

**towards Open Source Software adoption and dissemination  
tOSSad**

**Contract N° 015981**

**Economical and Social Benefits of F/OSS  
Report**

**D09**

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1 <http://www.gnu.org/licenses/gpl.html>

2 <http://creativecommons.org>

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## Abbreviations

FLOSS: Free/Libre Open Source Software

F/OSS: Free/Open Source Software

OSS: Open Source Software

tOSSad: towards Open Source Software adoption and dissemination

OS: Open Standards

TCO: Total Cost of Ownership

PA: Public Administration

ICT: Information and Communication Technologies

GNU: GNU's Not Unix

GPL: General Public License

## Table of contents

Executive Summary.....	6
1. Introduction.....	7
2. Economic Benefits of F/OSS.....	9
2.1. Open Standards vs. Vendor Lock-In.....	9
2.2. Enabler for the European Software market.....	9
2.3. Intellectual Property Rights and licensing.....	10
2.4. Stability.....	11
2.5. Lower Hardware and Software Costs.....	11
3. Social Benefits of F/OSS.....	13
3.1. Security.....	13
3.2. F/OSS for Open Societies.....	13
3.3. Endorsing Cultural Diversity.....	14
3.4. Enhancing Education.....	15
4. Examples: Munich, GER and Extremadura, ESP.....	16
4.1. Introduction.....	16
4.2. Analysis.....	17
4.3. Findings.....	19
5. Conclusions.....	20
References.....	21

## Executive Summary

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Worldwide, an increasing number of governments are considering the adoption of Free/Libre Open Source Software (F/OSS) solutions. Public administrations are taking note of the significant financial and functional benefits offered by the adoption of F/OSS. Government support for F/OSS can vary from tacit approval through to mandatory, legislated implementations.

Much has been written and said about the commercial benefits of F/OSS but, there are also significant benefits to be derived from large-scale F/OSS adoption in Public Administration. These benefits are not necessarily the same benefits that are driving F/OSS adoption in commercial companies.

This report examines the major benefits of F/OSS adoption within Public Administrations. It highlights the economic basis for such government decisions and whether F/OSS provides an alternative and cost effective solution to Public Administration's current reliance on proprietary software (PS). This report argues that in addition F/OSS offers benefits beyond economic interests; benefits leading towards a more open society, the fostering of social inclusion and a reduction in the "digital divide".

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### **TIP      The German Government voices support for Open Source.<sup>3</sup>**



At Linux Day 2000, Siegmur Mosdorf, German Secretary of State in the Federal Ministry for Economy and Technology (1998-2002), voiced his government's support for Open Source. "I am convinced that open source development can form the European base model in the information age."

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<sup>3</sup> Linux Weekly News, 6th July 2000

<http://lwn.net/2000/0706/bigpage.php3>

## 1. Introduction

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Since the ancient world it is a principle of academia that knowledge should be able to circulate without restrictions of patents or copyright control (Grassmuck, 2004, p. 177). It is important to realize, that all early computer software was an academic creation. In 1936 Alan. M. Turing invented the first software by introducing an abstract machine "to give a mathematically precise definition of an algorithm or mechanical procedure."<sup>4</sup> It is for this reason software being an invention of the academic milieu and therefore being part of the tradition of free circulating knowledge that F/OSS exists today.

Microsoft, the largest player in the software business, acknowledges the social, intellectual and technical capacity that lies within F/OSS. In an internal memo, also known as "The Halloween Documents" and subsequently leaked to the press, Microsoft "noted 'the ability of the F/OSS process to collect and harness the collective IQ of thousands of individuals across the Internet as 'simply amazing' (Cubranic, 1999)."

Aside from this astonishing ability of bringing together the collective effort of thousands of individuals, the benefits of F/OSS lie within its philosophy of continuous incremental change and by a gradual diversification of F/OSS use beyond server platforms – a “change everything, and do it now” approach to software is, in general, not to be recommended.

F/OSS tools and applications allow for fast and flexible responses to the current need of users, be they private, commercial or in the government sector.

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### TIP

#### Widely accepted benefits of F/OSS adoption:

- 1) Reduced costs lead to affordable software for individuals, enterprises and governments.
  - 2) Less dependency on imported technology and skills.
  - 3) Universal access through mass software roll out without implications of costly licensing.
  - 4) Access to public information without barriers of proprietary software and data formats.
  - 6) Lowered barriers to entry for software businesses.
  - 7) Participation in global networks of software development.
  - 8) Reduced security risks due to extensive peer review and access to source code.
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<sup>4</sup> [http://en.wikipedia.org/wiki/Turing\\_machine](http://en.wikipedia.org/wiki/Turing_machine), accessed 2005-10-19.

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**TIP**      **Priority of F/OSS reasons from a government's point of view.<sup>5</sup>**

1) protection from coercion or threats from corporate entities that develop and control the software upon which your government depends.

2) greater control of the software upon which your national security depends.



3) greater national economic potential for companies internal to your nation to develop, improve and support software without dependence on partnerships with corporations outside your country.

4) reduced litigation and international pressure regarding issues of "piracy".

5) cost savings

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<sup>5</sup> Linux Weekly News, 6th July 2000

<http://lwn.net/2000/0706/bigpage.php3>

## 2. Economic Benefits of F/OSS

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### 2.1. Open Standards vs. Vendor Lock-In

Open standards as used in F/OSS projects give users great flexibility and freedom to use and switch between different software packages, platforms and software vendors. Standards used by proprietary software irrevocably locks Governments into using software from only one vendor. Once all relevant data is saved in a proprietary format such standards also make Governments dependent on the respective software vendor. Conversion to an open standard often becomes prohibitive. Vendor lock-in can be avoided by using F/OSS, since F/OSS always uses open standards and the source code is freely available. Open standards increase interoperability, flexibility and re-usability and provide better security.

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**TIP**      **Italian public employees join to promote open source**

By: Marco Fioretti 17<sup>th</sup> Nov. 2005

<http://software.newsforge.com/article.pl?sid=05/11/09/1725232>

ROSPA (Rete dell'Open Source nella Pubblica Amministrazione, translated as "the Open Source Network in the Public Administration") is a network of IT specialists and other professionals who advocate wider utilization of FOSS in all Italian public administrations.




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Since proprietary software is normally distributed as a binary it is very difficult to examine and to understand how the program works. While this kind of distribution offers (limited) protection for the intellectual property of a software developer, it also creates a sense of mistrust and suspicion concerning security issues. Mistrust and security issues have been cited as one of China's main reasons for its adoption of F/OSS and are one of the reasons why other Governments are also considering F/OSS adoption (Kettman, 2001).

### 2.2. Enabler for the European Software market

Proprietary software is mostly developed and owned by a few exclusive organisations in a limited number of countries; the United States being the major producer of proprietary software. Countries around the world pay huge amounts of money for software licenses that are imported. Money that is not invested in local industry but leaves the country of origin irrevocably – is a huge strain on Government finances.

F/OSS, on the other hand, can be obtained at little or no cost and creates potential savings on foreign exchange leaving the country. Moreover F/OSS has a positive impact on local employment, investment base, tax revenue, etc. (Ghosh, et al, 2002).

Money spent on F/OSS in a particular country usually stays within that country. This leads to localised investment and the development of a local

software industry. A positive correlation between growth of a F/OSS developer base and the innovative software capacities of an economy has already been noted (Sayo, 2004).

A report from the International Institute of Infonomics has listed three reasons for this:

- Low entry barriers: F/OSS is easy to obtain, use and learn from. Proprietary software tends to be much more restrictive, not just in terms of limited availability of source code, but also because of licensing, patent and copyright limitations. Therefore, F/OSS allows developers to build on existing knowledge and pre-built components.
- F/OSS is an excellent training system: The open and collaborative nature of F/OSS allows experts to examine and experiment with software concepts at virtually no direct cost to society. Proprietary systems are usually closed and do not encourage this experimentation and learning.
- F/OSS as a source for standards: F/OSS often becomes a *de facto* standard by virtue of its dominance in a particular sector of an industry. By being involved in setting the standards in a particular F/OSS application, a region can ensure that the standard produced takes into account regional needs and cultural considerations (Ibid).

By now many public officials in Europe have realised the importance of an independent European Software Industry. Advancing the F/OSS sector in Europe is a big step towards achieving this goal.

### 2.3. Intellectual Property Rights and licensing

In 2003, the global trade in pirated software applications was estimated at nearly 29 billion US-Dollars per year, accounting for nearly 60 per cent of the 51 billion US-Dollars global software market.<sup>6</sup> After the Internet gathered momentum in the late 1990s software firms and media companies saw a rapid proliferation of pirated versions of their software as online file sharing networks and “warez” trading sites made it easier to exchange all kinds of copyrighted material. With more than half of all software installed on machines being pirated versions, the Asia-Pacific region, Eastern Europe and Latin America continue to be the biggest piracy hot spots in the world.

Software piracy occurs for many reasons, but in most cases it is due to the high costs for proprietary software licences. As previously mentioned, F/OSS can be distributed at minimal costs. F/OSS usage can therefore reduce piracy rates and ease pressures on developing countries with regards to compliance with IPR laws.

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<sup>6</sup> See: “Software piracy rate climbs”; Times of Malta. 8th Jul 2004.  
<http://technology.timesofmalta.com/article.php?id=1398>

F/OSS also provides for simplified license management. Since no additional costs occur for supplementary licenses implementation of a certain software can grow rapidly, resulting in lower Total Cost of Ownership (TCO). Furthermore, several studies have claimed that with F/OSS, the cost of ownership is lower because some F/OSS, unlike most proprietary software, works well on less-powerful personal computers.

## 2.4. Stability

While many argue as to whether open source software is more or less stable than proprietary software<sup>7</sup>, it is clear that the quality of open source applications increases rapidly as the widespread availability of the same application increases. Consequently, it is not surprising to observe that popular open source applications are characterised by outstanding robustness; mostly due to having hundreds of competent programmers and critics who collectively fix programming bugs and errors, as well as providing various enhancements to the applications. This is in sharp contrast to even the biggest commercial software suppliers, who regularly acknowledge that they lack the number of developers necessary to develop the desired reliability levels within their products. Stability in current IT environments, especially those maintained by public administration, has obvious economic repercussions.

## 2.5. Lower Hardware and Software Costs

Providing communication infrastructure, computing and networking hardware, as well as the necessary software is usually an expensive undertaking and "can be daunting not only for developing countries but also for underprivileged sectors in the developed countries (Tong, 2004, p. 1)."

In terms of money, F/OSS has a core advantage compared to proprietary software. "The initial acquisition cost of F/OSS is negligible (Ibid)." Most F/OSS can be downloaded without any cost. CD-ROMs normally can be ordered for a nominal fee. The important difference to PS is that for F/OSS there are no licensing fees. Acquiring PS means licensing fees have to be paid for each user or computer. For big institutions such as public administrations this can be a substantial amount of money. Software upgrades for PS also generate substantial costs.

The production of computer hardware is a complex and costly affair. A United Nations University study into the environmental impact of personal computers revealed that about 1.8 tons of raw material are required to manufacture an average desktop computer and monitor. "According to the study, the manufacturing of one desktop computer and 17-inch CRT (cathode ray tube) monitor requires at least 240 kilograms of fossil fuels, 22 kilograms of chemicals and 1,500 kilograms of water (Williams, 2004)."

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7 Poynder Richard ; "The Open Source Movement - Does this software provide a viable, user-friendly alternative to proprietary solutions?". Retrieved on 18/12/04  
<http://www.infotoday.com/it/oct01/poynder.htm>

Extending a computers operational life through re-use not only holds a much greater potential for energy saving than recycling, but can also save public administrations a considerable amount of money. However, running proprietary software and operating systems on outdated hardware can be a hassle. On the other hand, F/OSS provides much better utilisation of out-of-date hardware.

Unlike MS Windows, which requires serious hardware upgrades once a new version is released, a wide range of Linux distributions are making older and less sophisticated hardware a valuable resource<sup>8</sup>. The “Computerbank Project”, an Australian initiative, aims at utilising this F/OSS advantage by forming and supporting organisations that receive donations of computers for redistribution as refurbished computers running F/OSS to people and groups that can't afford to buy such technological devices and who would otherwise be on the wrong side of the digital divide. Since even in the European Union there are center-periphery patterns when it comes to distribution of information technology such a project could help to close the digital divide in Europe.

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<sup>8</sup> Microsoft's upcoming operating system Windows Vista is likely to require a dual-core processor system, with 2 gigabyte or more of fast random access memory (RAM) and a 256 megabyte graphics card.

## 3. Social Benefits of F/OSS

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### 3.1. Security

The threat of worms and viruses across proprietary products has in many cases provided a need to develop and implement open source applications. Although open source software is not immune to worms and viruses, the open source community has not experienced the severity of exploits as that suffered by competitive proprietary products. Supporters of open source contend that open source systems are less vulnerable to attack by computer worms and viruses because of an in-built set of technical characteristics that make it relatively more difficult to distribute and propagate fast-spreading worms and viruses across open source applications<sup>9</sup>. Consequently F/OSS applications require fewer administrative resources in order to deal with security holes, viruses and worms; and organisations tend to benefit from less downtime from virus-induced system crashes. However it is only fair to indicate that the 'added security' of F/OSS is also due to the fact that they are not as big a target as proprietary software and the situation could change in the future as hackers and virus developers start attacking open source software.

According to Mosdorf in 2000, the German federal government expects an increase in security in data processing and data communication because of the open source movement. This is because if the source code of a program is clear and visible and can be checked by experts, then security is considerably increased. "Security through Obscurity" is the motto of yesterday. The slogan must today be "Security through Transparency". For this reason the Federal Ministry for Economy and Technology is supporting the development of an encryption product on an open source basis. This initiative is not about putting certain businesses under pressure. The competition in security matters will benefit the IT sector, says Mosdorf.<sup>10</sup>

### 3.2. F/OSS for Open Societies

F/OSS is not just software. Adopting F/OSS has much to do with a society's intellectual, moral, and cultural climate. Without open access, be it to source code, scientific results or other information, there can be no open society. Since information and communication technology (ICT) becomes ever more important in the modern world, proprietary software is a major hindrance for open society.

F/OSS guarantees public access to software both for commercial and non-commercial usage, and for the aforementioned reasons reaches disadvantaged social levels, therefore bringing ICT to larger parts of society than proprietary software could ever do.

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<sup>9</sup> Wheeler A. David ; "Secure Programming for Linux and Unix HOWTO"; Retrieved on 18/04/2004 <http://www.dwheeler.com/secure-programs/Secure-Programs-HOWTO/open-source-security.html>

<sup>10</sup> Internetnews.com, Richenda Gillespie, 5th July 2000  
[http://www.internetnews.com/bus-news/article.php/6\\_408271](http://www.internetnews.com/bus-news/article.php/6_408271)

Open Government is also an important issue. Worldwide, the public sectors of more and more nations are considering migration from proprietary software to F/OSS. Public procurement for F/OSS development makes public administrations more transparent and accountable, leading to an increase in competition and employment.

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**TIP      The Responsibility of Governments? Open Standards, Open Source, and OpenOffice.org**

<http://homepage.mac.com/luispo/blog/C564357417/E20060517155215/index.html>

By: Louis Suárez-Potts, OpenOffice.org Community Council  
Community Manager 17<sup>th</sup> May 2006



- I. From Inked Paper to Electronic Media
- II. The Bargains We Made
- III. The Solution Is Open

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### 3.3. Endorsing Cultural Diversity

The cultural impact of dependence upon proprietary software vendors became apparent in 1998, when Iceland, in order to preserve its letters in the digital world petitioned Microsoft to support Icelandic by localising it into Windows. Iceland even offered to pay for the service, but Microsoft believed this market to be negligible and declined. Without access to the source code and without the right to modify it, Iceland was at Microsoft's mercy. As a result, a project was initiated, to implement language support with GNU/Linux; such an undertaking was possible because of the freedoms of F/OSS. Iceland's public administration and its many citizens migrated to the free operating system (Grassmuck, 2004, p. 318).

By endorsing cultural diversity around the world F/OSS could play a decisive role in bridging the digital divide. Computers are becoming an essential part in the lives of increasing numbers, worldwide. Effective use of ICTs depends upon fluent language skills. Countries where English is not commonly spoken can be at a serious disadvantage when it comes to the uptake and dissemination of ICT. If the country and language are not deemed to be economically important, proprietary software makers may not choose to produce a localised version of their software, thereby increasing the barriers to ICT usage. Users are able to modify F/OSS to suit the unique requirements of a particular cultural region, regardless of economic size.

In Sub-Saharan African countries for example only 10% of the population speak the official language of the countries they live in (Bekele, 2005). Since proprietary software producers only choose to localise their software if it is in their economic interest it becomes very unlikely that there will be versions for the more "remote" regions of the world. This is the reason why Microsoft's Windows XP Home and Professional editions are released in only 24 languages.

### 3.4. Enhancing Education

It is important for every society to dispose of an autonomous social sphere free from commercial interests; this is especially so within the educational sector. Computer education using proprietary software with its lack of access to the source code leaves users studying only the menu items with no possibility of viewing the underlying logic of the “engine”. Hence, if computer knowledge is to be understood and disseminated as a technique, rather than as a narrow competence in the use of specific vendor software, proprietary software proves unsuited to this aim.

In the case of F/OSS, however, one can always study the functionality and modes of operation. Since the source codes are open they can be studied, experimented with and may be modified and enhanced. Access to the source code allows users to assess the correct operation of the code.

F/OSS, contrary to proprietary software, provides access to substantial resources for self-education. The growing F/OSS community helps academic research and supports the dissemination of cutting-edge technological solutions.

An essential aspect of F/OSS is that students can also (legally!) take home copies of the software.

## 4. Examples: Munich, GER and Extremadura, ESP

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### 4.1. Introduction

The experience of the process of migration from proprietary software to F/OSS in the case of the city of Munich, Germany, and also Extremadura, Spain, presents a wealth of knowledge to any party that is considering the migration itself. The cases are well known; therefore we shall only present the scale of the migration before jumping into the analysis of the cases. We also omit repetition of the analysis already made regarding the projects and just highlight some of the attributes that are, in our opinion, some of the most important factors that need to be considered before migrating proprietary software to F/OSS.

In the case of the city of Munich, the migration of 13.000 PCs in public offices from MS Windows and MS Office products to non-proprietary software is planned. The migration is divided into three steps. First, the evaluation of the alternatives was done in order to be sure, that the migration to F/OSS was plausible. Second, a detailed plan of the process of migration is being made. Third and finally, pilot studies and "soft" migration is being executed. The migration team plans to set up pilot PCs running Linux and OpenOffice.org in every department. Once the pilot is completed, departments will be migrated to open-source software in either one or two steps, according to Peter Hofmann, the project leader of the migration.<sup>11</sup>

Extremadura, a region in Spain with more than 1 million people, have gone even further than the city of Munich. In Extremadura, they have developed their own distribution LinEx (mix of words Linux and Extremadura), which is used in more than 70.000 desktop computers and 400 servers, providing services to around 100.000 students and teachers. Government has created more than 150.000 installation disks and is providing them to anyone who is interested. It has even created TV commercials to promote the benefits of F/OSS.

The processes of migration in Munich and Extremadura are followed by other European cities, like Vienna, Austria and Bergen, Norway. In Vienna, a total of 7.500 PCs are to be migrated to OpenOffice, from which around 4.800 are to be completely switched from MS Windows to Linux. The government in the city of Vienna uses around 16.000 PCs, mostly running MS Windows 2000 and MS Office 2000. In the city of Bergen, the computers in schools were being considered for the migration, but so far, they have only switched from MS Windows servers and proprietary Unix servers to Linux. The test pilot showed that the switch to Linux on the teachers' desktops would disrupt their daily work too much. Nevertheless, the pilot showed, that the pupils liked the Linux desktop and that the administrators found it more stable and less prone to be hacked by the pupils.

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<sup>11</sup> <http://waste.informatik.hu-berlin.de/Grassmuck/Texts/Linux.html>  
<http://news.zdnet.com/2100-3513-5850633.html>

## 4.2. Analysis

Before starting the analysis, we should note the fact that roughly the same infrastructure, in terms of functionality, can be established by using either proprietary or free solutions. In this view, by specialized software we mark all software that was developed specifically for some platform for the special needs of a named customer. The analysis is divided in two parts. The first part considers factors that mostly influence the costs. The second part highlights the steps that were taken in order to successfully migrate vast numbers of users to new infrastructure.

### **Analysis of major cost factors**

The mentioned cases have been analyzed from various perspectives; therefore, we can highlight some of the most important factors learned from these migration processes. In our opinion, the most important factor, when considering a migration, are the people that are going to be affected by the process. The second, but still important factor is the amount of specialized software present in the whole infrastructure.

#### *Affected people in the process of migration*

In Munich, people in public offices were the target group. Most of them have been trained to use the software they need for their work, mostly by using only a small subset of the available features and functionalities the software offers. The majority of these users know very little about computers and programs outside the scope of their work. The biggest cost in the migration process is therefore the cost of their retraining and the time needed for adequate competence to develop with the new system. On the other hand, in Extremadura, the project targeted mostly students and teachers. Students are very flexible and very apt to learn new things. Not only their learning curve is steeper, but also the amount of common knowledge regarding computers and programs is much higher than in the case of older people. This is due to the fact, that computers are part of their every day life. Therefore, when the costs of migration are being considered, the question that should be answered first is, how flexible is my target group to change. This is also a reason why the costs of migration in Extremadura are much lower than in the city of Munich, where more than 50% of all costs accrue for software introduction and training.

#### *Amount of specialized software in use*

The second factor is the amount of specialized software in use. Costs for adapting or rewriting existing software for the desired platform and infrastructure must be thoroughly considered and calculated. Each specialized program is a case for itself and only detailed analysis of all possibilities will present a clear picture as to whether the migration can be justified or not (but only in regard to the costs).

### **Analysis of major prevention steps**

The city of Munich is an excellent example that migration of a vast number of users can be achieved without taking major risks and forcing users to a sudden change. On the other hand, by having an agile group of users, the switch can also be made in one step.

The Munich migration path consists of three phases. In phase 1, Mozilla and OpenOffice will be installed on all workstations, replacing the combination of MS Office and Netscape or MS Internet Explorer. Since OpenOffice can read most existing MS Office files, the migration of data from proprietary to open formats will proceed slowly. The migration teams have not yet defined the final standards and open file formats to be used. Phase 1 started right after the June decision and was concluded, for most departments, in 2005. The remaining departments will finish by the end of 2006.

Phase 2 involves replacing other non-problematic software (e.g. general office applications) by free software and switching non-problematic workstations to GNU/Linux. Emulation systems for Windows applications (e.g. VM-Ware, Wine or terminal servers) are to be used only when no other solution can be found. The long-term goal is a complete shift to free software. The parallel use of free and proprietary operating systems was considered too demanding on the IT administration. For this reason, it was determined that the existing NT systems will be used until the end of their life cycles.

In phase 3, the most sensitive software, e.g. software concerning data protection and professional data processing, will be migrated to FOSS. This phase has recently started and will continue until the end of 2009.

Key to the success of the migration is a well-defined communication process between migration teams and end users. Employees were educated early, during the planning phase, by Intranet presentations, introductory seminars, flyers, demonstration systems and personal discussions about the new system. The goal of the information dissemination is to decrease worries and reservations about the use of free software among public servants. Employee training started with the beginning of the first client replacements.

The key, and most notable aspect of this process is, in our opinion, the user-friendly "soft" migration. Users are introduced to new solutions gradually. The IT support has to be continuous. The quality of support is very important since the satisfaction levels in dealing with the problems of transition depends upon it. If the user is lost and confused when dealing with the new environment and the IT support is not available, the user becomes dissatisfied with the new solution. Bad experiences will be passed on to co-workers and the whole adoption process might be endangered. On the other hand, if the IT support helps users to overcome their problems, the dissemination of bad experiences is stopped at its root. Therefore, the IT staff must be present and available at all times, not only during the pilot studies and first adoption steps, but also long after the transition is finished, for as long as the need for support exists. Again, the duration of support required depends on the migration target group.

### **Analysis of social impact**

Unfortunately, these projects are in their early stages and the complete picture of the social impact upon the internal users of the system, the external users required to interface with the system and also the long term impact on local SME's, is not yet known.

### 4.3. Findings

Migration of a vast number of users can be achieved by careful planning and by proper pilot studies and training. Also, the justification of the migration must be considered, in the long run. The costs of training depend on the target group and their knowledge. The cost of training is only present in the first phase. Specialized software represents the major cost factor. This cost factor is hard to estimate because each component must have its own case study, where all possible solutions have to be considered. To sum up, not only does migration to F/OSS bring lower TCO (Total Cost of Ownership) in the long run, but importantly, increasing numbers of users are going to become familiar with F/OSS solutions.

The costs of training will fall as more users become familiar with F/OSS use. In some cases training represents the majority of migration costs. This trend can already be seen in schools and universities around Europe, where younger generations are becoming increasingly familiar with F/OSS tools.

#### **Side Box. The OSS Renovation of the French Tax Information System: Project Copernic**

In year 2000, a 10-year-long program Project Copernic was launched by French Directorate-General of Taxes (DGI) to modernize the whole of DGI's administration process that will offer new online services. It is a full implementation of Service-Orientated Architecture (SOA). The project has chosen open source technologies (Nagios, MRTG, Eclipse, Apache; by JBOSS and Atos Origin) along with systematic use of Open Standards which has yielded in a saving of millions of dollars. Along with that much saving the whole process has targeted and gained vendor independence, long term sustainability, and control of IT systems.

"France has 55 million citizens who can e-file their taxes and access their information, and 3 million corporations, and there are 80,000 tax agency employees needing to use the software." (Jean-Marie Lapeyre, CTO of the French Fiscal Agency)

Open-Source Software has been opted as rational choices for such features as, performance, sustainability, standards compliance, flexibility, and Total Cost of Ownership, etc. The whole system is reported to demonstrate much lower TCO (75 to 90%) compared to proprietary software based choices.

It is noteworthy to mention that the whole OSS adoption process resulted in a strong OSS policy - starting from a "neutral" position and being initially indifferent to both OSS and PS technological options. However the experience made them consequently opt to an OSS friendly IT strategy:

"The evaluation demonstrated that open source rivals or beats proprietary software on a technical level. More importantly, it proved that there are mature offers for cost-saving professional support and service." (Jean-Marie Lapeyre).

#### **Source:**

<http://www.groklaw.net/articlebasic.php?story=20060119232859729>

[http://jboss.com/pdf/jbw\\_barcelon/dgi\\_cp.pdf](http://jboss.com/pdf/jbw_barcelon/dgi_cp.pdf)

## 5. Conclusions

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This work has tried to provide the reader with a relatively detailed and comprehensive report about the social and economic benefits of F/OSS adoption. There is a scarcity of information regarding the benefits and issues surrounding the use of F/OSS. Several studies have been conducted and report positive findings towards F/OSS in terms of the functionality, reliability, maintainability, robustness, security, and scalability of F/OSS compared to their proprietary equivalents. It is also becoming clear that F/OSS can potentially provide the opportunity for significant reduction in overall software purchase costs, software support costs and general maintenance costs in addition to the "non-material" benefits.

F/OSS is not a nameless, faceless, or underground venture. Nor is it charity, or solely a community effort. The impact of F/OSS technology is going to be quite noticeable in the software industry, and in society as a whole; it is about to change ICT development in a profound way.

Throughout Europe, F/OSS is becoming one of the most interesting software solutions on the information technology landscape, because it allows for novel development models. F/OSS development methods have already demonstrated themselves to be especially well suited to efficiently take advantage of the work of software developers spread across the whole of the planet.

As it has been demonstrated by OpenOffice.org or the Mozilla project, F/OSS development works best in large projects that reach a critical mass. For Public Administrations it will be important to support F/OSS projects in such a way that the success of a F/OSS project can be guaranteed and even enhanced.

F/OSS also facilitates new business models forming a network of groups and companies (mostly SMEs) based on F/OSS development. Finally, F/OSS, in general, has a very positive impact on the creation of new markets and business opportunities.

Overall, F/OSS has already started to modify the rules of the information technology industry, and it is going to produce even more changes in the years to come.

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