

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

**Contract N° 015981**

**F/OSS National Programme Start-up  
Roadmap Report**

**D07**

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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

COTS: Commercial off-the-shelf

ICT: Information and Communication Technologies

SME: Small Medium Enterprise

VCS: Value-Capacity-Support

ODS: Open Data Standards

OEM: Original Equipment Manufacturers

NGO: Non Governmental Organization

SWOT: Strengths Weaknesses Opportunities and Threats

GNU: GNU's Not Unix

GPL: General Public License

FCC: F/OSS Competency Centre

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# 1. Introduction

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A substantial amount of open source code has been available since the 1980s. The collaborative model, one of the central features of the F/OSS model, gained momentum in the late 80s and early 90s. The term "open source software" came into general use in 1998 in parallel with the publicity surrounding GNU/Linux.

Globally, development and use of Free/Open Source Software (F/OSS<sup>3</sup>) has reached significant proportions. The potential benefits and the level of maturity of the F/OSS model is recognized as a viable alternative, which will, in many cases, prove to be the preferred approach to software development and application.

Public Administrations (PAs) are among the biggest computer hardware and software consumers world-wide. Every year they spend a substantial amount of money on commercial off-the-shelf (COTS) software licenses. By using appropriate technologies, such expenses might be either dramatically reduced or re-routed to further develop and support local business ecosystems. Additionally, F/OSS adoptions in PAs holds much promise for the overall public good.

This document proposes a roadmap to ensure that governments exploit the benefits that F/OSS can offer more, both by using available F/OSS solutions and by contributing to further F/OSS development. However, it does not suggest a single roadmap applicable for all governments, instead it highlights and discusses various approaches and possibilities which can be selected and adopted in a contingent manner. The rest of this technical report is organized as follows:

- Section 2 focuses on the rationale and motivations behind the adoption of F/OSS in public institutions. It points to the political, economical, social and technological promises and opportunities (PEST)<sup>4</sup>.
- Section 3 consists of subsections exploring 'state-of-the-art' approaches, methodologies, and legitimization issues of F/OSS adoption. It starts by discussing various approaches taken by governments in adopting Open Standards and Open Source Software in governmental organizations. Based on many 'state-of-the-art' implementations around the globe, the first subsection summarizes common characteristics observed in policy implementations along with a list of cited recommendations. The next subsection applies the 'SWOT Analysis' methodology<sup>5</sup> established in mainstream business administration schools of thought to provide and exemplify a tool for more appropriate and successful F/OSS adoption. This second subsection also highlights development opportunities of IT skills nurtured by the use of F/OSS and discusses its importance for relatively less developed regions. The subsection ends with a discussion on the 'Total Cost of Ownership' analysis framework on F/OSS adoptions. Section 3 concludes with a subsection on legal issues that might be faced while

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3 Synonyms used in similar texts are: OSS, F/OSS, FOSS, FLOSS, Open Source Software.

4 Porter, Michael E., (1985). "Competitive Strategy: Techniques for Analyzing Industries and Competitors"; Free Press. New York.

5 [http://www.valuebasedmanagement.net/methods\\_swot\\_analysis.html](http://www.valuebasedmanagement.net/methods_swot_analysis.html)

adopting and using F/OSS in public institutions. This subsection strongly stresses the need for clear government policy to prevent uncertainty and doubt<sup>6</sup> about F/OSS exploitation and adoption in public institutions.

- Section 4 suggests and compiles possible governmental policies and strategies for successful F/OSS implementations. The first subsection, based upon previously applied policies, classifies possible policy options for F/OSS adoption. It also presents a set of recommendations on how to incorporate F/OSS in e-government policies. The second subsection explores F/OSS implementation strategies: strategic approaches are mentioned along with their mode of development and level of involvement. This subsection proposes a Value-Capacity-Support (VCS) model to estimate success factors before any F/OSS implementation decision is taken. The VCS model is applied in order to derive value prerequisites for governmental institutions, and how these factors could be estimated to check whether F/OSS will provide additional value. The third and last subsection proposes a novel strategy towards F/OSS adoption and dissemination. It proposes the establishment of networked National and European F/OSS Competency Centers for better collaboration, communication, and information dissemination. Objectives, tasks, and organizational structure of these prospective centers are discussed in the same subsection.
- Section 5 outlines best national practices and discusses the similarities and non-transferable aspects of these experiences. Section 6 presents the conclusions.

Note that a number of case analysis are given in 'Side Boxes' along with the flow of the report in support of discussions, findings, and suggestions.

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<sup>6</sup> FUD (Fear, Uncertainty, and Doubt) is the term for any strategy intended to make a company's customers insecure about future product plans with the purpose of discouraging them from adopting competitors' products.

## 2. Purpose/Objective of National Programs

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### 2.1. Organizational re-engineering

In most cases, software users are highly dependent on their suppliers. This dependence is reflected in obligatory upgrades to new versions of software, particularly when the termination of maintenance agreements results in a "need" to upgrade to newer versions of the product; there is an ongoing need to purchase new hardware; to accept unilateral alterations of license conditions and the necessity to accept maintenance agreements. These are just a few examples of practices adversely affecting organizations throughout the public sector, in education, in health care and in population record maintenance. As large users of software, motors of the economy and guardians of free market forces, public sectors are striving to bring about the structural changes necessary to curtail this dependence.

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#### Note



Objectives of organizational re-engineering through F/OSS are: enhancing the quality of government information systems in terms of accessibility of information, transparency of action, security and future proofing improving the exchange of data between government domains; reducing dependence on external software suppliers by increasing the range of choice; combating monopolies in the software market in order to prevent abuse of dominant market positions; reducing the costs of software deployment.

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A very recent study highlights the fact that “public administrations (PAs) are among the biggest computer and software consumers world-wide and every year spend a substantial amount of money on commercial off-the-shelf software licenses” (Kovacs, et. al.). By using appropriate/alternative technologies, such expenses might be either dramatically reduced or re-routed to further develop local business ecosystems. However, F/OSS adoptions in PAs offer other promise for the public good; one of the motivations of this report is to comment upon this promise.

The success of Free/Open Source Software (F/OSS) is recognized in the eEurope 2005 Action Plan<sup>7</sup>. The report encourages the use of open source software in various public services, i.e., programme for Interoperable Delivery of European eGovernment Services to public Administrations, Businesses and Citizens (IDABC) has launched a portal for pooling F/OSS between European administrators and provides relevant information on F/OSS deployment cases and available studies<sup>8</sup>.

Efforts of another European Union funded project called COSPA<sup>9</sup> are also

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<sup>7</sup> The full report may be accessed @ [http://europa.eu.int/information\\_society/eeurope/2005/all\\_about/action\\_plan/index\\_en.htm](http://europa.eu.int/information_society/eeurope/2005/all_about/action_plan/index_en.htm)

<sup>8</sup> <http://europa.eu.int/idabc/en/chapter/452>

<sup>9</sup> The Consortium for Open Source (OS) and Open Data Standards (ODS) in the Public Administration (COSPA) is a two-year EU funded specific research project that officially began in January 2004. With funding of €2.6 million through the Information Society Technologies priority of the EU's Sixth Framework Programme (FP6), the project aims at studying and supporting the introduction of open source software (OSS) in the Public

noteworthy since it examines the versatility, adaptability, and transparency of F/OSS adoption in PAs.

In their widely quoted study, Varian & Shapiro (2003) indicate that open source software has achieved a 'critical mass' sufficient to assure users that it will be available and improved for years to come, reducing the risk to users and software developers making investments in open source software. As such, open source software is becoming an attractive choice for IT managers both in the private and in the public sector. (Varian & Shapiro, 2003, p.1; Becker, 2004)

Yet, as Varian & Shapiro (2003) exemplify with GNU/Linux, there are other peripheral reasons for the public sector to adopt open source software:

“Public sector technology managers have additional reasons to adopt Linux. Adoption of Linux platform software promotes the training of software engineers and provides an open platform on which commercial or open source applications can be built, thereby spurring the development of a robust domestic industry. Certainly, any government information technology manager seeking to put in place a flexible computing environment that also helps promote the domestic software industry should give serious consideration to Linux.” (Varian & Shapiro, 2003: p. 20)

Many independent reports (Schmitz, 2001; Ghosh et al., 2002; Evans & Reddy, 2003) show that increased economic growth and employment is expected by a broad adoption of open source software in the public sector. Consequently many governments have started political interventions in order to increase the use of open source software. In the last couple of years, these political initiatives have gained significance because they coincided with “the biggest desktop refresh since Y2K” (Kotadia, 2004). As maintenance and support contracts, negotiated in order to avoid Y2K problems have started to expire, the Gartner Group has estimated that 220 million corporate desktop PCs should have been replaced in 2004 and 2005. (Gartner Group, 2004: cited in Ghosh & Glott, 2005).

This report states the major objectives of such organizational re-engineering, particularly those for public bodies are as follows:

- to enhance the quality of government information systems in terms of accessibility of information, transparency of action, security and ability to maintain and extend them in the future;
- to improve the exchange of data between government domains;
- to reduce dependence on external software suppliers and increase the range of choice;
- to combat monopolies in the software market in order to prevent abuse of dominant market positions;

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Administration through carrying out an empirical and objective evaluation of how much it will cost to use OSS and to identify what the main problems are if PAs do decide to use it. COSPA believes that using open source software may offer better versatility, adaptability and transparency. See [www.cospa-project.org/](http://www.cospa-project.org/)

- to reduce the costs of software deployment.

## 2.2 Brief on accepted benefits and possibilities of F/OSS

A substantial amount of source code has been open since the 1980s. The collaborative model, one of the central features of the F/OSS model, gained momentum in the late 80s and early 90s. The term "open source software" came into general use in 1998. Recently, the development and use of F/OSS has become globally significant. The potential benefits and the level of maturity of the F/OSS model is recognized as a viable alternative, which will, in many cases, prove to be the preferred approach to software development and deployment.

The eEurope Action Plan 2005<sup>10</sup>, which was presented at the summit of the European heads of state in Seville (Spain) in June 2002, states that the Interoperability Framework would be "based on open standards and encourage the use of open source software." Rationale for the support of open source software is articulated in the European Interoperability Framework (EIF) document:

"Open Source Software (OSS) tends to use and help define open standards and publicly available specifications. OSS products are, by their nature, publicly available specifications, and the availability of their source code promotes open, democratic debate around the specifications, making them both more robust and inter-operable. As such, OSS corresponds to the objectives of this Framework and should be assessed and considered favorably alongside proprietary alternatives."

The necessity of Open Standards, as formulated in EIF section 1.3, is as follows:

"To attain interoperability in the context of pan-European eGovernment services, guidance needs to focus on open standards. The following are the minimal characteristics that a specification and its attendant documents must have in order to be considered an open standard:

- The standard is adopted and will be maintained by a not-for-profit organization, and its ongoing development occurs on the basis of an open decision-making procedure available to all interested parties (consensus or majority decision etc.)
- The standard has been published and the standard specification document is available either freely or at a nominal charge. It must be permissible to all to copy, distribute and use it for no fee or at a nominal fee
- The intellectual property — *i.e.*, patents possibly present — of (parts of) the standard is made irrevocably available on a royalty-free basis
- There are no constraints on the re-use of the standard."

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<sup>10</sup> [http://europa.eu.int/information\\_society/eeurope/2005/all\\_about/action\\_plan/](http://europa.eu.int/information_society/eeurope/2005/all_about/action_plan/)

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**Note**

Widely accepted benefits of F/OSS adoption:



- 1) Reduced costs and less dependency on imported technology and skills.
  - 2) Affordable software for individuals, enterprises and governments.
  - 3) Universal access through mass software roll out without implications of costly licensing.
  - 4) Access to government data without barriers of proprietary software and data formats.
  - 5) Ability to customize software to local languages and cultures.
  - 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.
- 

There are many extensive case studies and published results on the benefits of F/OSS within governmental bodies (MIT, 2003; Ghosh & Glott, 2005; OGC, 2004; GITOC, 2003), all of which support the aforementioned directives of the European Commission. The major reasons for governments use of F/OSS can be listed as follows:

- Preventing vendor lock-in,
- Interoperability / Flexibility,
- Re-usability,
- Quality, transparency, sustainability, safety,
- Reduced costs,
- Stimulation of local (European) software industry.

Open source software enhances the reliability and security of systems: the user can verify how the software works by investigating its source code, thus allowing full control in critical environments. Software durability is also ameliorated since availability of source code allows any modifications to the program necessary at any given time, even by developers other than the original ones.

Vendor lock-in is eliminated by the fact that all suppliers have equal access to the maintenance process. Together with F/OSS, open standards allow combined use of software from different market participants and can prevent an organization from being obliged to use the software of a specific supplier. As a result, governments can choose the software component with the best price/performance ratio or choose according to any other relevant criteria.

Thus, the use of open standards along with F/OSS provides the flexibility needed to establish links with other information systems. In addition, open standards contribute greatly to the durability and accessibility of information.

### Side Box 1. LINEX Case Study

Extremadura is the poorest region of Spain, lagging behind the rest of the country in both the economic and technological arena. In the mid-90s the regional government saw that new information technology could help the region to overcome its historical “peripheral” situation. Though short of financial resources, the region has set very high goals for itself in its Regional Strategy on Information Society launched in 1997 by the president of the region. Two formal objectives were presented by the strategy: Accessibility for all (Internet as a public service) and stimulation of technological literacy.

The LinEx project (Linux+Extremadura) is directly derived from this strategy. Its objective is to create a fully functional platform, based on FLOSS, providing universal access of IS tools to all citizens. LinEx is a Linux distribution, customized and translated into Spanish, specifically designed for use in regional administration and schools. As of 2003, LinEx has been installed on 40.000 computers in schools, an additional 150.000 installation disks have been distributed.

LinEx is co-financed by e-Extremadura, the Programme for Innovative Actions. Initial software development costs and hardware sum up to 193.000 Euro. The project has calculated to save a total amount of 30 million Euro compared to more closed or non-free software solutions.

**Source:** FLOSS deployment in Extremadura, Case study Extremadura LinEx, November 2003, Open Source Observatory

## 2.3 Prominence of F/OSS in mainstream software market

### 2.1.1. F/OSS in mainstream software market

F/OSS has reached a critical mass allowing it to enter the mainstream software market. Its impact is becoming noticeable in the software industry and in society as a whole. Companies like IBM, SAP, Sun, Intel, Novell, Hewlett-Packard and Silicon Graphics are committed to using open software as a core part of their business and are investing significantly in increasing its already impressive capabilities.

The EU has funded many research projects, some of which are mentioned within this document, related to free software. The European Commission itself develops free software, but no official policy on this has yet been adopted. However, with respect to eGovernment, EC DG Research Expert Committee on “IPR Policies for ICT-based research” recommends free software licenses for software resulting from public funds. F/OSS is seen as a way to achieve “Lisbon goals”, by providing access to services for everyone regardless of platform or technology (Ghosh & Glott, 2005).

Government authorities in other countries are also showing much interest in the use of open standards and open source software. In addition to the European Commission, many countries are independently pursuing an active policy. China has succeeded in the massive adoption of free software in public administrations; Brazil legislation requests that 80 percent of new software purchases must be free software; Japan has spent millions of US dollars in funding free software development. In Korea a large government-wide migration plans to save \$300 mil by 2007; lastly, the US Department of Defense relies on free software and states have initiated political initiatives aimed at wider F/OSS adoption.

### 2.1.2. Actors of F/OSS business model

F/OSS blurs boundaries between conventional business models. It links product-related and service-related phenomena. Based upon very recent studies on the characteristics of F/OSS, the following F/OSS business actors are identifiable<sup>11</sup>:

1. Developers of OSS: They develop OSS and distribute it without royalties but they may make an income out of related services, such as consulting, system implementation and integration, support and training. They may also offer the object code of the program under a commercial/proprietary license as long as they are the initial developers, if permitted by the specific OSS license used or they may offer the product under an OSS license, along with support and warranties and/or program updates.
2. Developers of niche applications produce applications and administrative tools. They may offer the same niche application under a commercial proprietary license and an OSS license or they may develop proprietary software on top of the basic OSS functionality. Major customers are either value added resellers or OEMs (Original Equipment Manufacturers) selling optimized hardware-software bundles or they may develop and sell embedded products. Examples are Zope, Sendmail, MySQL etc<sup>12</sup>.
3. Distributors of OSS test, tune and optimize existing OSS fragments aiming to achieve good performance and reliability, to bundle and sell these as packages to a) end users, b) IT-administrators, c) developers using the OSS as a basis for their hardware-software combination packages or embedded systems. They may make an income out of the packaging and the provision of services, such as support, maintenance, training etc. Sales channels: websites for online downloads or CD-Roms for physical distribution. Examples are RedHat, SuSE etc.
4. Retailers: They are not involved in the development process, usually not solely focused on OSS, however, income is made by selling documentation and training books, such as CNET, ZDNet, CrazyPenguin, Linuxland, O'Reilly (solely based on OSS), etc.
5. Marketplaces, such as SourceXchange, Cosource.com, intraDAT, matching buyers and sellers, providing project management, productivity tools and on demand aggregation.

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11 The business models are mainly based on studies a) F/OSS project, F/OSS Final Report – Part 3: Basics of Open Source Software Markets and Business Models, July 2002, section 4, available @ <http://www.flossproject.org/report/index.htm>, b) IDA Study: Study into the use of Open Source Software in the Public Sector, June 2001, Part 3: The Open Source Market Structure, p. 29 – 33, available @ <http://europa.eu.int/idabc/en/document/1743/471>

12 See [http://www.sida.se/sida/jsp/sida.jsp?d=118&a=3055&language=en\\_US](http://www.sida.se/sida/jsp/sida.jsp?d=118&a=3055&language=en_US) for further discussion (Chapter 5) on open source business models.

6. End-users: The end-users of F/OSS, such as public administrations, private or commercial end-users. End-users may not merely use OSS for their purposes but also develop customized solutions for their specific needs. Since F/OSS gives exactly this freedom, i.e. to modify the program, end users become integral to the whole process.

### Side Box 2. Proof of Concept Trials of OSS within UK Governmental Departments

The UK's Office of Government Commerce (OGC) has conducted "Proof of Concept" trials of OSS with the objective to assess the viability within a "live environment" of using OSS across central government departments and the wider public sector. The main conclusions of the trials are:

- Open Source software is now a viable and credible alternative to meet the requirements of the majority of desktop users;
- Adoption of Open Source software can generate significant savings in hardware and software costs, and reduce the licensing costs and hardware upgrade requirements;
- The main obstacles to widespread implementation of Open Source software are: for desktop applications, the current lack of complex functionality which can affect ease of migration and interoperability for some organizations; and for business applications, the lack of Open Source products to compete with large-scale proprietary enterprise-level products; no significant obstacles were noted for the adoption of Open Source in infrastructure developments;
- Decisions for the adoption of Open Source, particularly for the desktop, should be made after full assessment of the future needs with an investment in planning, training of users, development of skills, and detailed consideration of migration and interoperability issues.

The report produced from the trial also makes various recommendations to public sector bodies, including:

- Public sector bodies should examine carefully the technical and business case for implementation of OSS and the role which it could play in current and future projects;
- They should review the potential for server consolidation;
- They should consider the potential costs and benefits of migration to an OSS desktop for transaction users;
- They should identify the role of open standards in future IS/IT strategy and policy, in conformance with the e-Government Interoperability Framework (eGIF);
- They should consider requirements for the development of skills in Open Source development, deployment and operation within the organisation;
- They should review their current infrastructure and applications well in advance of any planned procurement or renewal, and determine whether current technologies and IT policies inhibit future choice. Phase 2: Providing Internet access and computer Infrastructure.
- They should consider the benefits of incremental change by diversifying OSS use beyond the server platform.

Source: <http://www.gnn.gov.uk/>

## 2.4 Philosophy of F/OSS ethical/intellectual property

F/OSS is distinguished from other proprietary forms and practices of software production for many reasons. This is what the cultural anthropologist, Christopher M. Kelty (2004) says:

“... most interestingly because its advocates discuss it “not simply in technical terms, but as a philosophy, a politics, a critique, a social movement, a revolution, or even a “way of life.” For practitioners, observers, and advocates who have been drawn into this net of the intellectual, moral, and cultural climate, it seems to offer an answer to the 21<sup>st</sup> century question of how we should live—or at least, how we should promise, share, code, hack, license, lawyer, organize, buy, sell, own, sing, play, or write. More recently, such talk has broken free of its connection to software and become common amongst artists, writers, scientists, NGOs, and activists. It has provided them with not only a new rhetoric, but a new set of practices concerning authorship, ownership, expression, speech, law, politics, and technology.” (Kelty, 2004: p. 499).

Metaphors, such as 'The Cathedral and the Bazaar' (Raymond, 1998), used to describe the organization of F/OSS projects, typically place F/OSS in sharp contrast to proprietary development by emphasizing these aforementioned distinctive social and communication structures and implications of F/OSS.

### 2.1.3. The defining characteristics of F/OSS

In 1985, Richard Stallman founded the Free Software Foundation<sup>13</sup>, which provided the first free software license, and some software components forming an incomplete UNIX-derived operating system known as GNU (GNU's Not Unix). Stallman's movement often emphasizes the political aspect of freedom with the slogan “*Free as in Free Speech, not as in Free Beer.*”

The defining characteristics of F/OSS are a) the free availability of its source code, namely of the human-readable instructions that compose a given program, and b) the nature of the license under which it is distributed that allows both its free modification and its free redistribution. In other terms, this freedom, at a minimum, is the freedom to “run, copy, distribute, study, change and improve the software”. Richard Stallman, founder of the Free Software Foundation, articulates the four kinds of freedom guaranteed by free software<sup>14</sup>:

- The freedom to run the program, for any purpose.
- The freedom to study how the program works, and adapt it to your needs.
- The freedom to redistribute copies so you can help your neighbor.
- The freedom to improve the program, and release your improvements to the public, so that the whole community benefits.

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13 <http://www.fsf.org>

14 The Free Software Definition is available at <http://www.fsf.org/licensing/essays/free-sw.html>

These characteristics distinguish F/OSS, not only from proprietary software, which is distributed as object-code under a license that sets clear restrictions to its usage and requires payment of a fee for its use, but also from free-ware and share-ware that can be downloaded free of charge but do not allow access to the source code. The combination of the above characteristics of F/OSS licensing allows a scattered group of developers to modify existing programs and to redistribute them.

#### 2.1.4. Other technical/non-technical implications of F/OSS

The “open philosophy” of F/OSS in IT, covers open standards, open source, open content, open services and open hardware (GITOC, 2003). Thus, this broad adoption of open source software by the public sector is not only expected to result in increased economic growth and employment, but also to have potential impact on areas other than IT industries. Weber (2004) supports this hypothesis while stressing a different aspect. He points out that the democratic principles of open source have a strong potential in other industries, especially in biotechnology and publishing.

Yet, F/OSS also seems to break many conventional assumptions that underlie research on innovation and technological change. For instance, GNU/Linux is developed by an informal self-organizing social community. There is no well-defined market or hierarchy associated with it. Most of GNU/Linux development occurs without economic transactions. Instead of getting paid for their efforts, the developers often spend a lot of time, money and effort contributing to the development of the projects.

As such, referring to software that is developed, tested, or improved through public collaboration and distributed with the idea that it must be shared with others, F/OSS ensures open future collaboration. Thus, F/OSS has emerged as a powerful new way of generating knowledge and economic value.

Scholars from business and management sciences acknowledge F/OSS as an alternative model of software development that seems to challenge the conventional wisdom of modern industrial organization by allowing globally distributed individuals to collaborate online and with great success on large and complex software systems.

For economists, this has generated an ambiguity about the plausible or accepted paradox of “motivation”:

“... why anyone would spend so much unpaid time building software only to give it away for free online. It is here that the old anthropological standby of the “gift economy” has been given a new treble-mortgaged lease on life as a solution to the putative problem of motivation.” (Kelty, 2004: p. 503).

For lawyers and legislators, free and open source software represent a new combination, “a legal hack” of copyright and contract law. One that creates a “commons” which has been the object of both disgrace and advocacy. (Kelty, 2004: p. 504).

### Purpose/Objective of National Programs

Lastly, F/OSS also implies a learning media where ingredients/practices of participative and open society exists. Consequently, it can serve educationally through a conscious use of its prescribed advantages.

## 3. State of the Art

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### 3.1 State of the art of national programs

There are various approaches taken by governments in adopting Open Standards and Open Source Software in governmental organizations<sup>15</sup>. However, following the state-of-art implementations both within the European Union and within non-EU regions<sup>16</sup>, one can find some basic common characteristics in policy implementations.

In the Netherlands the starting point of such an adoption has been the vote in parliament in 2002, wherein all governmental organizations are advised to use open standards for communication and messaging. Although, this is not yet mandatory, there are serious attempts<sup>17</sup> towards its wide adoption. Similarly, though there is no duty to use open or free software, providing equal opportunities for F/OSS and closed source proprietary software is stressed by the Dutch governmental bodies.

The Italian Minister for Innovation and Technologies assigned a committee represented by numerous universities, municipalities, provinces, regions and ministries to study the "State of the Art on F/OSS in Public Administration"<sup>18</sup>. The primary goal of the Committee was to give policymakers elements to understand and define their own policies on F/OSS. Within that perspective the Committee published a list of recommendations on which the Directive on "Development and use of computer programs from public administrations" has been based (see sidebox 6). While most findings reflect common needs, the directive has been criticized for being, "not extensive enough": e.g. why should only "at least one document format" be open? France has adopted a formal recommendation by the Prime Minister, this urges all public bodies to communicate to the public by using open formats, exclusively.

The question of open standards has been raised by the State of Massachusetts, USA, in its Open Initiative. It notes that investments in information technology has to result in systems that are sufficiently interoperable to meet the business requirements of the state's agencies and to effectively serve its constituencies. The policy addresses the importance of open standards compliance for IT investments. For this purpose, open standards is defined as specifications for systems that are publicly available and are developed by an open community and affirmed by a standards body. Open standards imply that multiple vendors can compete directly based on the features and performance of their products. It also implies that the existing information technology solution is portable and that

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15 For many other different examples of F/OSS adoption in the public sector please see <http://europa.eu.int/idabc/en/chapter/452> (Open Source Observatory, part of the EU IDABC program)

16 For instance, policy implementation of South Africa is noteworthy, [www.fossfa.org](http://www.fossfa.org).

17 For an up to date current situation please refer to [www.ososs.nl](http://www.ososs.nl)

18 For the generated report in 2003, titled "Survey of Open Source Software in Governments" by MIT (Minister for Innovation and Technologies) see <http://www.innovazione.gov.it/>

it can be removed and replaced with that of another vendor with minimal effort and without major interruption<sup>19</sup>.

### Side Box 3. Free Software for Munich

Free software on the server end of an IT infrastructure is quite common in Germany. What makes the LiMux project stand out is that the Bavarian capital Munich (1.3 million inhabitants) will migrate 14,000 PCs and laptops of its public employees to non-proprietary software.

The driving force behind the City Council's migration decision was—Microsoft:

- Ending support for Windows NT, Microsoft forced Munich's IT administration to plan a major overhaul of its operating software base.
- By changing its licensing policy for XP from a sales to a lease model, concerns have been raised about the rising total cost of ownership (TCO) of the software.
- WindowsXP and its components regularly call home transmitting unknown kinds of data to Microsoft during these contacts. Munich's CIO, Wilhelm Hoegner argued that the strict privacy obligations of the public administration made such uncertainty unacceptable.

The City Council decided in May 2003 to move its IT systems to free software and web-based applications. The critical arguments for free software were greater vendor independence, leading to more competition in the software market; the future-proofness of open protocols, interfaces, and data formats; and improved security through greater transparency.

Microsoft responded by offering large price reductions on Windows XP and Office, but the long-term advantages of vendor independence weighed more heavily than short-term savings.

**Source:** Volker Grasmuck "LiMux – Free Software for Munich"

([http://www.ssrc.org/wiki/POSA/index.php?title=LiMux%E2%80%94Free\\_Software\\_for\\_Munich](http://www.ssrc.org/wiki/POSA/index.php?title=LiMux%E2%80%94Free_Software_for_Munich))

Most European states have issued statements on a national or regional level regarding the use of FOSS in public procurement. Directives have been made and programs have been launched including requirements such as

- solutions have to be selected according to value for money (not preferring any proprietary or open source);
- open standards for document exchange to prevent vendor lock-in and secure investments;
- security issues have to be taken into account (access to source code).

Although common elements can be found beyond conventional IT procurement strategies, they differ to the extent in which they push the move towards open source. For example, whereas Italy requires one open document format, Extremadura has replaced some 60.000 desktop PCs by F/OSS installations.

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<sup>19</sup>[http://www.mass.gov/?pageID=itdterminal&&L=3&L0=Home&L1=Open+Initiatives&L2=Policies&sid=Aitd&b=terminalcontent&f=\\_policies\\_standards\\_open\\_standards\\_policy&csid=Aitd](http://www.mass.gov/?pageID=itdterminal&&L=3&L0=Home&L1=Open+Initiatives&L2=Policies&sid=Aitd&b=terminalcontent&f=_policies_standards_open_standards_policy&csid=Aitd)

### 3.2 SWOT analysis for F/OSS

SWOT (Strength-Weakness-Opportunities-Threats) analysis is a basic, straightforward business administration strategy that provides direction and serves as a basis for the development of production, marketing, and investment plans. It accomplishes this by assessing an organization's strengths and weaknesses in addition to opportunities and threats (Ferrel, et. al., 1998). SWOT analysis can also be extremely beneficial to public administrators in analyzing F/OSS based solutions prior to their adoption within governmental institutions. In applying the SWOT analysis, it will be necessary to minimize or avoid both weaknesses and threats that may arise locally or may exist inherently within the nature of F/OSS.



**Figure 1. SWOT Analysis (Ferrel, et. al., 1998).**

SWOT analysis requires a thorough scan of the internal and external environment. Figure 1 depicts the process of environmental scanning. This scanning process might provide information necessary in matching public resources and capabilities to the local adoption of appropriate F/OSS solutions and to suggest where some processes of public organizations need to be remodeled and supported by F/OSS technology. Tables 1 to 4 provide a summary of such a SWOT analysis process applied to F/OSS adoption in the Public Sector. It is built upon the work of Ferrell (1998) and includes any necessary updates reflecting the current situation. This model can prove crucial for F/OSS practitioners attempting to identify whether the opportunities and the strengths exceed the weaknesses and the threats<sup>20</sup>.

<sup>20</sup> For an exemplary case study please see the technical paper prepared by The MITRE Corporation (See <http://www.mitre.org/>; Kenwood, 2001). The paper by Caralyn A. Kenwood (2001) has been prepared as part of The MITRE Corporation's Mission-Oriented Investigation and Experimentation (MOIE) research project "Open Source Software in Military Systems." This paper analyzes the business case of open source software. It is intended to help Program Managers evaluate whether open source software and development methodologies are applicable to their technology programs. The study is notable as it also summarizes issues and cases which lead to the emergence of F/OSS-driven opportunities that private and public sectors can and must exploit.

**Table 1. F/OSS Opportunities (Derived from Kenwood (2001) with certain modifications).**

F/OSS-Strengths
<b>1. Massive Programming Expertise:</b> Linux has an internationally distributed massive pool of programming expertise.
<b>2. R&amp;D Covered by Volunteer Labor:</b> Research and Development efforts are significantly covered by volunteer labor.
<b>3. Quick Release Rate:</b> Fixes and patches are released quickly, potentially an order of magnitude faster than that of commercial software.
<b>4. Parallel Development and Debugging:</b> Open source projects utilize multiple small teams of volunteer individuals that work independently to solve specific problems. Parallel debugging and development efforts enable the coordinating developer to choose the best potential implementation from the many creative choices offered. Parallel debugging, according to Eric S. Raymond, improves efficiency nearly linearly with the number of individuals working on the project
<b>5. Culture of Sharing:</b> The GNU General Public License has fostered a culture of sharing, which is pervasive throughout the community. OSS eliminates the economic loss associated with duplicated work.
<b>6. Long Term Accessibility:</b> Unlike proprietary companies, the open source movement cannot be driven out of business in the near-term. As long as sufficient interest and skills exist from the development community, the life of the open source product will continue. Furthermore, since the code is publicly available, the user is not entirely dependent on a single organization to maintain and support the software. The user always has the choice to provide in-house maintenance and support to continue the product's life indefinitely.
<b>7. Operating System Independent F/OSS Applications:</b> Critical F/OSS solutions such as Firefox, Thunderbird and OpenOffice enable easier penetrations at the desktop level.

**Table 2. F/OSS Weaknesses. (Derived from Kenwood (2001) with certain modifications).**

F/OSS-Weaknesses
<b>1. Lack of a Legitimate Entity:</b> A proprietary company is more tangible in the sense that it can position itself to potential and current customers as a contractually assured care taker. Microsoft, for instance, resorts to Fear, Uncertainty, Doubt (FUD) tactics against F/OSS, claiming its lack of "Ownership" presents problems.
<b>2. Hard to Originate:</b> In order for an open source project to be both get started and become viable, it must be able to amass a large enough community of highly skilled and interested developers to concentrate on the problem. The open source project must be relevant and interesting to a large group of developers. The larger the project, the more development and debugging the code receives.
<b>3. Documentation:</b> If the developers do not provide a good and complete documentation, all F/OSS strengths may become weaknesses and the whole product may become unusable.
<b>4. Psychological element:</b> F/OSS has to deal with already established strong user habits. The efforts to convince a proprietary software user to use F/OSS are often enormous because the F/OSS strengths appear

F/OSS-Weaknesses
not to be important to the user habitually using proprietary software. There is resistance to change and new methods such as F/OSS.
<b>5. Hard to standardize:</b> Due to their community and independent nature, F/OSS products are difficult to standardize. It is harder to convince a whole community of individuals to comply with some standards, and worse – to write code within some standard. That is why the GNU/GPL license says that the product comes “as is and with no warranty”. This often scares the new F/OSS user.

**Table 3. F/OSS Opportunities. (Derived from Kenwood (2001) with certain modifications).**

F/OSS- Opportunities
<b>1. Internet Connectivity:</b> The number and productivity of open source development teams expand with the Internet. The increasing growth and accessibility of the Internet will continue to expand Linux and all other F/OSS projects by making them accessible to a larger number of people. Collaborative technologies, such as mailing lists, Internet Messaging, blogging, trackback, RSS, social bookmarking, newsgroups, and websites have also fostered the growth of F/OSS.
<b>2. Many Distributors:</b> Distributors offer Linux software packages with integrated tools. They act as an intermediary between the fast-paced Linux development process and customers who do not care about the day-to-day changes to the kernel, etc., and remove many of the hassles of a downloaded operating system. Vendors are also providing sales, support, and integration, emphasizing services rather than the software product itself. As the Linux distributors compete against one another, they escalate the evolution of the operating system by adding features, improving its packaging, and advertising its use. The open source community provides an ongoing “service” evolving with the user to meet emerging needs, rather than a “product” that remains static and eventually requires replacement.
<b>3. Product Support From Large IT Companies:</b> Some conventional companies are trying to profit from the Linux trend by making some of their products available for Linux under a licensing agreement. Such vendors include: Oracle, Hewlett-Packard, IBM, Lotus, Novell, etc. For instance, IBM promotes itself as a competitive alternative to Solaris. Initiating a market strategy in support of Linux, IBM has developed close ties to the open source community and invested in OSS initiatives and Linux distributors.
<b>4. Competitive Support Structure:</b> Closed source software depends on monopoly support, one company that provides support and “holds all the cards” (i.e., access to the code) for a piece of software. This gives users the choice of either accepting whatever support the original authors provide or switching to different software. Since the cost of switching can be substantial, users are forced to accept monopoly support. In contrast, the publicly available source code for Linux and other open source products enables many vendors to learn the platform and provide support. Because vendors compete against one another to provide support, the quality of support increases while the end-user cost of receiving the support decreases. Open source can create support that lasts as long as there is demand, even if one support vendor goes out of business. Also, the support structure is self-scaling in that the more users that adapt OSS, the more users learn and

F/OSS- Opportunities
are able to support each other. The peer review characteristic of open source products helps to ensure that an adequate base of maintenance developers are familiar with the package.
<b>5. Influx of Start-up Companies:</b> Start-up companies represent an opportunity for Linux because they typically cannot afford a large in-house development staff. Linux direct costs are often less than those of proprietary software companies such as Microsoft.

**Table 4. F/OSS Threats. (Derived from Kenwood (2001) with certain modifications).**

F/OSS-Threats
<b>1. Strengthened Software Patent Rights:</b> Strengthened patent rights for software innovations threaten the continued existence of the F/OSS production mode. Patents increase the cost of using existing information, and thus negatively affect F/OSS development. Threats to F/OSS projects may take a very concrete form. In particular, they may take the form of patent litigation, an increasingly important strategic tool in the hands of commercial proprietary software companies.
<b>2. Competition:</b> There is a risk of companies developing strategies specifically focused against Linux. The success of Linux has made it a competitor in the market. There is evidence of formal competitive analysis and strategy against Linux and the open source movement <sup>21</sup> .

### 3.2.1 New IT Skill Development Opportunities

Apart from the advantage of the freedom offered by access to the source code, the non-proprietary status of F/OSS has many other implications for affordable IT solutions in both the public and private sectors (GITOC, 2003) . Due to the principle of free redistribution, and the possibility of running it on old obsolete equipment there are cost savings associated with F/OSS. Besides these aforementioned clear benefits, F/OSS may be placed to stimulate a new wave of opportunities in IT as, in addition to its new powerful way of generating knowledge and economic value, the F/OSS model also has profound educational benefits.

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<sup>21</sup> For instance, Microsoft has developed a formal competitive analysis and a strategy against Linux and the open source movement. Evidence of this has been seen in Microsoft internal strategy memorandum, referred to by the Linux community as the Halloween documents. The Halloween documents were obtained by the community and have subsequently been posted @ <http://opensource.org/halloween>.

F/OSS usage provides users from diverse educational backgrounds to informally learn computer skills, and even programming skills. These computer skills build competence in formal science training. The notion of openness and free access makes F/OSS suitable for the education systems. F/OSS allows students to learn more because they can better understand how computers and operating systems work, and allows practice, legally, at home without having to pay for an Operating System, Office program, etc to do homework. Hence, it widens the learning spectrum of the students, promoting the creation of additional skills. Besides, it makes it possible to reuse obsolete hardware systems still available at school, thus helping to reduce the total cost for hardware and software for educational institutions.

Accessibility of F/OSS has the potential of empowering people in ways that proprietary software does not allow. It offers users the choice to probe, modify, learn from and customize the software, while harnessing the power of many small contributions from a large network of individuals to meet their needs. F/OSS supports a rapid evolutionary process involving users, producing better products in less time than the traditional closed model.

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**Note**



The spirit of F/OSS encourages not only passive “use” but active participation in the creative process. Consequently, its participative media provide very low entry barrier for innovations, which is particularly crucial for less developed regions. Its evolutionary and participative media offer better opportunities to develop skills in computer programming, and team management.

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This evolutionary medium provides better opportunities to develop local skills. For instance, skills of programming, and team management are learned through participation in the F/OSS community, as it encourages not only passive “use” but active participation in the creative process. This participative medium also provides a very low barrier of entry for innovations. Participants don't have to be creative but if they want to, they can easily engage in innovative processes.

F/OSS is an especially useful means to allow less developed regions catch up with the information age. It encourages novel development models that have been demonstrated to be particularly well suited towards taking advantage of the work of developers collaborating across the Internet. In general, it also has a positive impact as an enabler for the creation of new markets and business opportunities enhancing progress in less developed regions.

### 3.2.3 The Total Cost of Ownership of F/OSS: A Strength or a Weakness?

Total Cost of Ownership (TCO) is a more frequently used type of calculation designed to help consumers and enterprise managers assess direct and indirect costs, as well as benefits related to the purchase of computer software or hardware (Gartner Inc., 2003). “Ideally, a TCO offers a final statement reflecting not only the cost of purchase but all aspects in the further use and maintenance of the computer components considered. This includes training support personnel and the users of the system” (Russo et al, 2005).

#### Side Box 4. French Ministry of Finance goes Open Source

“The French tax agency, which manages the taxes of all states and cities in France, plans to deploy the open source office productivity application OpenOffice.org on thousands of its PCs.

In an interview, chief technical officer at the French tax agency, Jean-Marie Lapeyre, said it plans to migrate 80,000 desktops from Microsoft Office 97 to OpenOffice.org next year.

The migration is expected to cut the agency's costs by €29.3m, compared with the cost of switching to Office XP. The agency has calculated it will only take three man-years to be "completely independent" of Microsoft Office, according to Lapeyre.

It may also consider migrating to Linux desktops in the future, although Lapeyre said this would require much more work.”

**Source:** Ingrid Marson (<http://www.silicon.com/research/specialreports/opensource/0,3800004943,39154084,00.htm>)

The paper by Russo, et.al. (2005) provides a TCO based framework to evaluate the transition to a F/OSS software solution in terms of returns and losses in the context of Public Administrations. This noteworthy approach is used to identify costs that are not easy to trace or that are not usually collected, like user acceptance. However it is important to note that TCO for comparing F/OSS versus proprietary solutions is a subject of debate.

Divergent views regarding the total cost of ownership of desktop applications exist. One of the major claims is that the cost of training, adapting, maintaining, etc. of F/OSS could be high enough to exceed savings on purchasing and licensing. This claim is supported by the findings that although Linux is driving the open source movement in the commercial world, it is predominantly deployed on servers, and particularly on web servers, but research has shown that F/OSS for desktop applications does not seem to share the same amount of popularity. For example, in the areas of office automation and client operating systems F/OSS is only deployed by 5% of European public institutions and businesses (Zuliani & Succi, 2004). However, it should be noted that in more recent times figures are increasingly favoring F/OSS adoption.

#### TIP



Using TCO for comparing F/OSS versus proprietary solutions is a subject of debate. The one-year budget cycle in PA is a very serious problem in making a rigorous analysis of TCO in PAs; it leads to difficulties in evaluating the medium to long term savings from the migration. Longer term budget estimates need to be applied in a Total Cost of Ownership (TCO) based framework to accurately evaluate the transition to a F/OSS solution in the context of Public Administrations.

One main problem holding back F/OSS growth in desktop applications might be that whilst those using F/OSS applications are more technical, the average desktop user, using standard commercial proprietary software, is not that technically apt and lacks basic computer skills (Nichols & Twidale, 2003). Based on these facts, it is argued that the cost of training for F/OSS adoption could be very high. On the other hand, the COSPA<sup>22</sup> consortium argues that the reduction of the expenses for software licenses will allow for investing more money in personnel training (Morgan, 2005).

The problems and costs of F/OSS in governmental bodies might arise as they face a new procurement process. Government procurement procedures are long, time consuming and expect a lot from the client. However, open source companies are mostly small SME's lacking the expertise and sales teams necessary to handle conventional procurement activities. Furthermore, open source means that code can be quality checked before it goes into production; but, local governments are generally not used to this process as they mostly use contractual clauses to control quality. In addition, open source means that code from other projects can be reused, potentially releasing your code back to the community, depending on which licensing option is chosen. Unfortunately, such practices are new and unconventional for the majority of governmental bodies. Consequently, both organizational and individual resistance to change is one of the most important complications in adoption of F/OSS in the public sector. Another problem in adoption of F/OSS in the public sector may be due to the lack of a broad adoption of open standards. Therefore, data exchange between different organizations can be problematic if they don't share the same technology and standards. Obviously, interoperability using open standards (OS) needs to be strongly supported or forced by way of clear policy/guideline while adopting F/OSS in the public sector.

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<sup>22</sup> The Consortium for Open Source (OS) and Open Data Standards (ODS) in the Public Administration (COSPA). See <http://www.cospa-project.org>.

### Side Box 5. Open source software in Estonia: A Long-Term Policy of Promotion

The Estonian public sector first adopted Free/Libre/Open Source Software (F/OSS) in 1995 to save costs. Now, it has grown to appreciate the many freedoms such software provides, and all common projects in the Estonian public sector are oriented towards F/OSS, following a policy that is described below.

When the Estonian public sector decided to adopt Open Source solutions in 1995, it was essentially for reducing the public sector IT expenses through the saving of costs in license fees. The public sector now runs open source on both server and client platforms. F/OSS is widely used for name and mail servers and for common middle-ware applications. Today, all common projects in the Estonian public sector are oriented towards use of Open Source technology.

Because it is a major software user, the Estonian public sector considers that it has a key role in promoting F/OSS. Thus, the basic software used for the modules of the data exchange layer of national databases (X-Road) is Linux. Besides this, all the software components developed for public access of the X-Road system are based on F/OSS and are available as free software for public sector organisations.

Furthermore, components of the Estonian PKI application software are freely downloadable for all users. Meanwhile, central and local government institutions are encouraged to follow the recommendations issued by the Estonian Informatics Centre<sup>a</sup> as well as EU guidelines set out in the “IDA Open Source Migration Guidelines<sup>b</sup>”

For the Estonian Public Sector, the adoption of Open Standards must follow some criteria, such as:

- the costs of using the standard are low and do not pose an obstacle for its usage;
- the standard has been published;
- the standard has been adopted on the basis of an open decision-making procedure;
- the intellectual property rights to the standard are vested in a non-profit organization which operates a completely free access policy;
- there are no constraints on the re-use of the standard.

Finally, the advantages of the open source software are to be considered by all central and local government agencies alongside proprietary alternatives.

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a <http://www.ria.ee/atp>

b <http://europa.eu.int/idabc/en/document/2623#migration>

**Source:** M. Zebrowski, F. Laera, and R. Ghosh, “Open source software in Estonia: a long-term policy”, 15.07.2005, @ <http://europa.eu.int/idabc/en/chapter/470>

### 3.3 Gaining Legitimacy (Legitimization)

There are debatable issues regarding the legal aspect of Free/Open Source Software licenses<sup>23</sup>. Yet, there are significantly new attempts from European countries towards discussion and analysis on legal issues related to F/OSS licenses. Attempts similar to the researchers (Metzger & Jaeger, 2001) should be encouraged to clarify the legal aspects towards adoption of F/OSS at national/regional level. For instance, Metzger and Jaeger, with US Copyright Law in mind, discuss the possible effects of German law on Open Source licenses. They analyze the most popular standard Open Source license GNU/GPL and question its effectiveness under German law.

After many years of mostly academic debate about the legal character of the GNU General Public License (GPL) as well as its validity and enforceability, a recent ruling in Germany (Munich District) has recognized the validity of the General Public License (GPL). A paper by Hoepner (2004) outlines the facts of the case as well as the rationale of the Court's decision. In addition, it aims to identify and comment on the questions of law underlying the decision. The Munich District Court issued the first-ever judgment dealing with a number of topics in the center of the discussion.

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#### Note



An in depth analysis of legal issues, namely copyright law, patent law, and contract, related to F/OSS use in public bodies is critical. It is required for a clear governmental policy to prevent uncertainty and doubt about F/OSS exploitation and adoption in public institutions. Such actions towards F/OSS legitimization might additionally necessitate revision of local or national/regional ICT Policies.

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In addition to these recent cases, the preliminary legal analysis of F/OSS licenses conducted in the literature seems to suggest that the model is legally valid, a fact that lends substantial credit to the movement. Other indications as to the soundness of the licenses are also encouraging, which further serves to stress that F/OSS is a global phenomenon that is revolutionizing the entire field of software development. A recent well regarded paper by A. G. Gonzalez (2005) presents a legal analysis of two of the main challenges to open source software, namely SCO's<sup>24</sup> litigation and software patents. The paper discusses the validity of such challenges, their possible impact to the future of open source software, and the possible legal defenses used against them.

However, an in depth analysis of legal issues relating to F/OSS has not yet been

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<sup>23</sup> See the review by Hannu Jarvinen on "Legal Aspects of Open Source Licensing", @ <http://www.cs.helsinki.fi/u/campa/teaching/oss/papers/jarvinen.pdf> (last visit: 16/08/2005)

<sup>24</sup> The SCO Group is a well known software developer of UNIX related products . The group filed a lawsuit against IBM alleging that the company was infringing its intellectual property over the UNIX kernel. For details see [http://en.wikipedia.org/wiki/SCO\\_v.\\_IBM\\_Linux\\_lawsuit](http://en.wikipedia.org/wiki/SCO_v._IBM_Linux_lawsuit) (last visit: 15.08.2005).

made, at a European level<sup>25</sup>. A recent Deliverable D04 of the LEGAL-IST Project<sup>26</sup> points out the requirement of such a legal framework for F/OSS. This deliverable of the LEGAL-IST project attempts to identify the related legal issues, provide mainly short-term solution, and a definition of requirements for a relevant legal framework that would provide short to medium term solutions. The deliverable examines three legal areas: copyright law, patent law, and contract law issues. It is recommended that governmental parties involved in F/OSS projects consider this deliverable, at least as a starting point for the legal issues relating to F/OSS.

### Side Box 6. Italian Laws on Open Source Softwares

Directive 19th December 2003: "Development and use of computer programs from Public Administrations" (Published on "Gazzetta Ufficiale" N.31, 07/02/2004)

"Buying software applications for Public Administration must follow also those criteria:

- Transferability of acquired solutions to other PAs
- Interoperability between administrations
- Independency from unique supplier and/or unique proprietary technology
- Availability of source code at least for inspection and traceability
- Exportability of data, documents in many formats (at least one must be "open")
- Administration must consider any software solution included F/OSS
- Administration must own the software developed under its own specifications and it can be able to transfer SW licences to other administrations without any further cost.
- Whenever it is possible, Public Administration must allow the reuse of software."

Emilia Romagna: Law 24/05/2004 N.11

"The Regional Structure must program the introduction of F/OSS, Open Data Standards and open/free communication protocols.

Goals of Region through F/OSS:

- interoperability
- accessibility and availability of data

To ensure citizen freedom to access and use public data, the Region promotes competitiveness and market transparency through pluralism and freedom of choice in computer platforms acquisition.

The Region promotes software reuse and it is committed in removal of technical "barriers" like non-standard formats pushing the use of Open Formats and F/OSS."

**Source:** Flavia Marzano, "Italian and Regional Laws for Libre Software in Government", presentation at FLOSSPOLIS Conference, Den Hague, Netherlands, November 18, 2004.

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25 Legal aspects are analyzed in IDA's (Interchange of Data between Administrations), a European Commission initiative, studies: Pooling Open Source Software – An IDA Feasibility Study, June 2002, and the Study into the Use of Open Source Software in the Public Sector, June 2001, available @ <http://europa.eu.int/idabc/en/document/1743/471>

26 LEGAL-IST (LEGAL Issues for the Advancement of Information Society Technologies), contract no: IST-2-004252-SSA, D04: Report on Legal issues in Open Source Software, Issue Date: 07/06/2005

This report strongly stresses the need for clear governmental policy to prevent uncertainty and doubt about F/OSS exploitation and adoption in public institutions. Such actions towards F/OSS legitimization might necessitate revision of local or regional IT Policy. Establishment of National F/OSS Competency Centers, which is to be discussed in Section 4.3, might serve a structural strategy.

### **Side Box 7: Issues Behind DRM and the EUCD directive. They may have huge impact on F/OSS as a whole**

#### **EUCD 32001L0029 directive**

The European Union (EU) Directive 2001/29/EC of the European Parliament and of the Council of 22 May 2001 on the harmonisation of certain aspects of copyright and related rights in the information society, commonly known as the EU Copyright Directive or short EUCD, is the EU's implementation of the 1996 WIPO Copyright Treaty. This highly controversial Directive was, at that time, the most heavily lobbied measure to pass the European Parliament. In its final form, it includes only very narrow exceptions to anti-circumvention measures and exclusive rights. As a result, it is generally regarded as a victory for copyright-owning interests (publishing, film, music and major software companies) over copyright users' interests (who, during the lobbying process, were primarily represented by librarians and not by consumer organizations).

Many important details are not specified in the Directive, and as a result, EU member states have significant freedom in certain aspects of directive implementation. The resulting lack of harmonisation in the member states' copyright regimes has led the chairman of the European Commission's Legal Advisory Board Taskforce on Intellectual Property to state that the directive is "unimportant, and possibly invalid". Due to escalating public awareness of the importance of copyright legislation, the process of implementation has not been entirely predictable.

Just to say it with the words of Benjamin Franklin: "Any society that would give up a little liberty to gain a little security will deserve neither and lose both." The same happens with Open Source. Open Source is an opportunity to regain our liberty. In disfavoring this development by any law or technology our freedom and liberty to use and develop digital data will be caged by others. At this place the atagonism or problematic of point nine of the directive should be distinguished.

"Any harmonisation of copyright and related rights must take as a basis a high level of protection, since such rights are crucial to intellectual creation. Their protection helps to ensure the maintenance and development of creativity in the interests of authors, performers, producers, consumers, culture, industry and the public at large. Intellectual property has therefore been recognised as an integral part of property." Only creativity of big companies with enough money will maintained and developed. For SME's and private people it is tough to be creative in a legal way. Creativity needs free and not controlled access to digital data.

#### **DRM**

Digital Rights Management (also called Digital Restrictions Management and often abbreviated to DRM) is the umbrella term referring to any of several technologies used to enforce pre-defined policies for controlling access to digital data (such as software, music, movies) and hardware. In more technical terms, DRM handles the description, layering, analysis, valuation, trading, monitoring and enforcement of usage restrictions that accompany a specific instance of a digital work. In the widest possible sense, the term refers to any such management.

In a narrow scope, electronic protective mechanisms for digital information are called DRMs. They enable utilization of digital contents outside fixed payments and permit additionally licencing and charging for duration or extent to the use. Thus on the one hand unlimited use of digital media gets restricted, on the other hand one on-demand-business-models become possible.

The effectiveness of such systems is extended frequently by national laws. In the USA for

**Side Box 7: Issues Behind DRM and the EU CD directive. They may have huge impact on F/OSS as a whole**

this purpose the digital Millennium copyright act (DMCA) was passed. This law forbids the evasion of such systems for every individual case under menace of fines and/or liberty withdrawal.

The European Community is expected to create a Recommendation on DRM in 2006, phasing out the use of levies (compensation to rights holders charged on media sales for lost revenue due to piracy) given the advances in DRM/TPM technology.

**Risks of DRM**

- Medias are more difficult to use – difficulties in playing new and incompatible formats (private copies, copies for education)
- Customer retention against free marketplaces – DRM restricted music cannot be played on every player
- Data security loss of information – older fileformats are not able to be open on new systems
- Is DRM “Fair Use” - DRM Systems do not support Public Domain

**Source:** Peter Steurer, PUBLIC VOICE Lab. Web resources:

[http://europa.eu.int/smartapi/cgi/sga\\_doc?smartapi!celexplus!prod!CELEXnumdoc&numdoc=32001L0029&lg=en;](http://europa.eu.int/smartapi/cgi/sga_doc?smartapi!celexplus!prod!CELEXnumdoc&numdoc=32001L0029&lg=en)

[http://www.cincomsmalltalk.com/blog/blogView?showComments=true&title=OSS+ban+in+France%3F&entry=3310998760#3310998760;](http://www.cincomsmalltalk.com/blog/blogView?showComments=true&title=OSS+ban+in+France%3F&entry=3310998760#3310998760)

[http://en.wikipedia.org/wiki/Digital\\_Rights\\_Management](http://en.wikipedia.org/wiki/Digital_Rights_Management)

<http://www.ccc.de/digital-rights/?language=en>

## 4. F/OSS Adoption Policies and Strategies

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### 4.1 Policy recommendations to be considered by governments adopting F/OSS

Following the discussions in previous sections it should be clear that using Open Source Software within national IT frameworks strengthens independence from software vendors, and interoperability between software systems. Common semantics and common Base Technology Standards, which will be supported and assured by Open Standards, are key issues for interoperability between various software systems. Another natural consequence, namely, 'openness' through F/OSS together with Open Standards (OS) will provide secure communications and secured work-flow within governmental institutions.

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**Note**

Full implementation of the F/OSS model implies that we do not only acquire and use the freely available software, but also contribute to development. In that respect, a pool of skills needs to be established in the public sector.

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Despite any specifically opted policy, there are some key issues to be considered while developing governmental F/OSS policies:

1. Full implementation of the F/OSS model implies that we do not only acquire and use the freely available software, but also contribute to development. Therefore, a pool of skills needs to be established in the public sector. These skills will enable the public sector to engage in appropriate further adoptions, and will ensure available in-house services that can self-support the public sector.
2. There are conflicting views on cost savings resulting from using F/OSS. Acquisition cost, which is often a minor component of total cost of ownership, may be lower at first sight. One of the major claims is that the cost of training, adapting, maintaining, etc. of F/OSS could be high enough to exceed savings on purchasing and licensing. However, indirect advantages, including indirect savings and spin-off development, such as investment in human capital, might well contribute to the overall advantages, leading to advantages outweighing disadvantages. In addition, in terms of efficiency, when Open Standards and Open Source Software are taken together, they will ease lower Total Cost of Ownership (TCO) with higher productivity and acceptance.
3. Carefully selected F/OSS should be deployed in the public service. The current environment demands this be accompanied by a well-planned change/migration management strategy.

### 4.1.1 F/OSS Adoption policy options for governments

Before further discussions on F/OSS policy options in governments, it is necessary to cite an important finding of an EU funded Free/Libre/Open Source Software: Policy Support (FLOSSPOLs) project. The recent FLOSSPOLs<sup>27</sup> survey concludes that experience with F/OSS has in general a positive effect on the evaluation/demand for F/OSS (Ghosh & Gott, 2005, p.60). Political programs aiming at an increased use of F/OSS in governments should therefore contain strong incentives for practical experiments with F/OSS.

**F/OSS as an appropriate option.** Governments are strongly advised to implement F/OSS where analysis shows it to be the appropriate option. The primary criteria for selecting software solutions should include the improvement of efficiency, effectiveness and economy of service delivery by government to its citizens.

**Opting for F/OSS where advantages of F/OSS and Proprietary Software are comparable.** F/OSS offers significant indirect advantages. Where the direct advantages and disadvantages of F/OSS and proprietary software are equally strong, and where circumstances in the specific situation do not render it inappropriate, opting for F/OSS will be preferable. In other words, governments are advised to accept the policy in favor of F/OSS where advantages of F/OSS and proprietary software are comparable.

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**Note**



Steps to create an environment where F/OSS can be implemented in those areas where government and the country are correctly positioned to benefit from it by: creating capacity, knowledge and awareness; promoting fair and impartial treatment of F/OSS in procurement processes; and creating opportunities for trials, through initiatives such as the sponsorship of demonstrator projects.

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**Opting for F/OSS as a political choice.** Wide adoption of F/OSS and use in public bodies requires the creation of an environment conducive to better utilization of F/OSS. These environments should be carefully selected to be those where F/OSS has the potential to provide significant advantages to government. Steps should be taken to create an environment where F/OSS can be deployed in those areas where the government and the country are correctly positioned to benefit from it by: creating capacity, knowledge and awareness; promoting fair and impartial treatment of F/OSS in procurement processes and creating opportunities for trials, through initiatives such as the sponsorship of demonstrator projects.

The major benefits for governments in implementing F/OSS is in preserving and developing the local people skills, preserving the language and cultural specifics, and investing money in the local economy instead of in foreign corporations. These factors are even more valid in developing countries where there is a constantly higher emigration of skilled people and a permanent lack of funding for IT budgets.

Whatever policy option is favored, it is necessary to embed Open Standards and

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<sup>27</sup> Free/Libre/Open Source Software: Policy Support (FLOSSPOLs), see <http://www.flosspols.org>

Free/Libre/Open Source Software within the IT-Strategy framework of national and/or regional government administration as a part of future eGovernment<sup>28</sup>.

**Table 5. Policy recommendations towards F/OSS adoptions in Governments**

<b>National ICT/eGovernment Policy</b>
<ul style="list-style-type: none"> <li>● Enable F/OSS in national governments' IT procurement process</li> <li>● Encourage software procurement from private sector to include F/OSS solutions</li> <li>● Encourage SMEs to adopt F/OSS solutions</li> <li>● Establish open standards based component architecture for e-government to enable transparency, security, and independence</li> </ul>
<b>Advocacy and Education</b>
<ul style="list-style-type: none"> <li>● Improve F/OSS awareness through pilot projects and other F/OSS dissemination activities</li> <li>● Establish and introduce F/OSS Competency Centers</li> <li>● Develop and introduce national F/OSS portals</li> <li>● Introduce F/OSS to university curricula</li> <li>● Introduce F/OSS to K-12 curricula</li> <li>● Establish customized F/OSS training programs through professional organizations</li> <li>● Develop e-learning services with F/OSS solutions.</li> <li>● Offer localized versions of F/OSS</li> </ul>
<b>Capacity Building in Local Software Industries</b>
<ul style="list-style-type: none"> <li>● Establish and/or introduce localization centers</li> <li>● Exploit localization opportunities in other countries</li> <li>● Establish and/or introduce F/OSS Solutions Center</li> <li>● Establish and/or introduce F/OSS R&amp;D Centers</li> </ul>

#### 4.1.2 Incorporating F/OSS in e-Government policy

The recommendations categorized and tabulated below in Table 5 may also serve for F/OSS incorporation in e-Government policy. These F/OSS policies should be integrated smoothly with broader e-Government policy and related strategies for the ICT sector in the country. Besides, governments may well seek to utilize the opportunities presented by the F/OSS movement to promote access to information for citizens. It should be acknowledged that F/OSS provides and encourages more creative procedures to enhance access to Government's electronic service delivery.

<sup>28</sup> Josephin Albrecht and Gregor Lietz, "Embedding the Open Standards and Open Source Software in the IT-Strategy Framework of the German Federal Administration", presentation at Open Standards & OS Software in Government, The Hague, 18. Nov. 2004.

Above all, it is necessary to establish national/regional policy frameworks to give F/OSS a fair chance through an enlightened IT policy. This is a critical need for e-government activities to succeed.

## 4.2 F/OSS Implementation Strategies

There are various enabling strategies of F/OSS migration. For instance, the IT-Strategy Framework of the German Federal Administration follows a new approach based on a soft migration strategy<sup>29</sup>. Within that framework, the functionality of a standard workplace both with Microsoft's and Linux platforms are defined first, and is considered as an initial step towards a common government set of IT-standards (SAGA: Standards and Architectures for eGovernment Applications). The migration guide prepared by the German Federal Administration thus functions as a bridge connecting all partial works for IT-standards in the public sector. This soft migration strategy of the German Federal Administration starts from server migration, followed by a transition phase through office migration, and finally targets the desktop migration.

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**Note** Possible F/OSS adoption levels within governmental bodies: i) using existing F/OSS products; ii) procuring F/OSS software; iii) modifying existing F/OSS solutions for internal use; iv) modifying F/OSS software and contributing the modifications to the collective development effort; v) managing and supporting own F/OSS projects.

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It should be noted that there is no single strategy towards F/OSS adoption in Government. However, it is possible to identify various F/OSS implementation levels within governmental bodies from using existing F/OSS solutions to managing and supporting government initiated F/OSS projects. Depending on local, regional/national circumstances, governmental institutions can be involved in one, some, or all of the following levels towards appropriate F/OSS adoptions:

- using existing F/OSS products;
- procuring F/OSS software;
- modifying existing F/OSS solutions for internal use;
- modifying F/OSS software and contributing the modifications to the collective development effort;
- managing and supporting own F/OSS projects.

### 4.2.1 Strategic approaches

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<sup>29</sup> See the presentation by Josephin Albrecht and Gregor Lietz (2004) at "Open Standards & OS Software in Government Conference" organized by FLOSSPOL, The Hague, 18. Nov. 2004. Available @ <http://www.flosspols.org/conf/index.html> (last visit: 16.08.2005).

It is still possible to offer various approaches which will be appropriate for different contingencies and conditions. For instance, approaches might range from a neutral one where discrimination against F/OSS has been eliminated, to an aggressive approach where Government actively encourages the development of OSS under appropriate conditions through legislation and policy. Table 6 summarizes such approaches along with possible mode of development and level of involvement.

**Table 6. Strategies towards F/OSS adoptions in governments**

<b>Approaches</b>
<ul style="list-style-type: none"> <li>● Aggressive and Central: This approach might necessitate legislation or government strategic plans towards F/OSS.</li> <li>● Enabling and Peripheral: Relatively more informal, flexible approaches to letting F/OSS use evolve. Such as through youth and women empowerment programs; computer literacy education programs in poor urban and rural regions, in prisons; Linux terminal projects, etc.</li> </ul>
<b>Mode of Development</b>
<ul style="list-style-type: none"> <li>● Public sector adoption</li> <li>● Private sector adoption</li> <li>● Adoptions via collaboration among various users/agencies</li> </ul>
<b>Level of Involvement</b>
<ul style="list-style-type: none"> <li>● National, Sub-national, and/or regional collaboration</li> </ul>

An initial neutral approach, ensures that choice is supported, and discrimination against F/OSS is eliminated. Such an approach should adopt policies to ensure that F/OSS is carefully considered in IT procurement processes. In order to follow a neutral approach it is still necessary both to implement criteria for evaluating open source products/procedures, and to adopt and maintain open standards. This approach will allow open source software to compete on an equal basis with proprietary alternatives. Besides, it will help to initiate communication and to enhance knowledge and understanding of F/OSS.

In the enabling approach, policies are geared towards the creation of the capacity to implement and maintain F/OSS solutions. However, it requires developing the capability to give guidance on selecting and implementing F/OSS. Such an approach can be followed by promoting education and training in F/OSS products; and supporting the establishment of partnerships and developer communities.

In addition to the enabling activities, in an aggressive approach Government actively encourages the development of F/OSS under appropriate conditions through legislation and policy. This necessitates:

- active involvement of Government in supporting F/OSS developer communities and development projects;

- adoption of governmental strategies to increase commitment to open source products;
- regular auditing of the impact of F/OSS on service delivery;
- active governmental participation in programs that can minimize risks associated with F/OSS;
- and standardizing on F/OSS where analysis shows it to be the best alternative.

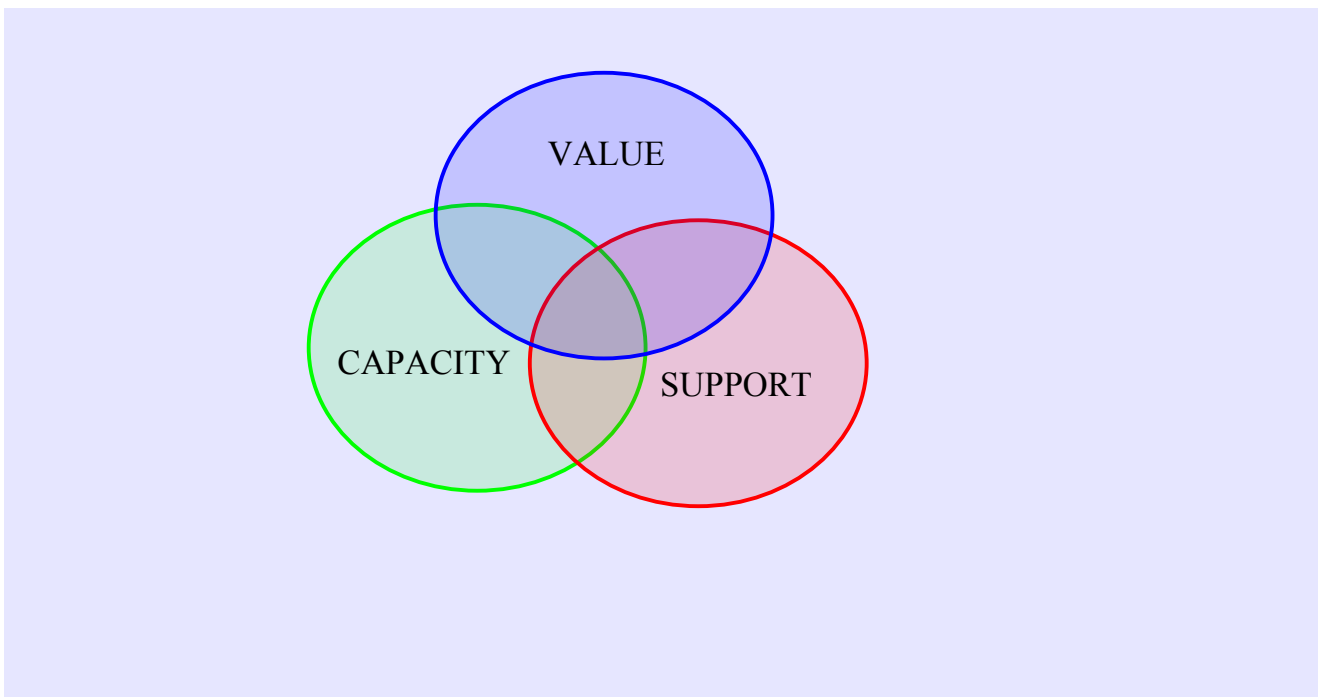
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**Note**



- Neutral approach: Ensures that choice is supported and discrimination against F/OSS is limited
  - Enabling approach: policies are geared towards the encouragement of the use of F/OSS
  - Aggressive approach: Government actively pushes the development of F/OSS
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#### 4.2.2 Success factors for implementation decisions and strategies



**Figure 2. The VCS Model<sup>30</sup>**

The success factors for implementation can be grouped under the three headings depicted in Figure 2. Before implementation it must be demonstrated that F/OSS will provide additional value, or rather that the necessary capacity to implement F/OSS exists, and that there is sufficient support to ensure the venture will not fail because, for instance, resources are not provided, outputs are not utilized or there is a lack of protection against threats.

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30 Moore Mark H; Creating Public Value; Harvard University Press, 1995

For such an analysis, a list of value prerequisites in the Value-Capacity-Support (VCS) Model for governmental institutions is tabulated in Table 6<sup>31</sup>. These factors could be estimated to check whether F/OSS will provide additional value.

To provide a sample of opted strategy, the noteworthy policy implementation proposal supported by South African Free Software Foundation<sup>32</sup> is analyzed in Side Box 4.

**Table 6. Value Prerequisites in the VCS Model**

Institutional Values
<ul style="list-style-type: none"> <li>● Freedom to enhance and extend existing software</li> <li>● Avoiding vendor lock-in</li> <li>● Freedom to redistribute</li> <li>● Expenditure</li> <li>● Non-obsolescence</li> <li>● License management</li> <li>● Savings on equipment replacement</li> </ul>
Broader Economic Values
<ul style="list-style-type: none"> <li>● Reducing imports of software and licenses</li> <li>● Stimulating local business, especially SMEs and NGOs</li> </ul>
Values for Society in General
<ul style="list-style-type: none"> <li>● Educational</li> <li>● Public Access to Information</li> </ul>
General Advantages
<ul style="list-style-type: none"> <li>● Security</li> <li>● Participation in global movements for software development</li> <li>● Access to global support resources peer review</li> </ul>

**Side Box 8. A Three Phase Strategy towards Adoption OSS in Public Sector and Governmental Institutions.**

Some studies initiated by FOSSFA (Free/Open Source Software For Africa), and supported by South Africa Government, have opted to follow a phased approach, moving from an introductory phase, followed by an enabling phase, to a mature phase.

**A. Introductory Phase.** The purpose during this phase is to create awareness and an environment where OSS can be deployed in areas in Government where conditions favor it.

Activities:

1. Information dissemination. This includes briefing sessions, publishing information through appropriate media, maintaining the OSS website and presentations to relevant interest groups.

31 The table is derived upon the prerequisites used by the document “Using OSS in South African Government: A proposed strategy compiled by the government IT officers' council”, @ [http://www.oss.gov.za/docs/OSS\\_Strategy\\_v3.pdf](http://www.oss.gov.za/docs/OSS_Strategy_v3.pdf) (last visit: 17/07/2005)

32 <http://www.fossfa.org>

**Side Box 8. A Three Phase Strategy towards Adoption OSS in Public Sector and Governmental Institutions.**

2. Trial development and use. Encourage use of OSS on a trial basis, also through sponsorship of OSS projects.
3. Consultation. Create opportunities to consult with users, developers and researchers. An OSS forum is to be established to involve all stakeholders.
4. Research. The research agenda will be based on the following objectives:
  - Develop a consistent picture of the needs and expectations of Government with regard to OSS;
  - Develop policies and legislation relevant to the use of OSS in Government;
  - Develop research and evaluation instruments to assist decision makers in the identification and evaluation of opportunities and areas for the appropriate use of OSS;
  - Develop a definition of the roles of the various sections of Government in the area of OSS;
  - Identify opportunities and identify pilot applications for the use of OSS in Government;
  - Define a clear longer-term research agenda to support the OSS strategy.
5. Consolidate support capacity. Ensure proper mobilizing of existing capacity, plan further expansion and build the necessary capacity where successful trial implementations can be replicated.
6. Including OSS utilization in short and medium-term plans.
7. Procurement. Avoid any bias against OSS solutions in Government procurement procedures. Wherever possible, avoid acquisition of hardware that does not support OSS.
8. Communication. Develop a comprehensive OSS communication strategy that will ensure optimal knowledge and understanding of, and commitment to OSS. The strategy is to target the political level, departmental management, IT professionals and computer users in general.

**B. Enabling Phase.**

Activities:

1. Implementing plans compiled during the introductory phase in order to: improve the availability of expert guidance; make training more accessible; strengthen software development assistance; and uphold non-discriminatory procurement criteria.
2. Software selection. Selections will continue to be based on criteria, such as, interoperability, information security, economies of scale, reducing duplication, lowering costs, increasing productivity and increasing citizens' convenience. The guiding principle of using open standards will apply for all Government software procurement, development and maintenance.
3. Software development. When planning software development, all government institutions will consider the advantages of using the OSS model and using OSS platforms.
4. Capacity development. Capacity will be developed to enable the following:
  - A certain minimum level of training for all prospective users;
  - More in-depth training for champion users, enabling them to render immediate assistance to other users around them;
  - Expert training for application managers;
  - Availability of highly expert specialists in service provider organizations, who are able to deal with complex problems as well as development needs.
5. Partnerships. Government will seek partnerships with all sectors in South Africa, with the rest of Africa and the world, for promoting development, implementation and support of OSS.

**C. Mature Phase.**

Actions:

**Side Box 8. A Three Phase Strategy towards Adoption OSS in Public Sector and Governmental Institutions.**

- persist with communication to maintain general confidence in the viability of OSS solutions;
- provide certification for OSS developers;
- undertake assessment and certification of software;
- maintain clusters and networks of support;
- promote OSS development and use on the continent.

**Source:** "Using OSS in South African Government: A proposed strategy compiled by the government IT officers' council" @ [http://www.oss.gov.za/docs/OSS\\_Strategy\\_v3.pdf](http://www.oss.gov.za/docs/OSS_Strategy_v3.pdf) (last visit: 17/07/2005)

### Side Box 9. Case study of the three phase migration to F/OSS: The Balkans experience in implementing F/OSS in Public Administration

The Bulgarian municipality of Kardjali served as a pilot administration in a UNDP funded project for implementing F/OSS in municipal administrations in South-Eastern Europe.

The project included migration to F/OSS under the three phase model as follows:

#### Phase 1:

Raise awareness about F/OSS benefits among the municipal employees and the mayor. Make analysis on the municipal IT infrastructure – computers, software used by different departments, Internet connection, users' computer skills, etc.

Based on the data collected, a report was generated and a plan for migration was prepared. The important decisions that were made consisted in: selection of first set of computers on which F/OSS programs to be installed in parallel with the existing proprietary ones; selection of suitable Linux distribution to be installed on desktops; definition of the training phases; definition of the manners of support provision, etc. It was decided also that all municipal computers (~200) should have installed OpenOffice.org and Firefox. On the computers that are used mostly as “typewriters” Linux should also be installed.

#### Phase 2:

Series of installations of F/OSS were made following the steps:

- 1) Installation of OpenOffice.org (localized version) and Firefox on all municipal computers. Firefox was made default browser, but the office documents were not associated with OpenOffice.org.
- 2) Training of all the employees on how to work with OpenOffice.org and Firefox. Differences between MS Office and OpenOffice.org. Advantages and disadvantages. Explanation on what is F/OSS and the benefits for the administration from its usage. Training materials given.
- 3) Performing file associations and making default the work with OpenOffice.org
- 4) Installing Linux on desktops as dual-boot.
- 5) Second training on OpenOffice.org. First trainings on Linux desktops.
- 6) Established partnerships for support. Training the municipal IT staff on administering the F/OSS equipped computers.

#### Phase 3:

- 1) Regular support was provided (as a minimum once per month or upon request)
- 2) More trainings were conducted. Certificates for passed training were given to the employees.
- 3) Website providing eGovernment services to the citizens of the municipality of Kardjali was developed and launched completely based on F/OSS.
- 4) Partnerships strengthened.
- 5) Replication of the above mentioned steps in more municipalities.

The above described model was applied in 6 more Bulgarian municipalities (Vratza, Mezdra, Peshtera, Dryanovo, Kosteneec, Belovo), 1 Macedonian municipality (Gevgelija) and 1 Kosovo municipality (Klina).

**Source:** Julia Velkova, Internet Society Bulgaria. Web resources: Official information from UNDP website ; <http://foss.bg> ; <http://isoc.bg>; Balkan cities become e-municipalities with open source (Ghosh, Zebrowski, IDABC-OSO); <http://kardjali.foss.bg>

### 4.3 Establishing Regional/National/EU F/OSS Competency Centers

In view of F/OSS related experiences and knowledge discussed so far, this report deems it necessary to propose the establishment of National/Regional F/OSS Competency Centers (FCC). The objectives and tasks of such competence centers are highlighted in Table 7 below. First of all, these F/OSS Competency Centers will contribute towards advocacy, guidance, and/or research activities related to F/OSS adoption and dissemination within public/private organizations and NGOs. Secondly, institutionalization of such or similar centers will provide sustainability to F/OSS based ICT development efforts. Thirdly, acting as F/OSS coordination and communication hubs, they will serve the community in decreasing resistance to F/OSS-based solutions and applications, thus lowering the entry barriers both in public and private sectors. In addition to these objectives, it is possible to assign to them many other F/OSS related dissemination and adoption activities.

This study also suggests the establishment of a F/OSS-EU Center. Such a center will function as an umbrella organization for local F/OSS Competency Centers. This F/OSS-EU center will presumably act as the coordinating and the communicating hub. This hub may coordinate activities between National/Regional F/OSS Competency Centers and other EU/non-EU F/OSS initiatives, communities, organizations, and projects towards effective global collaboration. Figure 3 depicts a prospective EU wide organization of F/OSS Competency Centers.

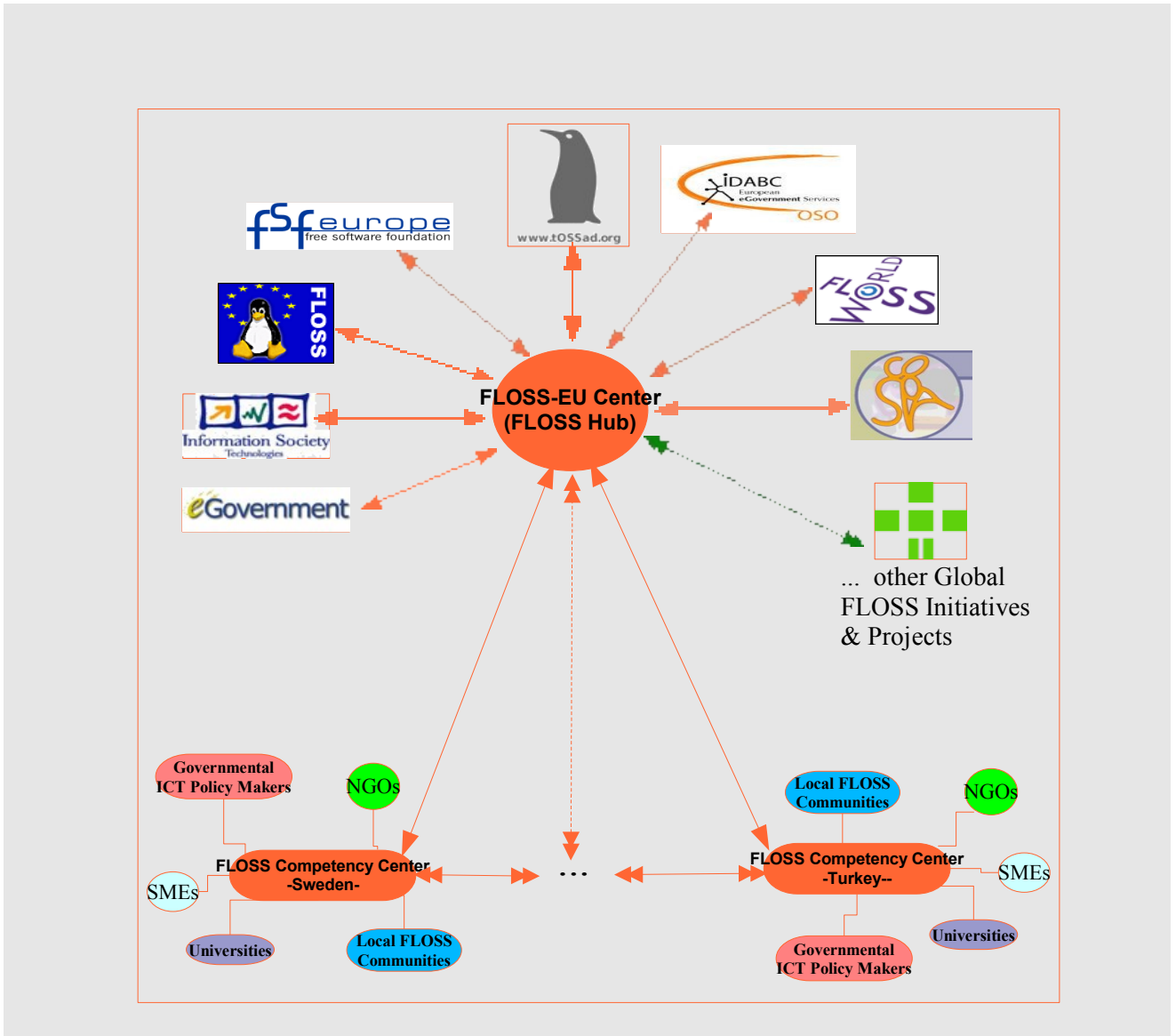
The foundation of such Europe-wide F/OSS Competency Centers will require delicate and thorough organizational and financial feasibility analysis in advance. However, evidence of their feasibility is observable through similar organizations and efforts that already exist. For example, IDABC-OSO<sup>33</sup> partially serves as an umbrella portal for F/OSS dissemination and adoption activities. IDABC-OSO intends to encourage the spread and use of best F/OSS practices in Europe. It also introduces new users to the concepts of F/OSS and presents interesting facts and references for experts through case studies, analysis, etc.

Already, evidence of the existence of National/Regional F/OSS Competency like organizations is becoming more common. A couple of such essentially similar organizations are mentioned in the brief case analysis in Side Boxes 5 and 6: Open Knowledge Centers of the region of Extremadura, and the Dutch Programme OSOSS<sup>34</sup>, respectively.

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33 IDABC stands for Interoperable Delivery of European eGovernment Services to public Administrations, Businesses and Citizens. It uses the opportunities offered by information and communication technologies to encourage and support the delivery of cross-border public sector services to citizens and enterprises in Europe, to improve efficiency and collaboration between European public administrations. And OSO stands for Open Source Observatory. For more details please see <http://europa.eu.int/idabc/en/chapter/452>.

34 See <http://www.ososs.nl>



**Figure 3. Organization of prospective Local F/OSS Competency Centers with F/OSS-EU Hub and the network.**

The example of the Dutch OSOSS Programme<sup>35</sup> efforts on formation and functions of the competence centre on open standards and open source software for governments is outstanding. The mission of the center/programme, commissioned by the Dutch ministries of Interior, Trade and Economics and Education, is to stimulate the use of open standards and to inform on open source software. The center consists of 10 team members and has a budget of €1,5 million a year between 2003 and 2005.

The programme/center is in fact a part of the Dutch organization for eGovernment (ICTU). Thus, it aims to cooperate with specific market organizations and e-government competence centers, such as health, education, and SMEs.

<sup>35</sup> <http://www.ossos.nl/>

**Table 7. Objectives and tasks of prospective F/OSS Competency Centers**

<b>Objectives of prospective F/OSS Competency Centers</b>
<ol style="list-style-type: none"> <li>1. Conducting advocacy, guidance, and/or research activities towards F/OSS adoption and dissemination</li> <li>2. Providing sustainability to F/OSS based ICT development efforts</li> <li>3. Acting as F/OSS coordination, communication and collaboration hub</li> </ol>
<b>Possible actions/tasks of prospective F/OSS Competency Centers</b>
<ul style="list-style-type: none"> <li>• Taking a leading role in development of F/OSS implementation strategies</li> <li>• Coordinating collaborations in between governmental, educational, and private institutions towards F/OSS adoption</li> <li>• Benchmarking national/regional F/OSS related activities and actions</li> <li>• Collecting and analyzing best practices</li> <li>• Promoting, participating, and coordinating F/OSS related research &amp; development activities, e.g: <ul style="list-style-type: none"> <li>• F/OSS business models</li> <li>• F/OSS organizational structures</li> <li>• F/OSS technologies</li> </ul> </li> <li>• Providing consultancy for migration and implementation of F/OSS solutions</li> <li>• Coordinating training activities: <ul style="list-style-type: none"> <li>• Youth/Women empowerment centers</li> <li>• F/OSS computer driving license</li> </ul> </li> <li>• Providing consultancy for private and public enterprises or individuals in preparing F/OSS based proposals in government IT procurement</li> <li>• Actively communicating and collaborating with F/OSS-EU Center and other National/Regional F/OSS Competency Centers</li> <li>• Participating/coordinating activities that increase public awareness on clear benefits and possibilities offered by F/OSS based implementations</li> </ul>

Among others, the primary task of this OSOSS Competence Center is to create awareness towards adoption of OS and OSS both in governmental and non-governmental bodies. The center plans to provide guidelines, and to derive best practices through case studies for both the initiation and sustainment of OS and OSS adoptions. Additionally, the programme prepares license manuals for various F/OSS licensing issues. The overall task of the center might be seen as a legal advisory through, for instance, guidelines on open source software liability and procurement. In other terms, the center aims to service: all legal, technical and organizational aspects of F/OSS adoption<sup>36</sup>.

<sup>36</sup> For instance for a catalog of open standards prepared by the center please check <http://www.canos.nl>.

### Side Box 10. Open Knowledge Centers in Rural Areas: The Extremadura Experience

Region of Extremadura of Spain uses Open Knowledge Centers (OKC) to provide information accessibility for all, to support Internet access as a public service, to increase technological literacy and to promote new models of business and new labour cultures.

OKCs are to be launched in rural areas and in the less favoured areas of big cities:

- to promote free access to ICT for all citizen;
- to extend the local culture by encouraging people to participate in the IS;
- to develop local capacity;
- to create a social and virtual space to commit people to the transformation of the region.

Proposed phases of OCTs:

Phase 1: Training teachers.

Phase 2: Providing Internet access and Computer Infrastructure.

Source: Luis Casas Luengo, Director Gerente, FUNDECYT, presentation at FLOSSPOLIS Conference, November 18, 2004.

The foundation of New Knowledge Centers (NKC)<sup>37</sup> in the rural area of Extermadura is another initiative which is essentially similar to the proposed prospective F/OSS Competency Centers. In order to prevent a "digital divide" within the society, the experience and practice of Extermadura provides a sample action towards support and foundation of similar OKCs for other rural areas of relatively less developed regions.

Another notable attempt towards formation of a legal body akin to F/OSS Competency Centers is the experience of F/OSS service providers in the U.K. Since the implementation of F/OSS in public administrations requires a business organization based on F/OSS technology, over 60 F/OSS service providers in the U.K. have set up a non-profit representative body, the OS Consortium, to serve as an independent reference for all firms offering or considering OS consultancy and to help them make business with the government<sup>38</sup>. The German Federal Government also funded the 'OSS Kompetenzzentrum'<sup>39</sup>, the German F/OSS Competency Center, to support knowledge exchange in public sector on F/OSS.

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37 <http://www.nccextremadura.org/>

38 For details see <http://www.opensourceconsortium.org>

39 <http://www.kbst.bund.de/oss-cc>

### Side Box 11. Dutch Programme for Open Standards and Open Source Software for Government

The Programme OSOSS encourages the use of open standard and informs about open source software. The programme is assigned to the ICTU, the Dutch organisation for ICT and government. The Programme targets entire Dutch public sector as well as the private sector and individuals.

With regard to open standards, the aim of the Programme is to encourage their use within the public sector. For this purpose its key role is to provide information and advice. The Programme aims to improve the exchange of knowledge and experience in relation to open standards within the public sector. This way the Programme will meet the need for continuous information about which (open) standards are already available both within the public sector and internationally.

The Programme also wants to create awareness among the Dutch public sector that open source software should be considered as a fully fledged alternative to closed source (i.e. proprietary) software. The Programme will do this by adopting a facilitating, informative and advisory role. It will support policymakers and ICT managers in making decisions whether or not to use open source software. ICT managers can be assisted in tackling problems that may occur when this choice has been made.

Three goals the Programme wants to achieve are: the establishment of a catalogue of recommended open standards; the government-wide introduction of a software licence model; and the establishment of an Internet exchange platform where software can be exchanged between government bodies.

The Programme has a budget of EUR 3 million for a three-year period. An application for funding has been submitted to the National Action Plan (NAP). The funding is provided by the Ministry of Economic Affairs and the Ministry of the Interior and Kingdom Relations.

**Source:** Mark Bressers, "Dutch programme on Open Standards and Open Source Software for governments", 28.06.2005 @ <http://www.ossos.nl>

## 5. Lessons

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### 5.1 Best Practices

It is a fact that any intention to derive best practices of F/OSS adoptions would be incomplete without a comprehensive and rigorous survey study. The database of F/OSS experiences is becoming larger and larger at an ever increasing pace. This constant accumulation of new information requires continuous re-assessment and re-evaluation of current F/OSS implementations running in the Public Sector. Thusfar this report has limited its presentation of the analysis of best practices to discussions within the Side Boxes. We will now discuss a range of illustrative and eminent examples of F/OSS implementation and support..

Recently, The eGovernment Unit of the UK government has issued the second version of its F/OSS Policy<sup>40</sup> in the public sector. The policy requires IT solutions based on open standards and, if possible, on fully owned software. To this end, F/OSS will be considered alongside proprietary software and contracts will be awarded on a value-for-money basis. Moreover, at the level of Content Management Systems to be used for the provision of online services by local authorities, 30 of 400 UK local authorities have already successfully adopted a F/OSS based solution (APLAWs<sup>41</sup>).

The French government is also strongly supporting the use of F/OSS by public bodies. F/OSS have been chosen by many ministries and local administrations in the recent years<sup>42</sup>. The main reason why public administrations decide to use OSS is always the same: cost reduction.

One of the best examples of local/municipality level experience is the Linux Project<sup>43</sup>, started by the city of Munich. Accordingly, 14.000 desktop computers will migrate to OSS (basis-client migration) by 2008. Similarly, the city of Treuchtlingen, Germany, has already migrated to OSS and reports a 40% cut in costs. The establishment of 'OS Kompetenzzentrum' by the German Federal Government to support knowledge exchange in public sector F/OSS is one of the exemplars of German best practices.

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40 The document can be reached, last visit 20.08.2005 @ <http://www.oss-watch.ac.uk/resources/ukgov.xml>

41 APLAWS is an Open Source Content Management System developed to assist UK local authorities deliver services online. For details see <http://www.aplaws.org.uk/project/>

42 For experiences of French public bodies see <http://www.adullact.org>

43 For an introduction of the project see [http://www.muenchen.de/vip8/prod2/mde/\\_de/rubriken/Rathaus/40\\_dir/limux/publikationen/inuxtag\\_englisch.pdf](http://www.muenchen.de/vip8/prod2/mde/_de/rubriken/Rathaus/40_dir/limux/publikationen/inuxtag_englisch.pdf), (last visit, 20.08.2005)

## Side Box 12. Some non-European experiences

### VENEZUELA'S MOVE TOWARDS OPEN SOURCE SOFTWARE

The government of Venezuela is focusing efforts to quickly adopt open source software for its public administration. The government expects to reduce IT costs and to attain technological independence from private software companies by intensively using open source software.

The Office of Information Technology at the Ministry of Science and Technology is currently promoting Open Source software through a series of workshops. Government-sponsored public Internet access points, based on open source software instead of previously used proprietary software, have been installed around the country.

The Ministry of Education deployed open source software in its data centre at the Ministry's Office of Informatics and saved more than two million dollars within the last year just with this step alone.

The Ministry also plans to install 380.000 open source based personal computer in public schools. According to the Ministry's Office of Informatics open source software helps to reduce costs, by nearly half in this case, and to be free from viruses written for Microsoft systems.

### SUPPORT OF F/OSS TO CREATE NEW EMPLOYMENT OPPORTUNITIES

The Indian government is evaluating options for using open source software in governmental institutions. The government expects the introduction of open source software to encourage the increased use of IT in departments as software costs will be reduced.

India's department of IT also considers, through the support of open source software, to develop the domestic IT market and therefore to create new employment opportunities.

#### Sources:

<http://sify.com/finance/fullstory.php?id=13638288>

<http://www.venezuelanalysis.com/news.php?newsno=1439#top>

## 5.2 Similarities

The identification of similarities within the various F/OSS adoption projects might lead to the identification of transfer potentials so that other European partners can learn from each other and from non-European experiences.

A recent survey by FLOSSPOL<sup>44</sup> was conducted in order to understand attitudes towards and usage of F/OSS in the public sector in Europe, and in regional government authorities in particular. The report concludes that increasing awareness, highlighting best practice case studies and encouraging experimentation in pilot projects would increase and deepen F/OSS use in the future. The survey has been conducted in Austria, Belgium, Czech Republic, Denmark, France, Germany, Greece, Italy, Netherlands, Poland, Spain, Sweden, and the UK.

Most of the analysis of this survey focuses findings on common government attitudes and usage, rather than country differences. The important highlights of the survey findings:

<sup>44</sup> FLOSSPOLs (Free/Libre Open Source Software Policy Support) project, funded under the Sixth Framework Programme of the European Union, managed by the eGovernment Unit of the European Commission's DG Information Society. See <http://www.flosspols.org>

## Lessons

- “• Roughly half (49%) of local government authorities report some intentional use of F/OSS. However, a large additional population (29%) reports using F/OSS software, such as GNU/Linux, MySQL or Apache, but are unaware that these are F/OSS.
- Within organizations, partial use on servers dominates (40%) followed by partial use on desktops (16%). 20% experiment in pilot projects. Complete use is very rare, whether on desktop or server.
- Demand exists: 70% of F/OSS users and 38% of non-users want to increase F/OSS use. Awareness of F/OSS leads to increased willingness to use it regardless of current use/non-use.
- More than a fifth of those wanting to increase F/OSS use want a complete migration to F/OSS.
- Perceived advantages of F/OSS include: customization and the ability to combine it with existing proprietary systems. Barriers perceived by non-users include cost of training and being the first among peer organizations to adopt F/OSS. The experience of current users leads them not to see such barriers, and to appreciate the advantages more strongly than non-users.
- Organizations valuing interoperability are much more likely to increase F/OSS use.
- For non-users, who are more likely to use external maintenance services, a sense of vendor dependency and the need to customize software are strong drivers to future F/OSS use.
- Small budgets lead to “unaware” F/OSS use rather than intentional use or non-use of F/OSS.
- License fees account for 20% of IT budgets. Half of all respondents find this too high. This perception leads to increased future F/OSS use, especially among current non-users.
- F/OSS users administer 35% more PCs per IT administrator than non-users F/OSS use appears to reduce administrator workload per PC, and IT departments with high workloads are more likely to want a future increase in F/OSS use.” (Glott & Gosh, 2005)

Another survey, which has been conducted in more than 50 countries worldwide, provides a good first glance at international policies on F/OSS. The clearest finding of the study reveals that the majority of governmental, national or local policies are not mandating the use of F/OSS, but prefer to encourage it<sup>45</sup>. The other key finding of the survey illuminates the common motives of various legislators or governments in putting forward F/OSS initiatives. According to the survey, unhappiness with the U.S. lead in software, the hope that the use of F/OSS would encourage an indigenous software industry, a commitment to the 'informatisation' of society, and a desire to reduce the costs of information

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45 Center for Strategic and International Studies (CSIS), Global Policies on Open Source Software, December 2004, available @:  
[http://www.csis.org/tech/OpenSource/0408\\_ospolicies.pdf](http://www.csis.org/tech/OpenSource/0408_ospolicies.pdf) (last visited 15.06.2005)

technology purchases compose the common body of these F/OSS initiatives.

### Side Box 13. ADULLACT initiative in France

The ADULLACT initiative (located in Montpellier) is a regional French initiative which has as its objective to maintain and coordinate the actions of regional communities, public administrations and hospitals in order to promote, develop and exchange open source libraries for the interest of the public. Some well-known members in the public domain are the regions of Champagne Ardenne, Lorraine, Limousin and Rhone-Alpes, the departments of Iserre, Haute- Savoie, Dordogne, Rhone, Loire et Drome et les villes de Metz, Rouen, Reims, Paris, Aix, Cannes, Dijon and Marseille.

The admission fee for ADULLACT membership varies for persons, cities, departments or regions, hospitals, schools or private companies, ranging from 15 Euro (1 individual) to 6.000 Euro (for departments with more than 2.000.000 inhabitants).

Members are granted access to the following services :

- Technical support on OSS
- Access to the ADULLACT work platform and transfer of the necessary competence and support
- Access to OSS libraries, collected and organised by ADULLACT, in the sectors administration, education, health and ICT
- Access to the internal ADULLACT network
- Access to organised workshops and thematic days
- Access to ADULLACT studies and white papers

Success stories of Adullact include :

- The choice for Typo3 as CMS by the community of Grand Lyon
- The choice for Zope/CPS as CMS by the city of Lyon
- The migration to StarOffice (600 clients) by the hospital of Tourcoing

**Source:** <http://www.adullact.org>

## 5.3 Non-transferables

Although it is possible to share the whole vast majority of experiences in F/OSS adoption, there might be cases where approaches, methodologies, etc., should differ from, country to country or region to region. Sources of such 'non-transferables' stems from country/regional specific social and technical differences, such as computer literacy and accessibility, and some other differences specific to local legislation.

In order to identify 'non-transferables' specific to legislation, one can look at whether the policy or legislation mandated the use of F/OSS, expressed a preference for F/OSS, or encouraged its use or commissioned research into F/OSS.

## 6. Conclusions

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Following current state-of-the-art efforts, first of all, this roadmap report suggests that regional/national ICT programmes should promote, sustain and encourage the use of solutions preferably based on F/OSS framed with the principle of technological neutrality.

It is highlighted that F/OSS adoption in regional/national programmes, in addition to its many other secondary advantages, is necessary in order to enable interoperability, reuse of products and solutions and to optimize resources.

The report concludes that regional/national programmes can significantly contribute and benefit from F/OSS, especially in the following areas:

1. Introducing appropriate policies and legislation to enable and to promote F/OSS use within public bodies. Such regulations can lead to maximizing the return on ICT expenditures/investments by saving on license costs, increasing efficiency gains by avoiding potential vendor lock-in and allowing a wider choice regarding software solutions.
2. Stimulating the local software industry by enabling the creation of local capacity and skills necessary to satisfy Government's ICT needs; and contributing significantly to human resource development, especially in the area of ICT.
3. Lowering entry barriers for various kinds of new F/OSS based business models and players, such as new SMEs, into the ICT industry.
4. Preserving local languages and cultural specifics by the usage and availability of localized software versions of all software products.
5. Fostering innovation, security, interoperability and stability by the free availability of the program source code and its implications when it is compared to the "closed" world of proprietary applications which tends to inhibit innovation. The development processes of the "closed" proprietary software model are slow and in some cases barely take into consideration the specific needs and requirements of governments and public sectors.

The report stresses the fact that full implementation of the F/OSS model implies that national programmes do not only acquire and use the freely available software, but also contribute to development. In that respect, it proposes the establishment of a pool of skills in the public sector. A Total Cost of Ownership (TCO) based framework can be applied to evaluate the transition to a F/OSS solution within the context of Public Sector, however many important benefits from increased F/OSS utilization go beyond a simply reduced TCO.

Possible F/OSS adoption levels within the Public Sector is summarized as follows:

- i) using existing F/OSS products;
- ii) procuring F/OSS software;
- iii) modifying existing F/OSS solutions for internal use;
- iv) modifying F/OSS software and contributing the modifications to the collective development effort;

## Conclusions

v) managing and supporting own F/OSS projects.

In addition, an in depth analysis of legal issues, namely copyright law, patent law, and contract, related to F/OSS use in public institutions is critical and it requires a clear governmental policy to prevent uncertainty and doubt about F/OSS exploitation and adoption. Such actions towards F/OSS legitimization might additionally necessitate revision of local or national/regional ICT policies. The report summarizes the following strategic approaches for regional/national programmes: Neutral approach:

- Ensures that choice is supported and discrimination against F/OSS is limited
- Enabling approach: policies are geared towards the encouragement of the use of F/OSS
- Aggressive approach: Government actively pushes the development of F/OSS

Free/Libre Open Source Software for government activities can be best practiced through pilot projects, benefit studies, migration guidelines and R&D activities towards F/OSS. Recommendations derived from best practice analysis, focused on demonstrating lasting benefits via national and regional experiences, will be important pointers to the future. In that respect, this report deems it necessary to propose the establishment of networked National/Regional F/OSS Competency Centers (FCC).

F/OSS adoption within European wide public administration will accelerate the modernization of public administration and will contribute to the Lisbon agenda for economical, social, technical and environmental renewal.

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