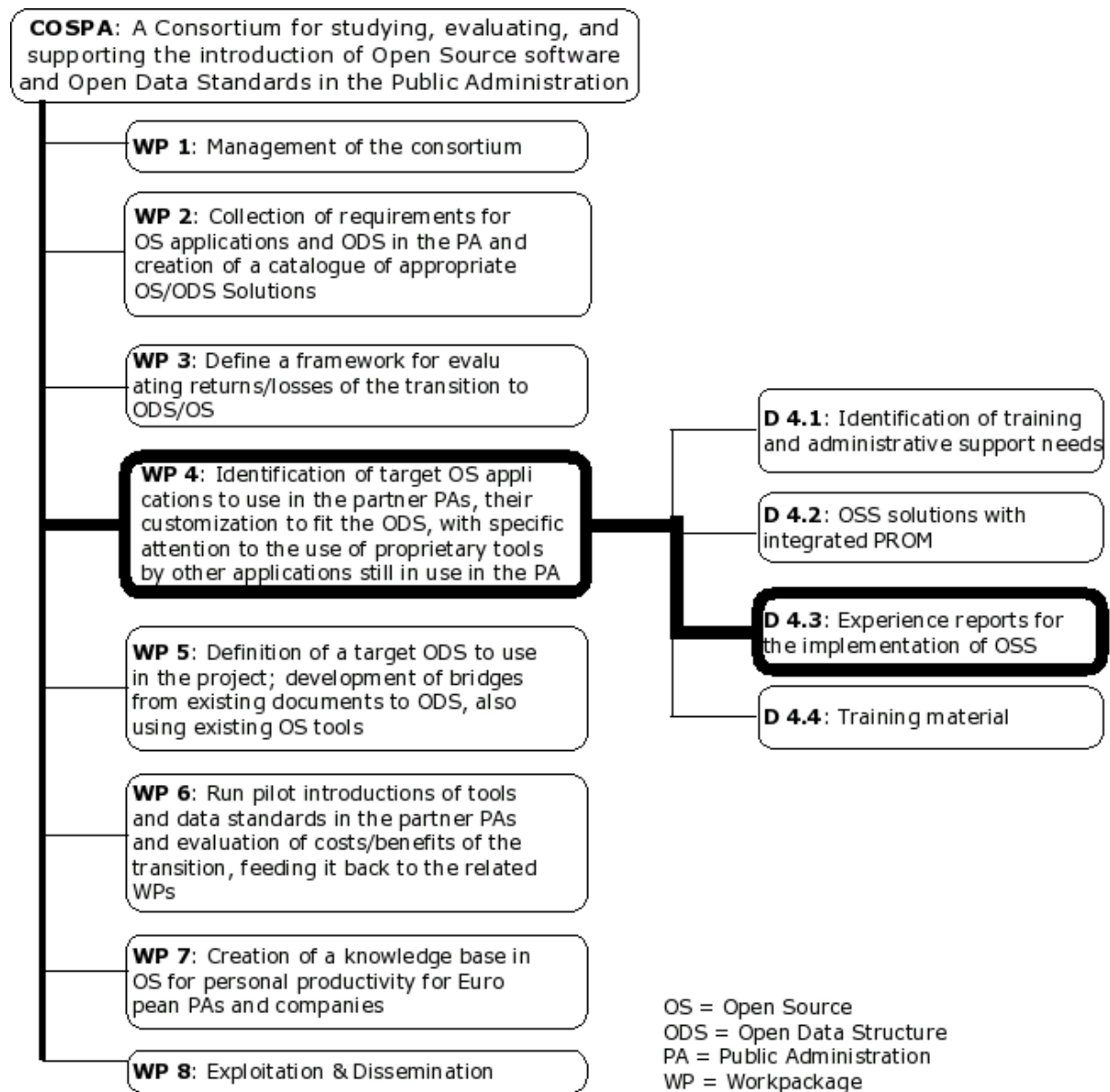
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Deliverables Navigator



Executive Summary

This report collects real-world experiences of a small number of Public Administrations (PAs) in a variety of countries and contexts which have adopted Open Source Software (OSS). It synthesizes from the data their strategic potential for OSS migration in terms of a Virtual PA Matrix, showing how A PA's size and available financial resources contribute to its options in terms of technology or service innovation. The ultimate goal is to use this positioning to provide a strategy assessment tool for any European PA considering future OSS migration plans.

The experience reports come from PAs in Denmark, Italy, the Republic of Macedonia, Ireland and Hungary, and are largely expressed in the PA's own words. This approach brings out the variety of factors that contribute to the success or relative failure of the migrations, including how user buy-in contributes to or slows down migration, how far a pro-OSS public policy influences the process, and to what extent specific software applications and even document types can affect the success of a migration. All of these stories provide examples of the kind of situations to be expected and illustrate different ways of handling them.

At a more strategic level, the Virtual PA Matrix shows that most PAs in the COSPA project are fairly large in size while exhibiting low growth in their economic resources. This means that the services they provide and their administrative business processes are fairly stable over time, and that they focus on cost saving. Their optimum strategy, therefore, in terms of technological innovation (i.e. opting for OSS and Open Data Standards (ODS) is more likely to be that of a follower than a front runner. If this sort of positioning proves generally true for other PAs, then many of them will benefit most from a lower-risk, learning-centric approach to OSS migration, compared to a higher-risk, innovation-centric strategy. The learning option will enhance the value of COSPA's objective, shareable knowledge about OSS migration as an asset for governments and the PA community as a whole when seeking to lower IT costs while maintaining quality of service.

0 Introduction

COSPA is a consortium for studying, evaluating and supporting the introduction of Open Source software (OSS) and Open Data Standards (ODS) in the Public Administration. It consists of partners from PAs, Universities and Industry. It is a two year project investigating the introduction and issues surrounding the deployment of OpenOffice.org and Linux on desktops in the partner PAs. Further information can be found at the COSPA project website[4] and links to a number of articles relating to the project can be found at [5].

This document contains the results of experience reports on implementing Open Source Software (OSS) submitted by the partner Public Administrations (PAs).

In this report, real-world experiences of PAs adopting OSS in a variety of countries and contexts are described and discussed. Although the information collected in this way (via questionnaires and interviews) is presented in a less formal structure than tables of results in other deliverables, we believe this more informal approach will be more accessible to other PAs than more impersonal approaches, and thus provide a beneficial resource for any PA considering experimenting with OSS.

The reports covers experiences from a number of PAs from Denmark, Italy, the Republic of Macedonia, Ireland and Hungary, and concludes with a discussion of the relevant factors, policies and categories affecting any decision to move to OSS.

This document is organised as follows:

- **Method** - how the data was collected;
- **Results** - reports of the OS experience of a representative number of partner PAs;
- **Discussion** - comments about the data collection process and the results;
- **Conclusion** - ideas for future directions;
- **Appendix A – Abbreviations** - defines all the abbreviations used in the document.

0.1 Scope

The main purpose of this document is to describe the early and ongoing status of OSS experimentation in partners PAs. It results from intensive participation by most partners, (shepherds and PAs), to ensure the quality and accessibility.

It features a selection of representative PAs report on their experience with OSS, points of strength and problems encountered, making it a valuable reference For decision makers in other European PAs that are evaluating a transition to OSS.

This document does not address experiences and cost/benefit analysis during the later stages of the experimentation, since these are to be documented in Work Package 6.

0.2 Methodology

The research carried out by the Sheffield unit of the COSPA project was coordinated by its principal investigators who played a leading role in identifying the core research focus. Weekly meetings are held to verify the current status of work, check the progress and delineate the action points until the next meeting.

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The principal investigators coordinate the work with the other groups within the COSPA project. Each deliverable produced is verified by at least one of the principal investigators.

1 Method

The method used in this deliverable was strongly influenced by its scope. To ensure that it addressed the concerns of PA decision makers, PAs were closely involved in the writing. A PA is likely to be more capable of focussing on points that are interesting and relevant for other PAs.

The PAs within the consortium vary in geographical location; size, and status of implementation of OSS. They were asked to write a report on their own experience, using the Good Practice Framework [1], produced by the eGovernment Unit in DG Information Society programme.

PAs received support while writing the document to ensure that the questions were clear and understandable, and to that useful and relevant information would emerge from the process.

FUB and USFD were jointly responsible for the research, and they shared the the job of ensuring that PAs delivered the required information.

USFD collected the material and was responsible for producing and revising the document.

2 Results

This section includes the reports of the ongoing experimentation on OSS within the partner PAs. Experiences during the later stages of the experimentation are to be documented in Work Package 6.

2.1 Beaumont Hospital (BH)

2.1.1 Background

Beaumont Hospital is a 690-bed acute general hospital located on the north side of Dublin. The hospital provides acute care services across 54 medical specialities and is the national Irish referral centre for Neuroscience and Renal Transplantation. The hospital offers in-patient, day patient, out-patient and casualty services to the population which it serves.

In 2000, a new piece of legislation – the Copyright Act – was passed. This new law stipulated for the first time that the use of unlicensed software was a criminal offence. At that point, in Beaumont Hospital was significantly exposed to the use of unlicensed software, lacking around € 1 million in funding to remedy the situation.

2.1.2 Specific objectives

In response to this situation we set out to address two distinct objectives. The first was to migrate as much of the back office and associated middleware applications to Open Source solutions as was practical. The second was to repeat this approach for the desktop. The overall aim was to ensure that the level of service and the user experience was maintained as consistently as possible. But an important driver was to ensure that the hospital was legally compliant with its software compliance obligations. A third consideration was the recognition that the software environment provided under the existing proprietary architecture was relatively out of date (based primarily on Microsoft's Windows NT 4) and prone to virus and other "malware" attacks.

2.1.3 Resources

There were separate resource for each objective. However, because of the nature of the work, there was also a high degree of commonality among the individuals involved. The first steps was to discover appropriate tool sets and software configurations to deliver solutions. Through desktop research, web browsing, etc., it was relatively straightforward to identify candidates in each area claiming to offer the relevant functionality. However, this did not factor in the learning curve or absence of available skills base on which to base such learning. In the desktop context, a decision was taken to focus software conversion away from Microsoft Office, Corel Word Perfect and Lotus SmartSuite and move to the Sun StarOffice offering. StarOffice was chosen in preference to OpenOffice.org to meet the high degree of anxiety in the senior management team about the transition. StarOffice was also favoured because of the extra features and capability of the application, which had key extra functions useful in a medical context, such as the incorporation of XML feeds. The fact that StarOffice was supported by Sun was also an important consideration in the decision.

The desktop transition was much more apparent to the hospital user community than the middleware background, but to achieve some degree of stability and coherence, it was decided to split the desktop migration into two parts. The first dealt primarily with software

productivity based on the standard Office suite, (i.e. introducing StarOffice in place of Microsoft Office, etc.). The second was to prepare the other environment/applications to enable the hospital's service delivery to be migrated into a Linux environment. This initiative is only now reaching a conclusion, and took substantially longer because of the inherent difficulties associated with moving between a proprietary Windows environment to a Linux environment.

2.1.4 Implementation

The implementation of the backend and middleware solution is largely completed. The comprehensive architecture has only been recently documented, and represents for the first time the layered approach used in the backend systems which have been implemented, and also includes those yet to be delivered. The implementation of these solutions essentially revolves around issues of learning, access to knowledge resources and support. Our experience has been that the bulk of the learning was driven by our own staff. We had one software engineer who focused on the learning and discovery aspects of the software deployment while he worked in close harmony with a second individual, who focused more on the implementation and support issues. Both worked as a team in a sort of “programming arrangement pair”.

We attempted to source support from a small number of external Open Source support companies, focused on two areas. The first was in the whole area of document management where we deployed a tool called Zope (www.zope.org). This is a very complex tool which we deployed initially in a competitive bid internally against a proprietary document management solution. Although we won the bid, the actual implementation itself was much slower than expected, due to the fairly complex nature of the product and because of staffing issues in our own team.

Due to non-optimal personnel choices, we wasted time with an individual unsuited to mastering the complexities of the Zope solution, but they have now been replaced by a much more competent developer. This has accelerated our rate of adoption of the Zope solution.

The second area where we attempted to source external support was in relation to our email server. The selection was initially based on our limited knowledge of available Open Source e-mail solutions. Our preliminary research suggested that applications such as SendMail were too complex to implement, so we opted for Skyrix Mail, marketed with the Suse product family at that time (Skyrix 3.1). Again knowledgeable support was a critical issue. At the time the hospital had an operational copy of Lotus Mail running in a Linux environment and based on a web mail interface. At first Skyrix seemed to be a sound choice since migration issues from Lotus to Skyrix went relatively smoothly.

However in this particular version of the implementation we discovered that there was a performance problem when the user load exceeded 500 or so users. The server froze, causing enormous user dissatisfaction.

In other areas, we implemented an open standards (DICOM) management capture solution. This is based around the concept of storing raw DICOM images from our x-ray machines. These are indexed and cross referenced within a PostgreSQL database, held on the Sun Solaris platform. At the time we began this implementation we knew very little about the DICOM standard. Two and a half years on we have collected approximately 2 TB of images. We have built up a very clear understanding of the DICOM standard functionality – including the

problems associated with linking it to (radiology equipment and a proprietary radiology system).

The DICOM implementation involved a very steep learning curve. DICOM is a medical image standard developed by the American College of Radiologists. It is widely supported by manufacturers of medical imaging equipment, and is the only mechanism through which intra-operability/transfer of data can be accomplished. It is therefore an interesting example of an Open Data Standard existing in an entirely proprietary vendor space. However the mere existence of this standard is not in itself a panacea. Each vendor appears to implement the software configuration in subtly different ways. A large part of the implementation exercise is therefore focused around understanding these configurations, options and differences. This is essentially done through studying the vendors' DICOM conformance statements. However it also requires a high level analysis of the data streams provided by each vendor to actually decide whether the conformance statements are accurate (and in some cases they are not).

The inevitable downstream consequence of this whole development is that it requires lengthy meetings with suppliers in order to find out how their protocols are actually structured, etc. This is very time-consuming and in the Beaumont Hospitals case involved two people working on a half time basis. We were fortunate that one of them had a very good knowledge of DICOM and the other a good knowledge of systems engineering. Nevertheless, problems such as incompatibility, changes in configuration without apparent explanation, etc were frequently encountered.. The overall result was that the implementation of the image archive in the hospital was far slower than originally expected. Furthermore the the solution has not gained much buy-in from the clinical radiography staff, who see the solution as a new problem:- “.why don't we buy a proper PACS system and get on with it like everybody else.”¹

There is still tension between the radiology service and IT staff, and a growing groundswell of support across the hospital to purchase a proprietary PACS. This pressure seems to be irresistible, even though almost all of the implementation issues with the initial DICOM archive have now been overcome. But because of the huge investment of effort in coping with the practical implementation of this open data standard, not all of the functionality which could be sustained utilising the DICOM based solution implemented. Such aspects as the introduction of work flows, integrated patient scheduling, etc. have very significant organisational implications, over and above software-related issues (however complicated these may be). It is unclear whether the organisation has a clear sense of the real implications of this approach, which will inevitably involve changes in work practices across a large range of radiology service delivery points. It may well be that the justification of the expensive investment in a PACS is the only lever that will actually enable such changes to be made.

¹ PACS stands for Picture Archive Communication System and is the common industry title for a medical imaging solution in a hospital context.

<i>Software name</i>		
Apache Tomcat	Jasper Edit	OpenLDAP
Apache Web Server	Jasper Reports	PHP Nuke
Bash Shell	JBOSS	Python
BIND	JBoss	Postgress
BSD	JUnit	PostgresSQL
CUPS	K Edit	Red Hat
Debian	K3B	Samba
DIA	KDE	Send Mail
DoseMu	KDE URL Link Launcher	Sophos Antivirus
Email Server (Postfix)	KFontinst	Squid Proxy Server
Fedora	Kongueror	StarOffice/OpenOffice.org
Firefox	Linux – Whitebox	SUSE Mail Client
GCC	Mozilla Browser	VNC Viewer
GIMP	MySQL	Weblogic
Gnome	Nagios	Wine
Interbase	NVU	Zope
Jamelion	Open Reports	

Table 1 - Main OSS installations in BH

2.1.5 Results, lessons learned and conclusions

The OSS experience at Beaumont Hospital has so far delivered mixed results. From a cost benefit angle, we have identified cost savings of €8.2 million over 5 years [2]. However, to a large degree these cost savings are notional rather than real: they may save the organisation expenditure but it is unclear that the organisation is actually aware of these savings. As a publicly-funded body, there is a tendency to think: of “It's not my money” and “I need only the best tools for my work”. It is therefore unclear whether we have actually won the battle of hearts and minds with our OSS-based solutions.

In terms of the (entirely invisible) infrastructure investment, on the other hand, we have implemented for example an e-mail service (second attempt) based on a PostFix mail transport agent and a Squirrel Mail web client. We have around 2,000 users and we aim to offer it to all 3,000 staff who work in the hospital. This solution has proven to be robust, stable and extensible.

This particular experience is probably the major example of learning that has emerged for us in attempting to implement OSS solutions. It suggest that the solutions' quality must match user perceptions of the quality of the previous proprietary solutions. It must be recognised that in many cases such perceptions are based on idiosyncratic judgements and personal experiences, rather than on hard financial criteria. People - including senior management – are not impressed by our arguing that we have saved money for the organisation.

It is ironic that senior management's (justified) frustration with the e-mail service and some of the implications of using StarOffice/OpenOffice.org (e.g. inability to match the functionality of PowerPoint in every dimension) has led to a demand from them to re-evaluate the option of moving back to proprietary solutions. However since the hospital faces a continuing funding deficit, it will be difficult to see how this new demand can be justified in the face of competing investment demands for more clinically relevant solutions. That is not to rule out that this option may become a reality – stranger things have happened.

2.2 Hanstholm Kommune (HK)

2.2.1 Background

HK is a small Danish PA of nearly 70 employees, organised in several departments, often with only one or two people in each. The IT department itself consists of two people.

HK decided to participate to the COSPA project on economic grounds - the fact that European funding would cover most of the costs was a very important factor.

2.2.2 Specific objectives

The objectives of the migration to OSS and ODS in HK is mainly to reduce the costs of ICT services over the long term.

One of the more important aspects of this is the introduction of StarOffice/OpenOffice.org, to replace the existing proprietary environment. The focus is on the compatibility with Microsoft Office.

2.2.3 Resources and implementation

It was decided that the OSS and ODS experimentation would take place across the whole PA, applying different strategies to different departmental situations.

A technical expert was employed to suggest and then implement policies for migrating to OSS and ODS.

A 3½ hours training session with external instructors was offered to all users immediately after the shift. However, it was noted that most users needed a general booster course in using an office suite, rather than a course in moving from MS Office to StarOffice/OpenOffice.org.

2.2.4 Result, lessons learned and conclusions

In testing and using the product, we found that, for some reason, a graphic element may be displayed in the wrong size. Furthermore there are problems when reading our old Microsoft Excel files containing graphs, but it only takes a short time to resize these files.

Another difference between Microsoft Office and StarOffice/OpenOffice.org is the use of soft and hard carriage returns. In Microsoft Office, it doesn't matter much if you don't know the difference, but in StarOffice/OpenOffice.org, it is very important to use the right style tools.

StarOffice/OpenOffice.org has proven itself to be a real alternative to Microsoft Office. All the necessary functionality is available. Since it is a different product, functions do not necessarily have the same names or work in the same way. But all work required for HK's administrative business processes of HK can be done using StarOffice/OpenOffice.org, if necessary.

There were no drastic errors or disruptive problems when using the StarOffice/OpenOffice.org software.

If the project fails, approximately DKR 600,000 (€ 80,500) will be needed to return to Microsoft Office. This corresponds to the amount left on the budget for the rest of the year

after settling all contract payments – or one year's salary for 2 employees.

After a report was released by the Ministry of Science, Research and Innovation, there was a heated debate in Denmark on whether Open Source saves users a lot of money or costs a fortune. As far as Hanstholm Community is concerned, no money has been saved by this stage of the project. On the other hand, it has been estimated that DKR 300,000 (€40,250) would be needed to upgrade to Microsoft Office 2000 or XP from Microsoft Office 97, (used until November 2002). The transition to OSS allowed us to avoid this expense.

Microsoft Office 2000 is not revolutionary enough to spend money on. Microsoft's new licensing policy means an upgrade every second year, so Hanstholm Community can save a great amount of money.

2.3 Province of Pisa (PP)

2.3.1 Background

The Province of Pisa has stated its intention to adopt ODS and OSS well ahead of national and regional initiatives. Today the Province of Pisa has already made progress in spreading the culture of ODS among its employees and creating GPL-license tools for the PA.

Already in 2003, the Province of Pisa officially stated that, with regard to ODS, it would:

- Create a tool to convert proprietary document formats into open formats so that documents could be published in at least one open format;
- Plan the migration to tools natively using ODS;
- Create a web-based version of the above tool and publish it on the Province's web site.

With regard to OSS, the Province of Pisa has stated that it would:

- promote the reuse of software among PAs, in line with national law;
- promote the use of OSS;
- request compliance with the national law on software reuse, for each tender, ;
- promote similar initiatives in the regional areas and inform all municipalities of such initiatives.

In line with its mission of providing support to its regional municipalities, the Province is getting them more involved in a community that uses the same OS-licensed software applications, and collaborates on improving them. The project has already delivered free connectivity and services to municipalities and schools for more than two years, and this infrastructure now forms the base for adopting OSS-enabled services.

2.3.2 Specific objectives

The Province of Pisa has two main OS-related objectives:

1. The adoption of ODS;
2. The development of OSS solutions that can be reused by other PAs to build a community of PAs that share the same software and improve it cooperatively.

For the first objective, a product called DOCTransformer has been developed offering a web-

based user interface for converting documents into a variety of common formats, including both proprietary and open formats. The product is based on OpenOffice.org APIs. ODS adoption can be measured by inspecting the format of the documents published on the Province web site and related sites.

For the second objective, the Province has already developed four vertical OS-licensed applications with:

- *Agenda Aule*, software for booking shared resources (e.g., conference rooms) and displaying the information to the public;
- *PEG*, an application for defining an organization, planning activities and keeping track of progress;
- *Gare d'appalto*, an application for managing a tenders database, calls for tenders, generating results and awarding contracts;
- *Procedura espropri*, software for expropriation.

Since these applications are potentially useful for other PAs, the Province of Pisa has decided to develop them or port them to a version with a complete OSS license. The aim is to attract the interest from other PAs and, create an active community.

Progress towards this objective can be measured by the number of applications developed and made available, and by the number of times other PAs reuse them. It will be more difficult to measure the activity of the overall community of PAs.

2.3.3 Resources

All the activities listed above began with the development of software applications. Various Italian software companies were employed to create and develop these solutions.

To aid ODS adoption in the Province, an application called DOCTransformer (<http://www.provincia.pisa.it/doctransformer/>) was created at a cost of € 19,000. The Province also bought a computer that was dedicated to this application. Internal resources for the installation and maintenance of the system added further costs, but they are not necessarily relevant to other PAs and will decrease as soon as more OSS-based applications are managed by the internal IT staff.

The system is today used by the Province's employees and is available to the general public on the Province's web site.

The other applications mentioned have been developed but are not yet in use, either because they are being tested or due to the lack of appropriate hardware to run them. The only financial resources required at present are used for developing.

- *Agenda Aule*, (booking shared resources) - € 8,000
- *PEG*, (planning activities and keeping track of progress) - € 30,000
- *Gare d'appalto*, (software for creating tender) - € 20,000
- *Procedura espropri*, (software for expropriation) - € 25,000

2.3.4 Implementation

The implementation of DOCTransformer was carried out by a private software company with OSS competencies. The Province of Pisa has explicitly required that the software should be released with a GPL license.

DOCTransformer itself is very simple and easy to use, and did not require training. The Province of Pisa has nevertheless put effort into internal communication to make sure that employees understand the reasons behind the choice of ODS.

The project was presented at the Second National Conference on Open Source and Public Administration (<http://www.salpa.pisa.it>) organised by the Province of Pisa, and at a conference organised by the Computer Science department of the University of Pisa.

The other software listed above was commissioned from private companies, with the requirement of a GPL license. Three out of four are ready to be installed and the fourth is almost complete. None of them is yet used in production in a fully Open Source version.

2.3.5 Results

Table 2 illustrates the number of conversions performed on January 2005 using the application, grouped by the type of conversion performed.

Type of conversion	Documents converted
From.doc to.pdf	141
From.xls to.pdf	68
From.doc to.sxw	5
From.xls to.sxc	1
From.doc to.rtf	3
Total conversions	218

Table 2 - Summary of types of conversions

The tool is used daily by the Province's employees, who have shown a preference in using ODS for publishing to the Web Site and communicating with other organizations and citizens. At the same time, OpenOffice.org is also available on the Intranet, and many employees have installed it and use it for document conversion instead of DOCTransformer.

The type of conversion table shows clearly that .pdf is by far the preferred target format, and there is almost no conversion to proprietary formats.

2.3.6 Lessons learned and conclusions

The experience with DOCTransformer has shown that it is possible to change the culture of a Public Administration. Employees have accepted the fact that they might need to make an extra effort to ensure that they communicate properly by using ODS with citizens and other PAs, and they have clearly understood the importance of using ODS. This also applies to those who are not very skilled in using computers, suggesting that a somewhat technical

concept can gain acceptance provided that management shows real commitment to change and ensures that there is proper communication and follow-up.

The applications implemented have already raised much interest in municipalities and other PAs. The Province of Pisa therefore has a major opportunity to create an active community, and will be committing to this objective in the coming months.

2.4 Consorzio dei Comuni dell'Alto Adige (SGV)

2.4.1 Background

SGV is a consortium of 116 municipalities, 8 public offices supplying social services, and about 30 offices (the number is increasing every year) supplying social support in the Autonomous Province of Bolzano/Bozen. Nearly all the municipalities in the consortium are small and have an average of 50 desktop machines, and most do not have on-site technicians so maintenance is largely managed remotely from the consortium headquarters in Bolzano/Bozen. Moreover, the budget available for ICT (Information and Communication Technology) services in such small municipalities is low.

2.4.2 Specific objectives

Migration to OSS and ODS in SGV is designed to:

1. reduce the costs of ICT services over the long term;
2. assure that documents written today can be accessed in the future.

2.4.3 Resources

As described in detail in the next section, migration covers two phases:

1. server-side software;
2. clients.

The first phase involved 10 people (technicians only) and cost about €4,300 for the training. The second is part of the COSPA project and involves about 2,500 people (most of them working in the COSPA experiment). Since this phase is still in progress, the final cost of the training is not yet available.

2.4.4 Implementation

SGV's experience with OSS and ODS began in 1997 under the leadership of Hugo Leiter. At that time, there were about 2,500 desktop machines installed in the municipalities and managed by SGV, running Microsoft Windows 95, with the servers running Novell Netware 3.12.

SGV was planning to upgrade their network system to Novell Netware 4 or 5 or migrate to Windows NT. In addition to these proprietary technologies, SGV was looking at emerging Open Source technologies, especially the Linux operating system and Samba technology for sharing files with Windows desktops.

SGV chose to migrate to Linux and Samba because they were and are Open Source products that were fully robust and delivered appropriate performance.

the choice of Open Source way was challenging at that time due to the:

- **Lack of local technical support** - very limited skills base among technicians in SGV and the Province of Bolzano/Bozen ;
- **Lack of drivers for the chosen equipment** - most vendors were only developing drivers for proprietary technologies, while drivers for Linux were developed by individuals and not supported by manufacturers.

This meant that all suppliers discouraged SGV from using Open Source technology.

This lack of local technical support was overcome using a two step approach. First, intensive courses were organized for internal technicians, using external experts. The technicians then spread the knowledge throughout the organization by giving training courses. Table 3 shows the numbers, length, and cost of the training effort.

	People involved	Duration	Cost
1st phase	3	2 weeks	€ 3,000
2nd phase	7	1 week	€ 1,300

Table 3 - Training

Had a proprietary solution been installed rather than OSS, the cost would have risen to over € 1.5M. OSS is currently found on servers and desktop machines. Table 4 summarises the status of SGV's main OSS installations.

Installations	Product
2,516	OpenOffice
2,470	VNC
166	Linux Servers with SAMBA
147	CUPS Print Servers
147	Xntp Time Servers
147	DHCP Servers
150	Squid HTTP Proxy Servers
25	Apache Web Servers
15	MySQL Servers
2	IPtables Firewall
1	Htdig Search Servers for Full Text Search
1	Mwforum (Web based forum)

Table 4 - OSS Installations

Most of the consortium's municipalities are unwilling to spend much on frequently updating their desktop machines and servers, and SGV has chosen solutions that do not require frequent hardware updates and has adapted tools to run on old hardware. This approach improved overall performance at no additional expense. It was possible to recompile the product since most of the software is Open Source, with available source code.

As mentioned earlier, OSS migration involved two main phases:

1. **Server migration** - server-side products such as: file servers; web servers; DHCP servers; etc.

2. **Client migration** - client-side products such as: office automation tools; image manipulation; etc.

The first phase was completely transparent to users (both the employees of the municipalities and citizens using services provided). The migration of server-side products was implemented incrementally, starting with file servers and migrating one service at the time. It began in the 1997 and lasted 6 years.

The migration of every server-based service involved several steps:

1. Identifying the products that best fit the needs;
2. Searching for an adequate OS solution;
3. Customizing selected products and/or developing specific extensions;
4. Testing the solution in a restricted environment;
5. Deploying the OS solution that replaced the proprietary products.

In some cases, migration was fairly straightforward (e.g., DHCP servers and time servers), but more complex on others (e.g., firewalls and file servers).

The migration of DHCP servers and time servers simply involved the replacement of existing products by OS equivalents. This expended little effort since it only required configuring the products.

Migrating firewalls and file servers was more complex because of the nature of the products, which meant specifying access control lists and forwarding policies in each case:

1. **Migrating the data** - data has to be transferred from the old system to the new rendering the migration transparent to end-users and maintaining their full productivity.
2. **Converting server-side scripts** - scripts designed to automate several tasks (e.g. user and private login scripts) had to be completely rewritten. .
3. **Developing ad-hoc tools** - ad-hoc tools (including scripts) for the data migration and conversion had to be developed.

Most of the migration effort was spent on making the transition as transparent as possible for the end-users by implementing scripts and procedures that simulated the behaviour of the old system.

No end-users of these services were impacted in any way by the migration. But all technical staff were deeply affected, since they had to develop new procedures for maintaining the new systems. Most technicians were high motivated and rose to the transition challenge. Although SGV had to address a wide range of problems in the early stages, this positive mindset towards migration contributed to the success of the project.

The second phase of the migration was even more challenging since it affected end-users as well as technical staff. It began in 2004 with the COSPA project and is still in progress. Migrating the office automation tools mainly involved the shift from Microsoft Office to OpenOffice.org, and required the close collaboration of end-users.

The migration to OpenOffice.org includes the migration of both the users and the documents. It was a critical process, since users who are happy with one product (in this case Microsoft Office) are usually unwilling to change, even to a less expensive or a free product. This made end-user involvement vital for the success of the operation.

OpenOffice.org was first installed in a Windows environment alongside Microsoft Office, allowing both tools to be used. As employees were trained, they began to use OpenOffice.org in their everyday work. In several locations, Microsoft Office was then removed and all employees were compelled to work with the new tools.

Training was key to the success of this process, and it focused on both technical and non-technical issues:

1. Technical aspects:
 - a. How to perform common tasks in OpenOffice.org that were previously performed in Microsoft Office;
 - b. Improving the overall level of use of office automation tools (OpenOffice.org);
 - c. Focusing on value-add features not available in Microsoft Office.
2. Non-technical aspects:
 - a. Learning about OSS in general;
 - b. Benefits for the local community of adopting OSS.

On all the sites where the training was carried out properly, the level of acceptance of OpenOffice.org was extremely high and employees are now satisfied with it. In the cases where the training was not properly organized, employees refused to migrate.

The main benefit came from the non-technical aspects of the training content. In the Autonomous Province of Bolzano/Bozen, there was very close attention to the impact on the local community, and explaining the returns of OSS for the local community was a motivating factor.

Document migration was very time-consuming. Mostly this did not require changes from using OpenOffice.org, but in some cases, manual fixes of the layout were needed. In any case, many embedded scripts required rewriting or adaptation, since the language used for developing extensions in OpenOffice.org is different.

To encourage the adoption of OpenOffice.org, document templates were not only converted but also enhanced, and migrating to the new environment provided an opportunity for upgrading templates and including extensions. These OpenOffice.org templates therefore provide more functionalities than the old Microsoft Office templates, making it easier for employees to do their job.

The migration also affected all custom tools used by Microsoft Word and Excel to provide output. Even though OpenOffice.org is able to read most Microsoft Office formats without any changes, all tools were modified to generate documents in the native OpenOffice.org format.

The use of OSS solved many problems in SGV - especially managing licences, optimizing IT expenses, developing customised solutions, and future-proofing document readability.

Even in small municipalities, managing licenses is very expensive and time consuming, and even finding out how many and when licenses have to be purchased is not always easy. OSS has reduced the problem dramatically, since most of the software used today does not require a license. Moreover, using OSS, the cost of the licenses is no longer a problem, and the same configuration can be deployed on all desktops regardless the real use of the tools without wasting money.

As for the problem of future-proofing documents, even today it is impossible to read a Microsoft Word document created 10 years ago with the latest version of MS Office. This is a real issue for public administrations since many documents have to remain available over many years. ODS solves this problem, since the format is public and anyone can develop an extension for the tools available in the future to read such documents.

2.4.5 Results

The main results today are:

- Savings of € 1.5M in license costs;
- The money saved has been invested to improve IT services and technician and end-user skills;
- ODS guarantees future-proof document technology.

2.4.6 Lessons learnt and conclusions

From the quality point of view, SGV users perceive OSS as being as good as proprietary solutions in most contexts, but OSS usually has a longer lifetime.

SGV has had a very positive experience with OSS and ODS and plans to eliminate all proprietary software wherever possible.

However, some proprietary products will continue to be used in SGV until replaced (ideally by OSS solutions). Such products include custom tools such as the accounting system and certain databases. These tools could be replaced already, but the benefits are not significant enough to start a migration before the end of their life.

2.5 Municipality of Skopje (SK)

2.5.1 Background

In Macedonian IT culture, there is awareness that the growth of an Open Source developer base is increasingly an indicator of the innovative capacities (in the software domain) of a national economy. There are a number of reasons for this.

First, because OSS is a public resource with low entry barriers. Unlike forms of intellectual property with restricted access for re-use (through patents, restrictive copyright licensing), OSS can both quickly disseminate innovations, and provide for further development and innovation from any source without inefficient time delays or other costs.

Second, OSS is an excellent training system that comes at no direct cost to society, i.e. neither public subsidies nor future employers need pay directly for the training provided to (often novice) programmers through their exposure to source code and the Open Source developer network. This is implicitly recognised by employers, who may prefer prospective employees who have worked on Open Source projects, explicitly recognised by developers themselves, who join the Open Source community "to learn and develop new skills".

Finally, OSS is by its nature an automatic source of *de facto* standards for any number of protocols or systems, both historically as well as those being developed today. However, Open Source systems that have developed into standards tend to be initially developed by small groups and only later (if at all) promoted by companies that jump onto the bandwagon. Having a large base of Open Source development therefore helps companies involve

themselves early in the *de facto* standardisation process, as well as incorporating cultural factors into the process.

As such, the OSS support in the Republic of Macedonia is a more clearly socio-political than corporate in nature.

On the other hand, while SMEs are rarely in a position to invest in basic research or standardisation efforts and thus participate in Open Source at the heart of their business model, large firms can and do participate, due to their interest in basic research or in the standards process.

2.5.2 Specific objectives

Regarding Macedonia as a whole, policy and implementation vary enormously. Individual government institutions decide for themselves whether and to what extent they can use OSS. Some, such as the Ministries of Finance, the Economy, Education (through the e-school.mk project) and some larger municipalities are very active in implementing OSS. Others have only just begun to appreciate the possibilities offered by OSS. There are also PAs which show little interest in OSS. Despite bottom-up initiatives in the public sector, there is little support for the movement as a whole. The Free Software Macedonia NGO (<http://www.freesoftware.org.mk>) has carried out continuous awareness-raising activities for Open Source innovation, OSS translation and localisation into the Macedonian language, and the distribution of Open Source CDs and training activities.

Further confusion comes from the fact that in 2003, the Government of the Republic of Macedonia signed a strategic contract with Microsoft for the licensing of Microsoft products, but so far, this has not delivered any results. One reason for this move was to have Microsoft support the creation of important e-government solutions and provide official training for government officials and officers.

Despite this situation, the IT community and IT developers in software firms and government IT departments are working on implementing Open Source software in IT applications. They strongly believe in OSS for the following reasons:

1. Low or zero license fees;
2. Cost savings in installation and administration;
3. More stability and better access protection;
4. Open and/or modifiable source code.

A number of conditions must nevertheless be met to implement OSS:

- Changing and completely re-installing operating systems on PCs and servers;
- Installing OpenOffice.org software, due to the high price of Microsoft Office software;
- Training end-users and system administrators.

OSS supporters also understand the downside of implementing OSS:

- Less money will be available in the short term, due to high investments in new knowledge and technology;
- The need to support a new software environment;
- The learning curve for using new software;

- Dealing with negative end-user reactions;
- Wide-ranging changes to system administration at the beginning of implementation;
- At least 6 months work organising and stabilizing the new work regime.

Although the state is one of the largest purchasers of software products, governments are not merely participants in the software market on a par with others. In their relationship with and responsibilities towards citizens, they take vital policy decisions on investments in information and communication technologies. They should be aware that any information they hold is owned not by them, but by the citizens, who either paid for such information management in taxes or delivered it themselves, bound by the rule of law.

2.5.3 Conclusion

Public administrations are gradually implementing OSS in many of their units. Open Source usage generates wide-ranging changes that require time and human resources both for the switch and for helping end-users overcome their natural resistance to change.

It is therefore the government's duty to:

- Guarantee free access to public information;
- Maintain the permanence of public data;
- Assure the security of public data (including that provided by citizens);
- Avoid unnecessary public spend.

Unlike the private sector, governments must act in the communal interest, ensuring that the legal and organisational situation within their organisations evolves towards clearer specifications for the software products they are using. This is not a form of positive discrimination for a specific type of software (e.g. cost-free software). By determining the conditions under which software can be used in public sector organisations, government must ensure that no person or organization is prohibited from offering goods and services to them. There is nothing special about this, since in many other cases of public procurement the sheer technical capability of a given product is not the only criterion driving the decision-making process. Contractual conditions must fulfil the further requirement of public welfare. In the case of software, such requirements should include such criteria as the adequate processing of data from and about citizens, and ensuring its integrity, confidentiality, and accessibility throughout time.

In addition to these specifically legal reasons, governments should also promote the dissemination of OSS to the broader public by:

- Establishing and fostering Open Source work groups at national level;
- Developing and introducing statistical systems for monitoring the usage of Open Source in the public and private sector;
- Developing and promoting comprehensive policies for improving the usage of OSS in public institutions;
- Helping to enable and coordinate OSS migration and implementation in the public sector for small and medium size organizations;
- Coordinating and cooperating with public interest Open Source projects;

- Developing strategies to migrate the public and private educational sector to Open Source requirements;
- Supporting business models based on OSS;
- Informing and advising SMEs before and during their implementation/migration to OSS.

2.6 South West Regional Authority (SWRA)

2.6.1 Background

The South West Regional Authority (SWRA) is the statutory body in the South West Region of Ireland. It is responsible for the strategic planning and promotion of the co-ordinated delivery of public services for Cork and Kerry. The authority is tasked with the development of regional planning guidelines which perform a significant role in the implementation of the National Spatial Strategy. The authority is also responsible for making recommendations on and reviewing the National Development Plan.

The authority comprises 24 elected representatives from its constituent local authorities or public administrations: Cork City Council; Cork County Council and Kerry County Council. The authority is advised by an Operational Committee consisting of city and county managers and the CEO of the state agencies and the third-level institutions in the region. IT budgets for the three PAs vary, with much of the budget being spent on licences and maintenance contracts. Many of the branch offices are small, so technical help and computer maintenance are managed from head offices.

For these three PAs under the SWRA, their involvement or exposure to OSS and ODS has been relatively limited. Participation in the COSPA project will provide them with access to expert help and advice in the consortium and also open them to alternative technologies and software they might otherwise never receive. Through these experimentation sites, the COSPA project will also bring the availability and usability of OSS to the attention of the general public.

2.6.2 Specific objectives

The objectives of migrating to OSS and ODS in SWRA are to:

1. Reduce the costs of ICT services over the long term;
2. Ensure that the documents written today are future-proof;
3. Provide a direct benefit to its citizens;
4. Ensure that everyone has access to and can benefit from the Information Society through the promotion of OSS and ODS;
5. Effectively manage IT budgets.

2.6.3 Resources

From the outset it was agreed that experimentation with OSS would take place within the public libraries of the three PAs. The majority of staff and public access machines would make the transition to OpenOffice.org on a phased basis as they could be managed and evaluated more effectively.

The installation of new software on PA machines was met with some suspicion by IT staff. Many questions needed to be answered before any migration could take place, such as who would be installing the software, whether training would be provided, and how it would be

supported. As OSS and ODS was a very new area for many, it was decided that support for any OSS would be provided by the SWRA, which would also be responsible for all installations and training. Funding for this would come from the COSPA project. This would ensure that there was one point of contact for the 50 desktops that were making the transition, while reducing the PAs' need to recruit extra staff. Prior to the first installations of OpenOffice.org, PA IT staff attended a training course on OpenOffice.org delivered by Conecta to familiarize themselves with the new software.

2.6.4 Implementation

As previously mentioned, OSS and ODS usage in PAs was very limited and for many this was their first experience of them. The first installations began in May 2004 and are still continuing. Following discussions with library staff, the list of branch offices and desktops was agreed upon. The majority of these desktop machines were running Microsoft Windows NT/2000 and Microsoft Office 97/2000. Many of the staff had received training up to the European Computer Driving License standard on proprietary software, so were proficient in the applications. For training purposes, this was an advantage as staff already possessed many of the skills required to perform the tasks using the new software. Installations were conducted on a per-office basis. Many of the branches had only one staff machine and 2 or 3 public-access machines on which the software could be installed. It had been hoped that installations would be seamless and only cause minor disruptions. For the majority of cases this was true, but some migrations caused problems. All of the machines had some form of secure kiosk application software on them that meant that access to applications was restricted for users. Administrator rights were also restricted and at times required a PA IT staff member to log on to the computer before software could be installed. It was only after initial installations had begun that it was realised that other software would have to be installed on the machines first - e.g. Java, pdf reader, and WinZip. All applications were downloaded to a CD, including OpenOffice.org, to accelerate installation.

All the branch libraries have some form of secure kiosk software running on their desktops, which grants users access to only some applications. This also prevents users from downloading software to machines and saving attachments. A decision was made by the relevant IT managers about whether Open Office or Microsoft Office would be used. They concluded that once Open Office was installed on a PC, the proprietary office software would no longer be made available to the user. This would ensure that users would learn and use the new software rather than revert to what was familiar. In the larger branch libraries, it also gave users the benefit of having two different office suites at their disposal, since not all desktops were being used for the experimentation. One branch library was a new library and had six new desktops available for public use. There was no proprietary office software on these and so OpenOffice.org was installed on all of them. Desk staff in the libraries were provided with more detailed training, since they would be asked questions about the new set of tools on the computer.

Information was also posted on public noticeboards in the libraries and around the desktops where OpenOffice.org had been installed, informing the public of what was going on. Copies of customised LendingCDs (<https://theopencd.org>) were also distributed to participating branches. This would enable members of the general public to load OpenOffice.org on their own home computers. Training material was also available at each of the desktops, along with a quick reference guide to the differences between

OpenOffice.org and Microsoft Office.

End-user reactions to the new software was surprisingly positive. It was vital that the transition was as smooth and uninterrupted as possible, since they were used to working with and had received formal training on a particular suite, and a new set of tools would impact their productivity. Staff were surprised that there was indeed an alternative to Microsoft Office and that it was available at no charge. Their main concerns centred around the ease of use of OpenOffice.org and whether it could provide them with similar tools to those they had already been using. To reduce disruption in their work environment to a minimum, installations and training were carried out section by section. On staff desktops OpenOffice.org was installed without removing Microsoft Office. This allowed the staff to use both tools as a temporary measure, since Microsoft Office will be removed from the desktops after an appropriate learning period. They were encouraged to use OpenOffice.org as much as possible and avoid the proprietary software. A help number (a SWRA contact number, not their own IT helpdesk number) was provided to help remedy incidents with tools and layout. To date no major problems have been encountered with the libraries.

Problems with the software have arisen, however, in the SWRA itself. The present status is that, at the time of writing this report, staff had to remove the software. The SWRA work with a lot of complex-formatted documents that need to be e-mailed internally and externally for comment and review. These large reports can contain a lot of graphics, tables etc. One particular report was written using proprietary software and edited with OpenOffice.org. It was then proofread using proprietary software again, and serious problems with the formatting appeared. On one occasion, it took over one week to reformat the document, while on another, a report was emailed internally on the office network, opened using OpenOffice.org, edited and saved, and when opened again with the proprietary software, the corrupted formatting took nearly two days to fix. At this juncture, a decision was made to remove OpenOffice.org all together at the SWRA. But it is still running on the desktops of the PAs in Cork County Council, Cork City Council and Kerry County Council.

2.6.5 Results

It is difficult to put a figure on the current results of the transition as it is an ongoing process.

2.6.6 Lessons learned and conclusions

There is still a very positive attitude to OSS in these three PAs, but also a note of caution. The quality of the product is excellent and the public should be made more aware of and encouraged to use OSS in general. It will, however, take time for users to become as familiar with OpenOffice.org as they are with the proprietary software. Further investigation formatting and interoperability issues would help improve the product to a point where it would be as good as, if not better than, the software that was purchased and continuously upgraded at a high cost to the SWRA.

Field trials are under way and the three IT Managers have met with Tony Kenny at Beaumont Hospital in Dublin to discuss their transition and migration to OSS and ODS; and to learn from their experiences. Following on from that meeting with Beaumont Hospital and with Red Hat, Cork County Council are investigating a full migration to OSS, both for desktops and servers. They are currently awaiting a report from Red Hat outlining their recommendations. Others are adopting a 'wait and see' approach.

2.7 Torokbalint City Council (TO)

2.7.1 Background

TO is a small Hungarian PA of nearly 40 employees, organised into departments often with only one or two people. All departments are at walking distance from each other.

There are only three levels in the organisation: notary and mayor; managers; and line employees.

Employees use rather old computers running Microsoft Windows. There is a network but it is mainly used for incoming and outgoing communication, not for internal communication within the PA. Files are exchanged on floppy disks. Two servers are used, but users do not have access to a network file system.

TO decided to participate in the COSPA project for economic reasons. The fact that European funding would cover most of the costs was a very important factor.

2.7.2 Specific objectives

The main objectives of the migration to OSS and ODS in TO are to reduce the costs of ICT services over the long term.

2.7.3 Resources

It was decided that experimentation of OSS and ODS would take place across the whole PA, applying different strategies to the different departmental situations.

A technical expert was employed to suggest policies for migrating to and implementing OSS and ODS.

2.7.4 Implementation

OSS and ODS have been implemented or will be implemented throughout the PA.

TO interacts firstly with central government, and secondly with its own departments. Interaction with other PAs and organisations is less important. Interaction with employees in the same organisation is quite simple since people in the same office are more or less using the same set of software. The transition to OpenOffice.org has occurred locally but not throughout the PA, so there may be temporary problems of communication between the different units. These problems can be usually solved quite easily and will be further reduced when the PA finishes transitioning to the new office suite.

Communication with central government using proprietary Windows-based software. TO does not pay for the software but is obliged to use it. Nearly 50% of users use one of these software products, so migrating the operating system will only involve 50% of users at the most.

If central government releases a Linux version of the software, it might be possible to migrate the other desktops as well. This may occur, since other Hungarian PAs (some of which are quite large) are moving to OSS, including their operating system.

TO's administrative business processes are very stable. They rarely change, and are not likely to change during the migration. This means that they rarely need new software, and only one new software application has been ordered; in the past six years. Software already in use is

updated and/or upgraded when necessary.

The migration proceeds as follows:. The IT department, in agreement with the mayor and the notary, decides which departments or which single computers will be migrated. The new software is then installed in the computer, together with the required documentation (currently, COSPA tutorials and the Hungarian OpenOffice.org manual). The user then receives basic training, covering the major features of the software.

Usually the process of installing and training requires 30 minutes for most users in the PA. A few more advanced users receive extra training and one-to-one help when a problem arises.

2.7.5 Results

Today, several desktops have already been migrated to OpenOffice.org. There has been little user resistance to the change, since they have only basic requirements, and OpenOffice.org covers them. Users can call technical support, but there has been no extensive need for this. No external support is needed at the moment, and all the work related to the COSPA project can be done by PA personnel.

2.7.6 Lessons learned and conclusions

TO is looking closely at OSS and ODS as a promising way to optimise costs, and because no major problems have been experienced.

2.8 Additional information

Some PAs also answered a questionnaire providing for side-by-side comparison of the various PA situations. While not a complete overview, it is included here to allow reader to better understand the specific situation in the different PAs. SWRA provided information from its various constitutive organisations: Kerry County Council (KCC), Cork County Council (CCC) and Cork City Council (CCiC).

The results, given in Table 5 - Additional information, show that PAs predict noticeable savings in the longer term,– even though current savings are less obvious.

Work Package 4, Deliverable 4.3 - *Experience report on the implementation of OS applications in the partner PAs*

	HK	SWRA			TO
		KCC	CCC	CCiC	
Number of desktops in the PA	213	500	1200	800	47
Number of desktops with OpenOffice.org installed	213	Not stated	Not stated	Not stated	47
Number of desktop with OpenOffice as the only office package installed	201	9	15	29	5
Approximate costs for the training related to the migration	€10,000 (2001) €29,000 (2004)	In-house training	In-house training	In-house training	In-house training
Approximate costs for the regular training per year:	€1500 - for selected personnel.	€50,000	€600,000	€20,000	€0 - the staff is constant and no specific training is required.
Open Source operating system used on desktops	No, Windows XP is used	Not yet	Not yet	Not yet	Yes, UHU-Linux on 7 desktops.
Other OSS installed on desktops	All have Mozilla Firefox installed.	No	No	No	UHU-Linux on 7 desktops.
OSS installed on new desktops	Yes, all desktops are installed the same way	No	No	No	Yes, UHU-Linux (contains OpenOffice.org).
Savings by the installation of OSS	Approx. €41,000 each year on licenses.	No, the only saving would be for licences, however these had already been purchased.	No, the only saving would be for licences, however these had already been purchased.	No, the only saving would be for licences, however these had already been purchased.	Licences for operating system, office suite and anti-virus software.
Foreseen savings by the installation of OSS in future (if present)	Approx €41,000 in licenses.	Yes in licences	Yes in licences	Yes in licences	€16,000 in licences €2,400 in equipment Migration training will be approx €1,000 Savings are approx. €17400
Outsourcing required	No	No	No	No	No
Indication of the overall satisfaction of the migration within the organisation	Estimate: 90-95% of users are satisfied/indifferent & 5% are unhappy	All PAs are quite satisfied with the project so far	All PAs are quite satisfied with the project so far	All PAs are quite satisfied with the project so far	Satisfaction is high in technical and accounting departments. Initially, first time the users were averse to OpenOffice.org, but over time user satisfaction of office suite is the about same as the proprietary.

Table 5 - Additional information

2.9

2.10 Summary

The reports in previous sections describe the migration experience from the PA perspective. Table 6 - Summary of the reports highlights the information explicitly provided by the PAs. It does not imply that the un-ticked issues are unimportant to a given PA, but it helps see which are their key focus points.

Work Package 4, Deliverable 4.3 - *Experience report on the implementation of OS applications in the partner PAs*

	<i>BH</i>	<i>HK</i>	<i>PP</i>	<i>SGV</i>	<i>SK</i>	<i>SWRA</i>	<i>TO</i>
<i>Legal Reasons</i>							
Legal (intellectual property) compliance	✓		✓				
<i>Monetary Reasons</i>							
High cost of licenses/Reduce cost of licences	✓	✓			✓		
Reduce cost of ICT services			✓	✓	✓	✓	✓
Effective management of ICT budget						✓	
<i>Technical Reasons</i>							
Update architecture	✓						
Increase stability/less prone to virus & attacks	✓				✓		
Adoption of ODS			✓				
Spreading ODS culture			✓				
Development of OS solutions to be reused			✓				
Assure future accessibility of documents				✓		✓	
Open/modifiable source code					✓		
<i>Accessibility Reasons</i>							
Provide benefits for citizens including access for all						✓	

Table 6 - Summary of the reports

3 Discussion

PAs are no different from other organisations in having different time-scales and opportunities to assess their activities and evaluate what would be the best development strategy - growing their activities and IT provision, stabilising or cutting down. This strategic analysis needs to be made using a process that considers both the current situation and the exact status of the environment in which they operate, including future trends and responsibilities.

There are a number of models that can be used for such an exercise. Most of them have been developed for private business organisations, but the principles can be applied to PAs. In this chapter we introduce a Virtual PA Matrix, based on the integration of the BCG model [3] and the Virtual PA idea (previously developed in the COSPA project).

The BGC model has been in use since the 1970s and is used to evaluate the options available for business organisations. In the following subsections it is adapted for use in the PA context. By Virtual PA, we mean an “ideal”, prototypical PA that can be used to model the options available to real PAs. Our matrix will define four types of Virtual PAs.

The reasons for introducing the matrix are to:

1. explain how different choices in the implementation of OSS and ODS might be linked to the two variables under consideration - growth of economic resources and PA size;
2. provide a basic model that can be used by PAs when adopting OSS and ODS.

While this is clearly not a full methodology, it provides a simple and effective way to grasp and deepen the basic options available for PAs.

3.1 The Virtual PA Matrix

High economic resources growth	VPA-T1	VPA-T2
Low economic resources growth	VPA-T3	VPA-T4
	High relative size	Low relative size

The size of the PA and its available resources are the two main variables used to identify a possible optimal PA attitude to innovation.

The Virtual PA Matrix identifies four main Virtual PA types: VPA-T1 (Virtual PA-Type 1, corresponding to a 'star' in the BGC matrix), VPA-T2 ('problem child' in the BGC matrix), VPA-T3 ('cow' in the BGC matrix), VPA-T4 ('dog' in the BGC matrix). PAs assessing a strategy for implementing OSS must consider where they are positioned inside the Virtual PA Matrix: different strategies will be required for different positions, and these will be explained in the next subsections.

3.1.1 VPA-T1

VPA-T1s have high growth in economic resources and a high relative size, compared to other similar PAs. VPA-T1s are often optimum innovation *generators*, both in terms of *process innovation* and in terms of *technology innovation*. VPA-T1s have a high availability of inputs in terms of economic resources, and provide high availability outputs, in terms of services to their citizens.

Thanks to their sizeable resources, they are in an advantageous position compared to their peers, fostering a more aggressive attitude to risk and innovation. VPA-T1s are used as exemplary case studies by other PAs. While VPA-T1s can afford to take a studied approach

to risk and to test technologies, other PAs often cannot, and base many of their decision on what VPA-T1s do.

3.1.2 VPA-T2

VPA-T2s are PAs with a low relative size, but with high growth in economic resources. VPA-T2s are the optimum innovation *users*; they are willing to take risks as they aim to become VPA-T1s. VPA-T2s benefit from their small size, which makes them more suitable for running experiments.

On the other hand, VPA-T2s do require large quantities of input and do not provide a comparable level of service to the inputs they receive. They are in an intermediate state; and on a medium to long time-scale, they will either become VPA-T1s or VPA-T4s.

3.1.3 VPA-T3

VPA-T3s are PAs with a high relative size, and with low or negative growth in economic resources. They are expected to deliver services to citizens but do not need continual access to external resources. VPA-T3s are more likely to achieve innovation in their administrative techniques than in the technology they use.

In general VPA-T3s do not need to invest in innovative technology (hardware and/or software systems), neither do they need to invest in restructuring their administrative business processes. VPA-T3s simply need to keep up-to-date with small, incremental improvements in technology and the techniques used in their processes. Restructuring and radical changes cannot usually be sustained without appropriate cash flow, and the PA may be too small to undertake changes without external drivers and finance.

3.1.4 VPA-T4

VPA-T4s are PAs with a low relative size and low growth in economic resources. VPA-T4s may suffer from technological isolation and obsolescence.

Innovation in processes and technology is difficult, due to the scarcity of available resources.

On the other hand, PAs might voluntarily choose to place themselves in the VPA-T4 quadrant. A low innovation quotient means that the PA concentrates on its core business of providing services to its citizens, directly or indirectly. No new resources are invested, and only existing resources are used to achieve a standard level of service.

3.2 Applying the matrix

The Virtual PA Matrix can be applied not only to PAs as whole organisations, but also to units or departments inside PAs.

Some units may have a different degree of access to resources, or a different relative size, that positions them in a different quadrant. For example, a PA may be positioned in the VPA-T3 or VPA-T4 quadrant, but may include units that are VPA-T1s or VPA-T2s. And new units may be created to meet a new responsibility.

Most of the PAs will be located in the lower quadrants of the matrix, where there is low growth in economic resources. This is because most PAs will only experience high growth in resources for a limited period. In most cases, unless there are external contributions, there

will be only limited positive or negative variation.

Most PAs in the COSPA project are located in the VPA-T3 quadrant (high relative size, low growth in economic resources), for example BH, PROGE, PP, and SWRA. The services provided by these organisations and their administrative business processes are fairly stable, and close attention is paid to cost savings. The best strategy when it comes to technological innovation is therefore more likely to be a 'follower' rather than a 'front runner'.

In the case of BH, software requirements for much of the administrative part of the organisation were quite simple, and OSS has helped to minimise expenses without sacrificing either the personnel or the quality of service.

In SWRA, this strategy was not possible since their software requirements could not be satisfied by any existing OSS, ruling out a 'follower' strategy. No other PAs of comparable size and with comparable requirements had completed an OSS migration, which means that the options are either to sit back and refrain from any hazardous innovation, or find funding to enable more agile sub-units to drive innovation in the PA. Today for example, SWRA has had to stop experimentation in several units.

PP went through a similar experience to SWRA. Their business processes were complex, and it impossible to easily replace proprietary software with ready-made OSS solutions. Today, action is concentrated on a number of small units that play the role of VPA-T2s. Funds have been allocated to these units, which are being used as OSS test beds. These units are not only active as followers, but are producing independent innovation and learning experiences that can be followed by other PA units.

TO and HK are examples of small PAs where there is no growth in resources. Nevertheless, there are units in TO that, as a result of COSPA project support play the role of VPA-T2s or even VPA-T1s. In fact, some of these units are undergoing a process of technological innovation and carrying out OSS and ODS implementations which are even ahead of other full PAs. Technological innovations that have already been tested in other sectors or PAs are being used rationally, OpenOffice.org desktop experimentation is planned for most of the administration, and a full transition of 50% of the desktops is also planned. Similarly, HK has units that play an active role in implementing not just OSS but also OQS (Open Query Standards).

SGV is a quite different case to the others. It clearly belongs to the left-hand side of our matrix. In its OSS experimentation, SGV is playing the role of VPA-T1, by developing new technology and spreading the technology and knowledge, and keeping up relations with other PAs.

4 Conclusions

The reports covers experiences from a representative sample of PAs from Italy, Denmark, the Republic of Macedonia, Ireland and Hungary, and concludes with a discussion of the kinds of factors affecting the decision of whether to move to OSS that might be relevant to any other PA.

In Italy, the province of Pisa (PP) made a whole hearted commitment to OSS and moved in a well planned and structured way to full commitment to Open Source software. Their transition was not only successful, but they put considerable effort into creating software that can also be shared with other organisations, moving towards becoming the centre of a community of OSS users in PAs. The second Italian PA, Consorzio dei Comuni dell'Alto Adige (SGV), also had very positive experiences in moving to OSS. It also found that it was forced to retain some proprietary software products for certain applications where no OSS product was available. Nevertheless in SGV too, the move was a financial and public relations success.

In both of these Italian PAs, end-user cooperation was considered vital, though this was scarcely mentioned in the report from the Republic of Macedonia. On the other hand, in both Macedonia and Italy there was strong social and -political support for OSS, although this comes more often from the private sector than the public sector in Macedonia, where the technical community in Macedonia prides itself on its knowledge of OSS.

In Ireland the picture is far more patchy. In Beaumont Hospital (BH), the move from proprietary to OSS was entirely successful, whereas in the South West Regional Authority (SWRA), the experience was less successful and the experiment had to be abandoned in most units. The report from SWRA highlights a specific area of concern – there were major problems in swapping word processed documents back and forth between OSS and proprietary software, and strategies need to be established to avoid this situation. In fact the main problem posed in the SWRA experience was the difficulty of transferring layout between OSS and proprietary document formats.

In Ireland, as in Italy, user involvement and support was considered critically important, but in Hungary and the Republic of Macedonia, it was scarcely mentioned. The report of the move to OSS in Hungary presents a picture of another successful transfer to OSS. In this relatively small PA, migration is proceeding extremely smoothly with no unforeseen events, possibly because it was planned carefully in advance, with different PAs adopting appropriate strategies. The Hungarian decision to change to OSS was motivated by economic rather than political reasons, since the Hungarian government has no policy currently in place to support OSS.

The reports from the different PAs in four countries present a varied picture of real life experience of the move to OOS and will in themselves be useful and interesting to other PAs contemplating the transition.

In the Discussion section, the factors that any PA should consider when deciding whether to make the change are discussed, and different policies for different categories of PA are suggested.

The key factors for categorising PAs are relative size and the relative stability of their economic resource base. These factors are presented as a matrix, and the options and risks

open to a virtual PA categorised within a particular segment of the matrix are discussed. Finally, it is shown how any PA wishing to assess the risks and costs of a decision to migrate to OSS can use the matrix to explore its strategic options.

Naturally there are other environmental factors that impact such decisions that cannot be addressed in this report. If a government makes a policy decision to enforce the change to ODS and/or OSS, possibly to support local industry or to ensure that information remains future-proof, then PAs are going to change their risk profile. However, even in situations where there is no choice, this document should be useful in helping PAs plan the transition process in a structured and orderly way, avoiding the pitfalls encountered by the PAs who experimented as part of the COSPA project.

The reports collected for this deliverable are a useful resource, written with administrators of European PAs in mind, and designed to at help them decide on the benefits or drawbacks of experimenting with OSS and ODS.

This document collects reports from PAs of different sizes, with different access to funds and from different cultures, and a classification of PAs, using the Virtual PA Matrix, is proposed.

This research can have a positive effect on the landscape of European PAs, by showing PAs that OSS and ODS are being successfully used in other PAs, and that their experience can be replicated.

We foresee the possibility of being able to further extend the study and use of the Virtual PA Matrix, describing in more detail the different strategies that can lead to a successful experimentation of OSS and ODS for PAs located in the different quadrants of the matrix.

Abbreviations

The following table includes abbreviations used along the document.

<i>Abbreviation</i>	<i>Expanded version</i>
AAU	Aalborg University
BH	Beaumont Hospital
D	Deliverable
HK	Hanstholm Kommune
FUB	Free University of Bolzano / Bozen
OS	Open Source
ODS	Open Data Standard
PP	Provincia di Pisa
SGV	Consorzio dei Comuni dell'Alto Adige
SK	Skopje
SWRA	South-West Regional Authority
TO	Torokbalint City Council
USFD	University of Sheffield
WP	Work Package

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