The potential value and viability of Open Source software solutions in Malta's Public Administration

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Abstract

Governments use significant amounts of computer software and the Maltese Government alone will be spending around eight million Maltese Lira on Microsoft software licenses between 2004 and 2009. Open source software (OSS) is of major interest to local and international public administrations. Indeed some of them have already decided as a matter of policy to switch to OSS from their previous proprietary software. Governments have established study groups to consider Government support for open source, and some politicians in many countries have introduced legislation to help open source. Few Governments, however, have to date enacted explicit preferences for open source software; a handful of cities in Brazil are the most prominent.

Among the main considerations behind switching to open software solutions is greater control over software p[1]rocesses handling sensitive data, better security and reliability, and most predominantly reduction of costs. On the other hand, public authorities must consider costs associated with the 'switching process' in terms of training and capacity building.
OSS is a viable long-term solution that merits careful consideration because of the potential benefits however these must also be carefully balanced with a number of risks associated with OSS approaches and products.
To date no clear study has been conducted in establishing whether costs related to reliability on OSS are lower than those associated with reliance upon commercial software within the Maltese Public Administration.

This paper explains open source, describes its significance and compares open source to traditional commercial off-the-shelf (COTS) products, also known as proprietary software. The paper also presents a business case model and discusses the major benefits and disadvantages of adopting OSS products within the Maltese Public Administration. The paper will also explore whether OSS is an economical alternative to Public Administration's current reliance upon commercially supplied software, while assessing its viability and identifying barriers that could be encountered.

KEYWORDS: Open Source, Open Source Software, Software, Public Administration, Costs, Benefits, Functionality, Viability

[1] "The Brazilian Public Sector to Choose Free Software", 2 June 2003, http://www.pclinuxonline.com/modules.php?name=News&file=article&sid=6879

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Nonetheless, the views, opinions and/or findings contained in this report are those of the author and should not be construed as an official Government position, policy, or decision, unless designated by other documentation.

Table of Contents

List of Figures

List of Tables

List of Abbreviations

COTS	Commercial Off the Shelf Software
CPU	Central Processing Unit
DNS	Domain Name Server/Service
EU	European Union
FTP	File Transfer Protocol
FUD	Fear, Uncertainty, Doubt
GNU	Gnu's Not Unix
GPL	General Public License
GUI	Graphical User Interface
ICT	Information and Communication Technology
Interoperability	The ability of different types of computers, networks, operating systems, and applications to work together effectively, without prior communication, in order to exchange information in a useful and meaningful manner.
IS	Information System
IT	Information Technology
ISP	Internet Service Provider
OS	Operating System
OSI	Open Source Initiative
OSS	Open Source Software
PC	Personal Computer
Pilot study	A small scale implementation to check that the system works before it is rolled out to a larger user base
Proprietary software	Software that is owned by a specific company
R&D	Research and Development
Source code	The programming statements that make up a program
Standard methodology	Widely adopted industry standard approach to implementation
SWOT	Strengths, Weaknesses, Opportunities, and Threats
TCP/IP	Transmission Control Protocol/Internet Protocol
TCO	Total Cost of Ownership
US	United States
Vendor lock-in	A situation where a user is stuck using one proprietary software system and must pay whatever the vendor requires to continue support

Executive Summary

Worldwide, governments are looking into Open Source Software (OSS) and in many cases realising that they offer significant benefits that are strong enough to start considering and in some cases mandating the use of OSS software in governments. Much has been said about the commercial benefits of Open Source Software but there are also very significant benefits to be derived from large-scale OSS adoption in Public Administration. These benefits are not necessarily the same benefits that are driving the wide scale adoption of OSS in commercial companies.

This paper examines the major benefits and disadvantages of adopting OSS technology within the Maltese Public Administration. It examines the economic basis for such a government decision and whether OSS provides a cost effective solution to Public Administration's current reliance upon commercially supplied software, while assessing its viability and identifying barriers that could be encountered.

OSS offers a viable option to replace certain proprietary software used within Government and it is clear that if Malta where to adopt open source technologies in the short term it will have a huge competitive advantage, and that society in general can benefit a lot from this early adoption. For a nation that is counting on Information and Communications Technology (ICT) to help address social and economic issues, the current Microsoft Enterprise Agreement is very relevant. However, it may also limit the adoption of other kinds of software like OSS across Government. In the long-term, Malta needs to foster its own software development and capabilities. The Government should not be lethargic in facilitating a competitive domestic software development environment. And there is no reason why Microsoft and open source software cannot coexist in Malta.

CHAPTER ONE: INTRODUCTION

Commercial software, also known as 'Commercial off-the- Shelf' (COTS) products and herein referred to as proprietary software[2], is software that is distributed under commercial license agreements, usually for a fee, and without access to the source code. Proprietary software has quickly dominated the software market to such an extent that it is considered by many as the only possible model. Computer operating systems (OS) are a case in point. Microsoft's Windows[3] is estimated to be installed on over 90% of personal computers worldwide. Windows has achieved enormous market penetration due mostly to a first started advantage and the fact that it is the primary platform for Microsoft Office[4] and its proprietary document formats used by most microcomputer users. Also Microsoft is one of the few companies that license their OS to hardware manufacturers and Windows nowadays comes pre-installed on most computers, making it the default choice for much of the market. Consequently most personal computer (PC) users now use Windows, and are "locked in", that is switching operating systems becomes a lot harder. As Microsoft's Windows remains popular, more software developers write their programs to work with Windows, and the more applications are written for Windows, the more popular Windows became.

This cycle often translates early market leads into unusually large market shares and in some cases into implicit monopolies. Such dominance reduces competition, typically leading to higher prices, less innovation and fewer consumer choices. [5] At the same time when one firm dominates the market for a product that serves as a "platform" for other

[2] Through this document, the term proprietary software will be used to denote all non-free software. This is the usual term for that concept in the free software community. Proprietary means that some individual or company holds the exclusive copyrights on a piece of software, at the same time denying other people the access to the software's source code and the right to copy, modify and study the software. http://www.asiaosc.org/enwiki/page/Proprietary_software.html

[3] Microsoft Windows is a range of commercial operating environments for personal computers. The range was first introduced by Microsoft in 1985 and eventually has come to dominate the world personal computer market. For further details visit http://en.wikipedia.org/wiki/Microsoft_Windows

[4] Microsoft Office is a series of suites of productivity programs created by Microsoft and developed for Microsoft Windows and Apple Macintosh operating systems. As well as the office applications, it includes associated servers and Web-based services.

[5] Stoltz Mitch, " The Case for Government Promotion of Open Source Software"; (1999). http://www.netaction.org/opensrc/oss-report.pdf

products, just like Windows is for application programs, software developers do not need to write software that will work on different platforms, thus boosting productivity and innovation. In this way, Microsoft's establishment of the Windows standard has been a beneficial for software consumers. The danger, however, is that the dominant firm can exploit its market power to prevent new competitors with innovative technologies from having a fair chance at becoming the new market leader or de facto standard.[6] Netscape's Navigator, the first commercially popular browser, is such a case in point and competes against Microsoft's Internet Explorer (IE) for control of the internet browser market. Many believe that Microsoft's packaging of IE with its later versions of windows was an insurmountable barrier to entry for Netscape and a direct leverage of it 'monopoly'.[7]

A number of other issues remain prevalent with proprietary software. In many cases, proprietary software remains expensive and resource intensive in terms of hardware, while errors in code and security issues remain even in the most established programmes.

The choices in software Governments make are based upon a number of issues that involve weighing the risks against the benefits for the purposes to which the software is to be put. Proprietary software is not the only solution. An alternative method of software does exist, called open source software[8], and it offers a very viable solution to most of the problems mentioned above.
Open Source refers to software distributed with the condition that anyone using it must have access to, and the ability to give away unlimited copies of both the programme and its source code that is needed to make changes to the programme. Open source is not a technology, but rather a different way of thinking about and using software.

Only recently has the software industry and Governments started considering OSS as an option again. Consequently, Governments worldwide that have previously relied almost

[6] "United States of America, vs. Microsoft Corporation"; (June 24, 1999). http://www.usdoj.gov/atr/cases/f3800/msjudgex.htm
[7] Wilcox Joe; "*Judge calls Microsoft a monopoly*"; CNET; (November 5, 1999). http://news.com.com/Judge+calls+Microsoft+a+monopoly/2100-1040_3-232565.html
[8] The term "open source" was coined by Eric Raymond and ratified in a meeting between himself, Richard M. Stallman, and other notable open source advocates. It is intended to replace the previous term, "free software," used by Richard Stallman.

entirely on closed commercial software in their organisations are now considering the "open source" alternative. Open source software is also growing its market share in a few key areas because of its natural strengths of reliability, security, and low cost. However, open source has advantages on a broader level as well since it eliminates economic waste caused by the duplication of work, and presents a challenge to harmful monopoly power in the software industry, such as the alleged anticompetitive practices of Microsoft which are under investigation now in the European Union (EU) and United States of America (US)[9]. Governments are also interested in increasing the interoperability[10] between software systems for administrative purposes. The question of how to achieve interoperability depends largely on the nature of the standards upon which the software is based. Open standards that allow the standard to be seen, provides a capacity for interoperability between both open and proprietary software. Open source software provides a concrete way of developing open standards.

For these reasons, increased use of open source software serves more than private economic gain, but also serves a public good as well. The issues around whether open source software has a place in a Government portfolio can tend to draw mixed reactions, yet the choices about the acquisition and provision of software are far from black and white decisions.

> *"The arguments for and against open source software often get very trivialised. It's not a technology issue; it's a business issue to do with externalisation."*
>
> *Andy Mulholland, CTO, Cap Gemini, 1st March 2004*[11]

In the absence of Maltese research on this topic, this paper provides an overview about open source software and includes information from other reports drawn from around the world.

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[9] http://en.wikipedia.org/wiki/Microsoft_antitrust_case

[10] The ability of different types of computers, networks, operating systems, and applications to work together effectively, without prior communication, in order to exchange information in a useful and meaningful manner. There are three aspects of interoperability: semantic, structural and syntactical. http://library.csun.edu/mwoodley/dublincoreglossary.html

[11] Wheatley Malcolm; "*The Myths of Open Source*"; CIO; (March 2004). http://www.cio.com/archive/030104/open.html?printversion=yes

This paper will explain open source software, discusses its inherent strengths as both a private and a public good, how the Government of Malta is using it today, how its costs and benefits can be evaluated, and finally recommends how Government can take concrete steps to advance OSS across the Public Service. This paper may provide the basis for informing future discussions at the national level.

1.1 Research Objectives

This paper examines the major benefits and disadvantages of adopting OSS technology within the Maltese Public Administration, here forth referred as Government. It examines the economic basis for such a Government decision and whether OSS provides a cost effective solution to Public Administration's current reliance upon commercially supplied software, while assessing its viability and identifying barriers that could be encountered.

This paper:

- Explains open source, describes its significance, and compares open source to traditional commercial off-the-shelf (COTS) products
- Examines the major benefits and disadvantages of adopting OSS technology
- Conducts an OSS usage survey to at the 14 Ministries to iinvestigate the extent of use/non-use and development of OSS solutions within the Government of Malta. This survey was addressed to all Chief Information Officers at the 14 ministries. A questionnaire was designed to assess the Public administration software landscape and understand what the current level of Open Source Software adoption and development activity is; and eestablishes reasons for choosing OSS over proprietary solutions. It also gathers and analyses public sector opinions and attitudes vis-à-vis the long term prospects of OSS and relevant strategic issues. The survey was conducted on a one-to-one basis where possible.
- Examines political and economic influences on the adoption of OSS
- Compares the local adoption, if at all, with that of other countries.
- Introduces a business case analysis framework applied to Open Source products and processes. The approach first scanned the environment internally and

externally. The second step analysis the strategic factors to form the strengths, weaknesses, opportunities, and threats (SWOT) analysis, and assesses the feasibility of OSS based on information obtained in the environmental scanning and the analysis of strategic factors.

- Includes a Proof-of-Concept trial and analysis of an OSS initiative within a Public body to assess benefits, functionality, sustainability, and the viability of OSS;
- Provides a critical assessment and opinion related to the economic viability and functionality of OSS as an alternative to commercially produced software in the Public Sector, based on the OSS usage survey, the case study, business case analysis framework and on additional research;
- Offers some of the cost-benefit considerations that Public Administration in Malta needs to consider when thinking about investing in OSS development/use, and will delve into each of the reasons in turn and examine their impact
- Provides a basis for informed decision making about potential investments in OSS use in order to modernise public administration in Malta and support the economic development of the country.

Where appropriate, the study reviews some of the barriers to Public Administrations' effective exploitation of OSS and how those barriers might be reduced.

1.2 The Public Service of Malta

The Public Service of Malta, here forth referred as Government, is defined as the core of the permanent administrative machinery of the Government of Malta. Its mission is:

- To offer policy advice to the Government
- To implement Government policies and to administer legislation efficiently and effectively
- To deliver services to the public impartially, without errors and in a customer-friendly manner.

The Public Service is part of the wider public sector, but the two are not the same. Broadly speaking, the Public Service consists of Public Officers recruited under the authority of the Public Service Commission[12] who serve in Ministries and Departments and are subject to a common framework of rules and regulations. The wider public sector includes many public corporations, statutory authorities and other entities which are not part of the Public Service. Teachers in state schools, for instance, are public officers; university lecturers are not. Police officers are also members of the Public Service, but soldiers are not.

The Public Service has undergone a wide-ranging programme of reform over the last decade to improve its efficiency and responsiveness to Government and to the public. The Service has led the way in Malta in its application of information and communications technologies (ICT). The Service boasts a state-of-the-art ICT infrastructure which is now being used as the springboard for electronic Government.

1.3 Limitations and Assumptions

The following limitations and assumptions apply:

a. This paper deals specifically with OSS use within the Public Service alone, and does not attempt to analyse the entire Public Sector in Malta.
b. No official national data exists on OSS use within the Maltese Public Administration. The exercise will hence not aspire to provide a comprehensive analysis of OSS uptake.
c. Very limited information is available on software in use by the Public Service since all IT procurement is covered by a recent Microsoft agreement which is not available to the public.
d. The views, opinions and/or findings contained in this report are those of the author and should not be construed as an official Government position, policy, or decision, unless designated by other documentation.

[12] Public Service Commission See http://www.psc.gov.mt/start.htm

CHAPTER TWO: ABOUT SOFTWARE

This chapter provides some background information on the Information Technology (IT) market and describes the general features of software since this basic understanding is deemed necessary in order to fully understand the issues being discussed in the rest of the paper.

2.1 The Information Technology Market

The Information Technology (IT) market can be differentiated into four different market segments:

- hardware products,
- hardware maintenance services,
- software products and services,
- Internet and processing services. [13]

[13] Hoch, Detlev J. et al.; "*Secrets of Software Success: Management Insights from 100 Software Firms around the World*"; Boston, Massachusetts. (1999).

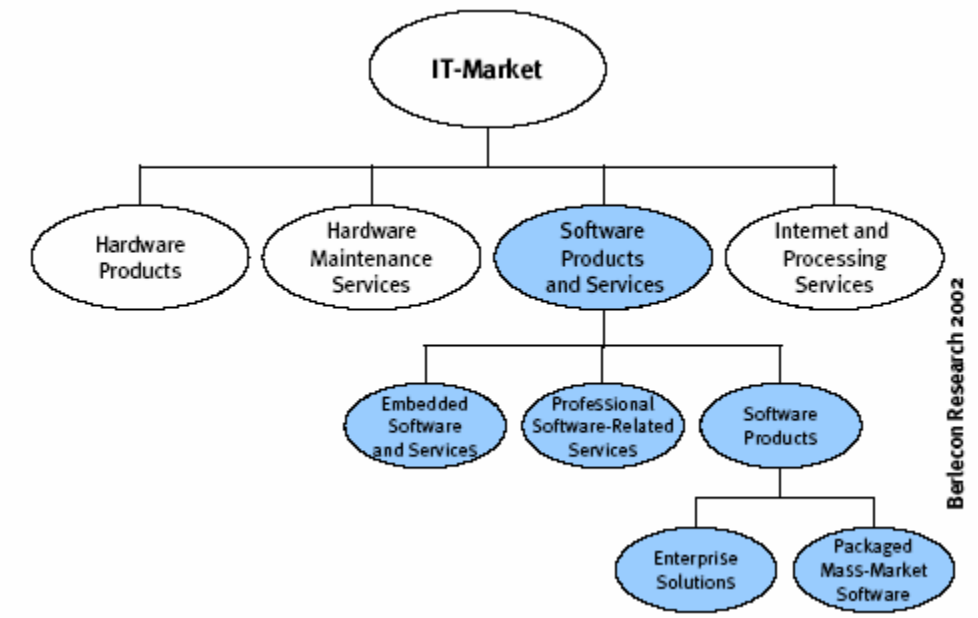

Fig 1. The Information Technology (IT) market

This paper will focus primarily on 'Software Products and Services' since it is one of the major building blocks of modern Government architectures and directly related to the Open source software argument being presented here.

2.2 Types of software

There are two main sorts of software:

- the systems software or operating system (OS), which controls the workings of the computer;
- and the application software that allows computer users to undertake specific sorts of tasks such as word processing, using spreadsheets or developing and manipulating graphics.[14]

Software applications will only work on a computer that has an operating system.

[14] Moyle Kathryn; "*Open source software in Australian school education*"; (August 2003). http://www.educationau.edu.au/papers/open_source.doc

Operating systems are used for making individual computers work as well as for making networks of computers work. That is, local and wide area networks are as dependent on a reliable operating system as is an individual personal computer (PC). Examples of operating systems are Windows and Windows NT, or Linux and FreeBSD. At the desktop of computers, users interact with a variety of applications software. Examples of such applications software include the Microsoft® Office suite of products, or OpenOffice and StarOffice. Web applications are software used to provide access to the Internet. Much Internet software is open rather than proprietary. To support distributed, networked computing environments middleware is used. The term 'middleware' refers to the set of services, the major components of which are identification, authentication, and authorization (IAA). Microsoft's Active Directory and Novell (NDS) are examples of proprietary middleware software and standards.

2.3 General Features of software

We will now take a closer look at software and its features in general.

The software product is determined by several characteristics that make it different from physical products. First of all, software is considered not to be a physical good and very different from such. Secondly, users of software rarely buy only the software product, but also the service related to the support of that software. Enterprise users, like Government, normally buy solutions; that is a combination of software, hardware and services. Therefore for the intents and purposes of this section Software is defined as consisting of two substantially different parts; product and service software. The 'software product' is the license that is sold to use the software. Such a license can be unique (customised software product) or it can be duplicated as many times as possible (standardised software product). On the other hand, the 'software services' surrounding software products range from consulting, implementation, support, and training to application management.

The product characteristics can be summarised as follows[15]. Software ...

- *"Is a non-material product with no physical limits.*
- *Cannot be worn out and does not physically deteriorate.*
- *Is a product of intellectual property. This results in high development costs and low sale prices for standardised products. Therefore, volume is very important for sales.*
- *Is aging (better hardware allows better software). This aspect is becoming less important over time.*
- *Is difficult to measure in terms of physical product measures. Either technical or financial equivalents have to be found to measure the value of software.*"

The most important software forms are[16] :

- The classical proprietary/commercial software, wherein the software is typically distributed in binary form only and the source code is not available.
- Shareware, wherein software is typically free for an initial period, but a license has to be bought after a test period and the source code is not available.
- Freeware, wherein there is no license fee at all for the freeware product, but maybe for a complementary product, and the source code is not available.
- OSS, where the source code of this software is available.

In the software value chain, we again find product-related and service-related steps. Here, value is created in the form of information about the products.

The value chain consists of three major parts:

- Production/Programming,

[15] Balzert Helmut; *Lehrbuch der Software-Technik: Software-Entwicklung*", Heidelberg. (1996)
[16] Spiller, D. and Wichmann, T.; "*Free/Libre and Open Source Software: Survey and Study, Part 3: Basics of Open Source Software Markets and Business Models"*. Berlin: Berlecon Research GmbH. (2002). http://www.berlecon.de/studien/downloads/200207FLOSS_Basics.pdf

- Marketing/Sales (Distribution), and
- Services.

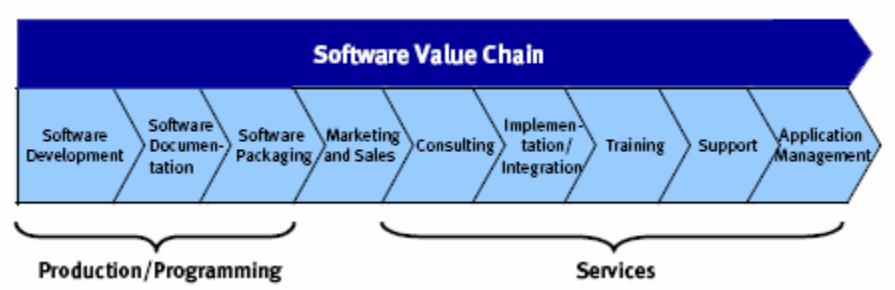

Fig.2 The Software Value Chain[17].

2.4 Typical Government software infrastructure taxonomy

The following figure identifies a typical enterprise software infrastructure taxonomy that could apply to Governments. The intention behind this brief is to give the reader an idea of the complexity of the software stack that is necessary to maintain an IT infrastructure that can support Government, and how the different components of manage ware, client ware, server ware and platforms interact. The following figure provides a basis of discussion when showing what OSS products are available for the various components of this taxonomy in Chapter Three.

[17] Ibid.

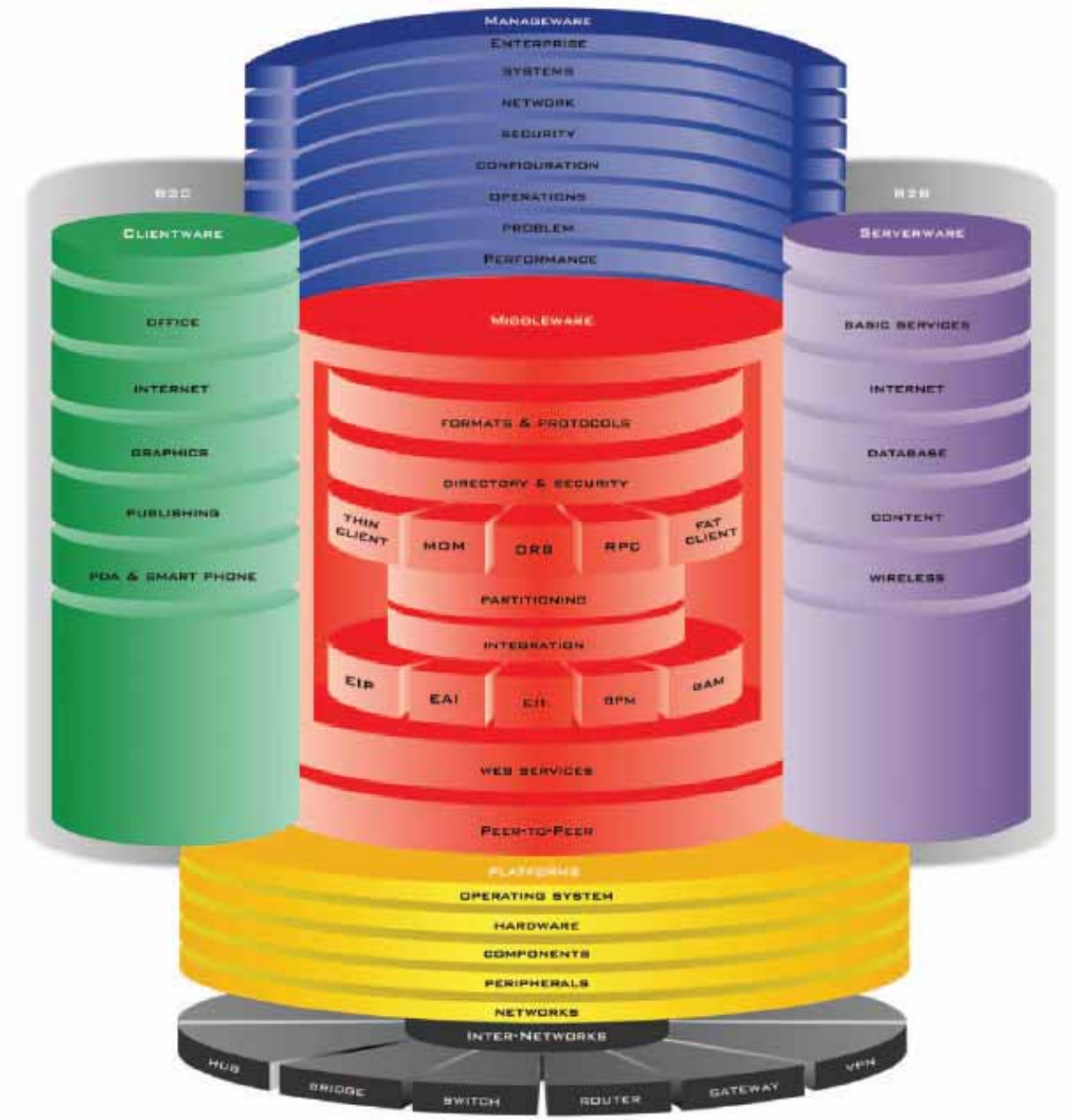

Fig. 3 Typical Enterprise infrastructure taxonomy [18]

[18] Tash Jeff, Flashmap Systems, Inc. See http://www.flashmapsystems.com/models.htm

CHAPTER THREE: WHAT IS OPEN SOURCE?

This section defines open source software, explains briefly as well the communities that have evolved with these systems and some of the commonly used software packages developed using the open source model. It also discusses some of the major figures in OSS uptake and market share.

3.1 About Open Source Software

Although OSS has recently become a hot topic in the press, it has actually been in existence since the 1960s and began as the 'hacker' culture of computer science laboratories at Stanford, Berkeley, Carnegie Mellon, and MIT. In 1985, Richard Stallman created the Free Software Foundation[19], and in 1991, Linus Torvalds created Linux, a version of Unix for the desktop PC and one of the most widely known and used Open Source software today. Linux's great success is "*not technological but sociological*" [20] in that it was created from the ground up with input and shared programming by developers around the world. The Open Source Initiative (OSI)[21] was begun by Eric Raymond and Bruce Perens in 1997 in an effort to "*market the free software concept to people who wore ties*". [22]

OSS has nowadays developed into a mature movement that continues to produce stable and widely used software packages. The open source model is proving to be a revolutionary development because it makes it easier for software designers to build on the work of others. As a result, the quality of open source software has steadily improved and, in some cases, OSS products match or exceed the performance of related proprietary

[19] http://www.gnu.org/fsf/fsf.html
[20] Eric S. Raymond; "*A Brief History of Hackerdom*"; In Open Sources: Voices from the Open Source Revolution. Ed. Chris DiBona, Sam Ockman & Mark Stone. Beijing : Sebastopol O'Reilly and Associates, (1999).
[21] Open Source Initiative (OSI) is a non-profit corporation dedicated to managing and promoting the Open Source Definition for the good of the community, specifically through the OSI Certified Open Source Software certification mark and programme.
[22] Bruce Perens "*The Open Source Definition*." In Open Sources: Voices from the Open Source Revolution. Ed. Chris DiBona, Sam Ockman & Mark Stone. Beijing; Sebastopol O'Reilly and Associates, (1999).

counterparts[23]. Although the true cost of software is more than its initial purchase price, the fact that OSS is freely available and upgradeable, along with other characteristics like security, stability, and access to source code for customization have led to its recent popularity. [24] Governments have long recognized that OSS can be more secure, stable and cost-effective and today OSS is also gaining acceptance for use on individual desktop computers.

Open source software uses software source code that is open, unrestricted and available for downloading from the Internet. The term 'open' in open source software is meant in a sense of 'open or free speech' rather than as a 'no-cost' product.
The most basic definition of open source software is software for which the source code is distributed along with the executable programme, and which includes a license allowing anyone to use, modify and redistribute the software with or without modifications. [25] If the end-user makes any alterations to the software, he can either choose to keep those changes private or return them to the community so that they can potentially be added to future releases.

The Open Source Initiative, a group of developers who disseminate information on the benefits of open source,[26] has posted on its web site a "meta-definition" of the basic conditions which they feel should be included in an OSS license.

These include:

- *"Allowing free redistribution of the software without royalties or other fees to the author.*
- *Requiring that source code be distributed with the software or otherwise made available for no more than the cost of distribution.*

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[23] Murrain Michelle et al; "*Choosing and Using Open Source Software: A Primer for Non Profits*"; Non-Profit Open Source Initiative (NOSI); (2003). http://www.nosi.net/node/24
[24] Bretthauer David; "*Open Source Software: A History*"; Library and Information Technology (LITA); http://www.ala.org/ala/lita/litapublications/ital/2101bretthauer.htm
[25] Stoltz Mitch, "*The Case for Government Promotion of Open Source Software*"; (1999). http://www.netaction.org/opensrc/oss-whatis.html
[26] See: http://www.opensource.org .

- *Allowing anyone to modify the software or derive other software from it, and to redistribute the modified software under the same license terms."* [27]

Examples of popular open source products include Open Office[28], Star Office[29], Apache[30], Sendmail[31], and Linux[32].

The code in open source software, referred to as source code[33] is available and viewable and is developed by identifiable communities who contribute to the development of a particular piece of software. People in the software communities participate voluntarily or are paid by employers such as Government departments or companies like IBM, Hewlett Packard and Sun Microsystems. Consequently open source software is made available to the public at large as a public good rather than for gain or profit. However, companies like RedHat[34] achieve financial gains related to open source software from the research developed through the collaborative processes associated with open source software development, and from associated products such as the packaging of products, technical services, conferences, books, and promotional materials. Red Hat customers which account to circa some 7.5 million, choose to pay about $50 for the added value which the company provides to Linux users, even though the company itself gives Linux away for free.

A lot of open source software is available for use in a typical software stack of an Enterprise infrastructure like that used by Governments and which was mentioned in

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[27] The full text of these guidelines are found at http://www.opensource.org/osd.html.
[28] http://www.openoffice.org/
[29] http://www.sun.com/software/star/staroffice/index.xml
[30] http://www.apache.org/
[31] Sendmail is an open source mail transfer agent (MTA): a computer program for the routing and delivery of email.
[32] Linux (often pronounced LIH-nuhks with a short "i") is a Unix-like operating system that was designed to provide personal computer users a free or very low-cost operating system comparable to traditional and usually more expensive Unix systems.
[33] Source code is the actual instructions which programmers write to create a piece of software, the "recipe" for the programme. Once a programme has been "compiled" into a form which can be installed and run on a computer, its source code is irretrievable. It is practically impossible to make changes to a programme without having a copy of its source code. If a programme's license includes the right to modify the programme, this right is meaningless unless the source code is readily available.
[34] See http://www.redhat.com/

Chapter 2. The summary in the figure below highlights the most prominent open source software operating in each area of the stack.[35]

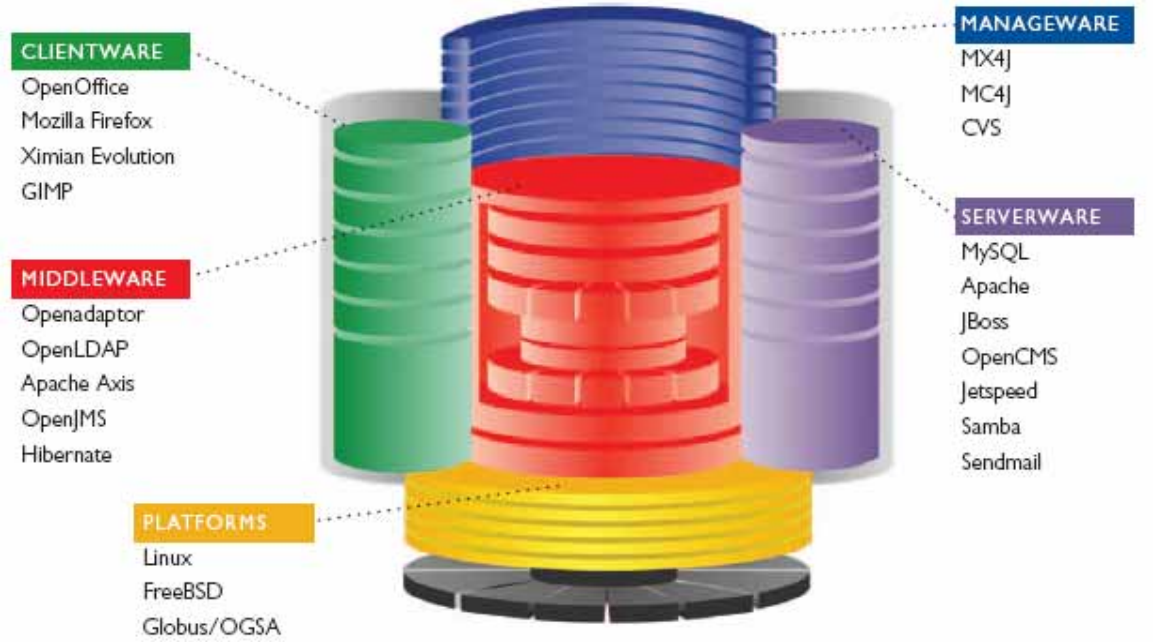

Fig.4 Possible OSS products in a typical Enterprise infrastructure taxonomy

[35] Gustafson Paul, Koff William; "Open Source: Open for Business"; (2004). http://www.csc.com/features/2004/uploads/LEF_OPENSOURCE.pdf

3.2 Open Source Licensing

The terms “open source” or “free software” are not specific enough to describe a particular software license. In general, the most important part of copyright in the software market is about the software’s copying, distribution and preparation of derived works. [36] Open Source licenses have two things in common:

- The right to earn license fees is typically waived,
- The condition that the source code is made available is incorporated.

The major distinction of open source licenses is the principle of “Copyleft” wherein a user of an oss product is restricted to release any derivative works created from the open source code to be released as open source again. The strongest case of “Copyleft” is the GPL[37].

An open source license is certified by the Open Source Initiative (OSI), a nonprofit association with the mission to own and defend the open source trademark, and advance the cause of OSS.

Actual licenses for OSS vary between different companies and development projects, but they have certain characteristics in common. The following figure describes briefly the most important licensing models currently available.

[36] Rosenberg, Donald K.; “*Open Source: The Unauthorized White Papers*”, Foster City. (2000)

[37] General Public License. A license for distribution of free software that permits copying, modification and redistribution. It was created by the Free Software Foundation for its projects like GNU, and has been applied to Linux as well. See http://www.gnu.org/copyleft/gpl.html

Software license	Available at no cost	Distribution allowed	No usage restrictions	Source code freely available	Source code modification allowed	Derived work must be free again	Linking with proprietary software allowed
Public Domain	X	X	X	X	X		X
Shareware	(X)1	X					
Freeware	X	X	X				
GPL	X	X	X	X	X	X	
LGPL	X	X	X	X	X	X	X
MPL	X	X	X	X	X	X	X
BSD-License	X	X	X	X	X		X
1) Shareware is gratis for a trial period only							

Fig 5. Software licensing models overview [38]

It is important to keep in mind that open source is not shareware, public-domain software or freeware. Shareware, whether or not one registers it and pays the registration fee, typically allows no access to the underlying source code. Unlike freeware and public-domain software, OSS is copyrighted and distributed with license terms designed to ensure that the source code will always be available. While a fee may be charged for the software's packaging, distribution, or support, the complete package needed to create files is included, not just the portion needed to view files created elsewhere.

3.3 The Advantages of Open source

This section will discuss some of the major advantages that are relevant to OSS?

[38] Berlecon Research; GmbHFLOSS Final Report – Part 3; Free/Libre Open Source Software: Survey and Study and Business Models; Basics of Open Source Software Markets.
http://www.berlecon.de/studien/downloads/200207FLOSS_Basics.pdf

3.3.1 Source code

Making source code available to a wide audience of software developers, as happens with OSS, helps identify and fix bugs and programming errors which users come across, and that are usually noticed and repaired by one of the thousands of developers across the Internet. This freedom to modify the internal source code of an application demonstrates how developers sharing a common problem and ideas, and working on a specific application can collectively accelerate development at a rate otherwise unattainable.

Open source software is completely flexible and transparent. Everybody can take an open source application and see how the application works. Moreover, since open source furnishes the user with the opportunity to examine, change and improve the software, any customisation and enhancement can be carried out either by the end-user himself or through the open source community[39] that supplies support for free.

This approach is in sharp contrast to the significant dependency that users of proprietary software have on the application's supplier. With proprietary software it is the supplier who usually dictates the timing and conditions for changes, amendments, patches, versions and enhancements, as well as the overall lifetime of the application. Moreover if the software supplier closes its business, all development and support is generally terminated and the existing user-base would have no other option but to be forced to search for alternative solutions.

In contrast, the "closed" world of proprietary applications tends to inhibit innovation, as the development process is slow and in some cases barely takes into consideration clients' needs and requirements.

3.3.2 Stability

While many argue whether open source software is more stable than proprietary software[40], it is clear that the quality of open source applications increases rapidly as the widespread availability of the same application increases. Consequently, it is not

[39] The open source community consists of individuals or groups of individuals who contribute to a particular open source product or technology.

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

surprising to observe that popular open source applications are characterised by outstanding robustness; mostly due to having hundreds of competent programmers and critics who collectively fix programming bugs and errors, as well as provide various enhancements to the application. This is in sharp contrast to even the biggest commercial software suppliers, who regularly acknowledge that they lack developers necessary to develop the desired reliability necessary within their products.

3.3.3 Security

The threat of worms and viruses across proprietary products has in many cases provided a need to develop and implement open source applications. Although open source software is not immune to worms and viruses, the open source community has not experienced the severity of exploits as that suffered by competitive proprietary products. Supporters of open source contend that open source systems are less vulnerable to attack by computer worms and viruses because of an in-built set of technical characteristics that make it relatively more difficult to distribute and propagate fast-spreading worms and viruses across open source applications[41]. Consequently OSS applications require fewer administrative resources in order to deal with security holes, viruses and worms; and organisations tend to benefit from less downtime from virus-induced system crashes. However it is only fair to indicate that the 'added security' off OSS is also due to the fact that they are not as big a target as proprietary software and the situation could change in the future as hackers and virus developers start attacking open source software.

3.3.4 Licensing

The open source model also provides for simpler license management since there are no additional costs for supplementary licenses as an implementation grows. This provides for a lower Total Cost of Ownership (TCO) and relative costs overall. Moreover, a number of studies[42] have claimed that the cost of ownership is relatively

[41] Wheeler A. David ; "*Secure Programming for Linux and Unix HOWTO*"; Retrieved on 18/04/2004 http://www.dwheeler.com/secure-programs/Secure-Programs-HOWTO/open source-security.html
[42] Wheeler David, "*Why OSS/FS? Look at the Numbers!*". Retrieved on 18/12/04 http://www.dwheeler.com/oss_fs_why.html

lower since open source software requires less-powerful personal computers for most applications than would be the case for proprietary software.

3.3.5 Vendor Lock-in

Also relevant is the fact that open source software reduces the dependence on a single supplier, also known as vendor lock-in. Software suppliers purposely attempt to achieve the highest degree of customer lock-in with the purpose of extending the purchasing lifetime of a customer by securing his repeated use of their products over a longer period of time. [43] Open source, however, reduces the reliance upon a single vendor by having open standards and spreading any form of software reliance on the open source community.

3.4 The Disadvantages of Open source

OSS can be a long-term viable solution with significant benefits, but there are issues and risks to organisations going down the OSS path and Government should make sure that there is enough interest from skilled developers before choosing a viable alternative to COTS.

The following section will provide a quick run-through of acknowledged disadvantages.

3.4.1 Support

Most open source implementation projects suffer from a lack of professional skills and currently there are definitely less consultants and support services in the market than for proprietary products. Whilst the OSS model counts on support from professionals over the Internet, in-house expertise is always key to the success of any OSS project. In many cases such expertise may not exist and consequently staff needs to be trained or

[43] Borenstein Severin, MacKie-Mason K. Jeffrey and Netz S. Janet ; "*The Economics of Customer Lock-In and Market Power in Services*". (September 1993) Retrieved 10/11/2004 http://econwpa.wustl.edu:8089/eps/io/papers/9401/9401001.pdf

acquired. Moreover, with open source implementations, the demand for in-house technical competence is generally higher than is the case for proprietary software.

Whilst the availability of thousands of unpaid programmers over the Internet is in itself a major advantage, organisations tend to discover that the dependency on such external programmers could become a major business risk. Unless properly managed, organisations using OSS could end up realising that the effective operations of their internal applications is dependent on a team of “faceless” and unknown programmers.

3.4.2 Authenticity

The wealth of Internet programmers presents another a dilemma of trust when IT managers require critical information from the open source community. A number of organisations that have implemented open source applications have also reported that the model still lacks basic components that are commonly included with proprietary software. These include issues like a lack of comprehensive critical hardware drivers, the programmes that act as intermediaries between the processor and peripheral devices such as the screen, printer, modem, and keyboards. However, it is fair to state that this problem is becoming less relevant as the number of implementations increases worldwide.

3.4.3 Cognitive competence

A less obvious disadvantage is the loss of cognitive competence that occurs when employees start feeling confused and lost when they have to shift between office open source applications at work and their home personal computer that may be running popular proprietary applications.

3.4.4 Interoperability

It is still rare for any organisation to migrate from proprietary applications to open source completely. Such a situation, however, creates potential problems with respect to open source and proprietary application interoperability. Although interoperability has lately been greatly improved, the ability of open source software to share information

with popular applications is still a significant problem and many business organisations hesitate to make the leap to open source for this specific reason.

Whilst there is a wide range of open source applications available today, many experts acknowledge that the open source concept is currently not the solution for mission-critical business applications. In fact open source software is generally recommended for certain classes of users who may never need the full range of desktop applications. The most commonly cited example describes how open source software can best serve as a cheap alternative for employees who use personal computers for functions such as email and browsing, but who hardly ever need to create documents, spreadsheets or presentations. For these employees, compatibility issues are generally minimal.

3.4.5 Legal Issues

No discussion of open source applications can be complete without raising the question of legal issues. Whilst the threat of copyright and patent claims have not deterred organisations from implementing open source applications, recent events could have the potential to impact in this respect.

In March 2003, the SCO Group sued IBM[44] alleging that the IT giant had improperly dumped parts of SCO's confidential, enterprise-grade, proprietary software code, called UNIX, into Linux. Over 1,000 corporations in the US have received letters from SCO telling them their use of Linux was exposing them to legal liability. The issue is still unresolved but it ensured that organisations running open source applications may wake up to the reality that they could be, at least theoretically, exposed to a whole plethora of legal issues and claims.

3.4.6 Graphical User interface

Highly technical, skilled developers tend to focus on the technical user at the expense of the non-technical user. As a result, OSS tends to have a relatively weak

[44] Shankland Stephen; "*SCO sues Big Blue over Unix, Linux*"; CNET News.com. (March 6, 2003)Retrieved on 21/12/2004, from http://news.zdnet.com/2100-3513_22-991464.html

graphical user interface (GUI) and fewer compatible applications[45], making it more difficult to use and less practical, in particular, for desktop applications even though some OSS products are greatly improving in this area. Version control can become an issue if the OSS system requires integration and development.

3.5 Open Source market and use

Many people think that a product is only a winner if it has significant market share since products with big market share grow a momentum that reduces future risk. Some writers argue against OSS as "not being mainstream", but if their use is widespread then such statements reflect the past, not the present. There's excellent evidence that OSS has significant market share in numerous markets.[46]

3.5.1 OSS Market Share

The following evidence and literature review was collated based on a very comprehensive paper by Kenneth Wong titled "Free/Open Source Software and Governments: A Survey of OSS Initiatives in Governments" in August 2003. [47]

- The most popular web server has always been OSS and Apache for instance is currently the leading web server with over three times the market share of its next-ranked competitor. Netcraft's November 2004 survey polled all the web sites they could find (totaling 51,635,284 sites), and found that of all the sites they could find, counting by name, Apache had 67.77% of the market, Microsoft had 21.25%, Sun had 3.14%, and Zeus had 1.32%. [48]

[45] Kahn A.Carolyn; "*Use of Free and Open source Software (OSS) in the U.S. Department of Defense*"; Mitre Corporation. (2 January, 2003) http://www.egovos.org/pdf/dodOSS.pdf
[46] Wheeler David, "*Why OSS/FS? Look at the Numbers!*". Retrieved on 18/12/04 http://www.dwheeler.com/oss_fs_why.html
[47] Wong Kenneth; "*Free/Open Source Software and Governments: A Survey of OSS Initiatives in Governments*"; International Open Source Network; Malaysia. (August 2003). http://opensource.mimos.my/OSScon2003cd/paper/full_paper/kenneth_wong.pdf
[48] http://news.netcraft.com/archives/web_server_survey.html

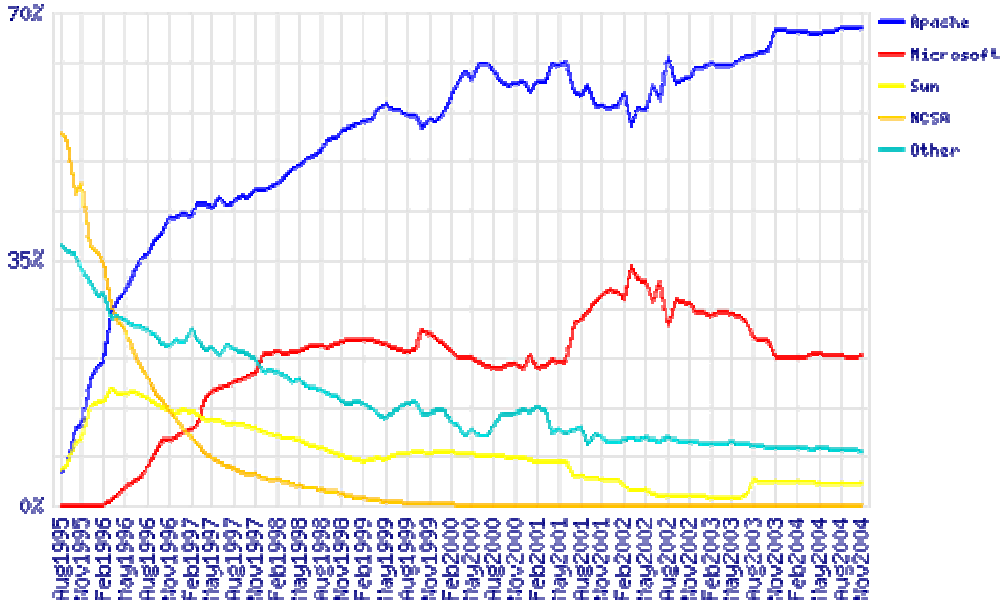

Fig. 6 Market share for top servers across all domains
August 1995 – November 2004

- GNU/Linux[49] is the second leading web serving operating system on the public Internet (counting by physical machine), according to a study by Netcraft surveying March and June 2001. Two 2001 Netcraft surveys[50] found that Linux is the second leading operating system for web servers when counting physical machines. Microsoft led the market by 49.6% in June, followed by Linux at 28.5%.
- Linux is the most used server operating system on the public Internet according to a 1999 survey of European and educational sites.[51] This survey found that, of the total number of servers deployed on the Internet in 1999 (running at least ftp, news, or http), the most used operating system was Linux at 28.5%, with windows trailing at 24.4%.

[49] The GNU Project was launched in 1984 to develop a complete UNIX style operating system which is free software: the GNU system. (GNU is a recursive acronym for "GNU's Not UNIX"; it is pronounced "guh-noo.") Variants of the GNU operating system, which use the kernel Linux, are now widely used; though these systems are often referred to as "Linux," they are more accurately called GNU/Linux systems. See http://www.gnu.org/gnu/linux-and-gnu.html

[50] Netcraft Report; (June 2001). http://www.netcraft.com/Survey/index-200106.html#computers; September 2001 http://www.netcraft.com/Survey/index-200109.html#computers

[51] Zoebelein U. Hans ; "*The Internet Operating System Counter*"; (April 1999) See http://www.leb.net/hzo/ioscount/

- Linux was the second most sold server operating system 1999, 2000, and 2001. According to study by IDC[52] on the server, Windows accounted for 41% of new server operating system sales in 2000, growing by 20% - but Linux accounted for 27% and grew even faster, by 24%. Other major Unixes had 13%.
- Sendmail, an OSS programme, is the leading email server. [53]
- PHP[54] is the web's most used Server-side Scripting Language. A study in 2001[55] noted that PHP recently surpassed Microsoft's ASP to become the most popular server-side Web scripting technology on the Internet, and was used by over 24% of the sites on the Internet. Of the 37.6 million web sites surveyed worldwide, PHP is running on over 9 million sites, and over the past two years PHP has averaged a 6.5% monthly growth rate.
- OpenSSH is the Internet's is the most used implementation of the SSH security protocol. The Secure Shell (SSH) protocol is widely used to securely connect to computers and control them remotely. On April 2002, a survey of 2.4 million Internet addresses found that OpenSSH, an OSS implementation of SSH, was the leading implementation, with 66.8% of the market; the proprietary "SSH" had 28.1%, Cisco had 0.4% and others totaled 4.7%. [56]
- An Evans Data survey[57] made in February 2004 found that 1.1 million developers in North America were working on OSS projects. The study concluded that more than 1.1 million developers in North America were spending at least some of their time working on Open Source development projects. That does not even account for developers in other countries.

[52] IDC released a similar study on January 17, 2001 titled "*Server operating environments: 2000 Year in review*". See http://www.computer.org/computer/homepage/june/ind_trends/index.htm
[53] Bernstein D. J.; Survey done between 27/09/2001 and 03/10/2001 that successfully connected to 958 SMTP (email) servers.
[54] PHP, a recursive acronym for "Hypertext Preprocessor", is an open source server-side scripting language designed for creating dynamic Web pages (e.g., such as e-commerce).
[55] Hughes Fiona; "PHP: most popular server-side Web scripting technology"; http://lwn.net/Articles/1433/
[56] SSH usage profiling; http://www.openssh.org/usage/index.html
[57] "*Evans Data's North American Developer Population Study*"; (February 2004). http://www.businesswire.com/cgi-bin/f_headline.cgi?bw.020904/240405311

- A 2004 InformationWeek survey[58] found that 67% of companies use OSS products, with another 16% expecting to use it in 2005; only 17% have no near-term plans to support OSS products. They also found that 42% of companies implement production database operations using OSS, with 33% more considering it; only 25% are not using or considering OSS for production database use.
- The European FLOSS study[59] found significant use of OSS. The report found significant variance in the use of OSS; 43.7% of German establishments reported using OSS, 31.5% of British establishments reported using OSS, while only 17.7% of Swedish establishments reported using OSS. In addition, they found that OSS usage rates of larger establishments were larger than smaller establishments, and that OSS usage rates in the public sector were above average.
- A 2002 European survey found that 49% of CIO's[60] in financial services, retail, and the public sector expect to be using OSS. The survey[61] published in February 2002 found that 37% of the surveyed CIOs stated that they were already using OSS, and 49% expected to be using OSS in the future. Perceived benefits cited included decreased costs in general (54%), lower software license cost (24%), better control over development (22%), and improved security (22%).
- MySQL's market share is growing faster than Windows'. An Evans Data survey[62] released in January 2004 found that the use of OSS database MySQL grew 30% over the year, as against 6% for Microsoft's SQL Server and Access databases. Microsoft still retains the greater total market share in the database development market.

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[58] D'Antoni Helen; "*Open source software use joins the mix*"; InformationWeek; (November 1, 2004). http://www.informationweek.com/story/showArticle.jhtml?articleID=51201599&tid=5979

[59] '*Free/Libre and Open Source Software (FLOSS): Survey and Study*". Published by the EU project titled 'Free/Libre/Open Source Software: Policy Support', (FLOSSpols); March 2004. http://www.infonomics.nl/FLOSS

[60] Chief Information Officer, often called the vice president of management information systems or of data processing.

[61] Mortali Mauro;; "*Market Opportunity Analysis For Open Source Software*"; (February 2002).Retrieved on 08/11/2004 http://banners.noticiasdot.com/termometro/boletines/docs/ti/linux/varios/2002/OSS_Management_Summary.pdf

[62] LaMonica Martin; "*Open source databases gaining favor*"; CNET News.com; (January 5, 2004). http://news.zdnet.com/2100-3513_22-5134836.html?tag=tu.swblog.6566

- Internet Explorer (IE) has been losing market share since July 2004 to OSS web browsers, mostly due to repeated security problems [63]. According to PC World, IE lost 1% of its market share in a single month. In the same time period Mozilla-based browser use increased by 26%.[64] IE remains far more widely used according to this July 2004 poll (94.73%), but IE hadn't lost market share in a long time.

3.5.2 Open Source Use by Governments Worldwide

A study into the use of OSS in the European Market[65] shows that all countries have adopted OSS to some extent or another. Numerous government and public sector organizations have commissioned and published studies of OSS in the last two years. Examples include the UK[66], the Netherlands[67], Italy[68], France[69], Sweden[70], and Germany[71].

The two leading adopters of OSS are France and Germany. France shows clear commitment to open standards and Open source software whilst Germany has used OSS for the creation of guidelines and also for implementations. With regards to Belgium, Italy, and Sweden, there is no clear Government commitment to use OSS as yet. However

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[63] Wheeler A. David; "*Why Open Source Software / Free Software (OSS/FS)? Look at the Numbers!*"; Revised as of November 7, 2004. See http://www.dwheeler.com/oss_fs_why.html#ie-vulnerabilities#ie-vulnerabilities

[64] McMillan Robert, "*Mozilla Gains on IE*"; IDG News Service; (July 09, 2004) http://www.pcworld.com/news/article/0,aid,116848,00.asp

[65] Schmitz Patrice-Emmanuel; "*Study into the use of Open Source Software in the Public Sector*"; June 2001, UNISYS. See http://europa.eu.int/ida/servlets/Doc?id=1973

[66] Office of the e-Envoy. "*Open Source Software: use within UK Government*"; (2002). www.e-envoy.gov.uk. Also, Peeling, N. and Satchell, J.; "*Analysis of the Impact of Open Source Software*". Qinetiq CR010223. (2001)

[67] Dalle, J-M, David, P.A. and Steinmueller, W.E..; "*The Economic Organization and Efficiency of OS/FS Software Production: An Agenda for Integrated Research*". European Union, FLOSS study. (2002) See www.infonomics.nl/FLOSS/report/index.htm

[68] Italian Ministry of Innovation and Technology. "Indagine conoscitiva sul software a codice sorgente aperto nella Pubblica Amministrazione Rapporto della Commissione"; (2003)

[69] ATICA. Agency for Information and Communication Technologies in Administration. "*Guide to choosing and using free software licenses for government and public sector entities*". (December 2003) www.atica.pm.gouv.fr/

[70] Statskontoret; "*Free and open source software – a feasibility study*". The Swedish Agency for Public Management. Also Appendix 1; (2003) www.statskontoret.se/english/index.htm

[71] Wichmann, T.; "*Free/Libre Open Source Software: Survey and Study*". Berlecon Research, Berlin. (2002)

these countries are allowing various OSS initiatives that are mostly based on individual effort to take place. According to the study made by UNISYS on OSS the choice of using OSS depends on its feasibility. If the solution is technically feasible and viable for the business unit, then it is approved.

Spain is also an active follower concerning specific departments where competent OSS advocates have demonstrated the efficiency, the value for money and the supportability of the solution, and where the installation of a standard specific Linux distribution can provide a scaling effect. This ambitious programme ensured that for every two students there was at least one computer, costs 67 million euros and it was estimated that the usage of GNU/Linux saved over 18 million euros[72].

There is a clear division between the server and the workstation markets. According to the study performed by UNISYS the real percentage of use of OSS General purpose and Web Servers is estimated to be that of 8%. This is quite low when taking into account that the Open Source Web Server known as Apache holds 61% of the Web Server Market. However it is forecasted to grow, as OSS solutions like LINUX are becoming the ideal choice in replacing proprietary solutions. With regards to OSS operating systems on workstations this is even more limited. The choice of OSS operating systems on workstations is only estimated to be one of 1% with the exception of the installations made in the educational sectors of the respective countries.[73]

3.5.3 Government expenditure on software

The gathering of information and materials has taken place through the pain stacking study of the Government financial estimates for 2005[74]; and other type of information obtained through meetings. No exercise is available that attempts to isolate ICT

[72] "*Sweeping Initiative Puts 80,000 Computers Running GNOME Into Student's Hands in the Region of Extremadura, Spain*", Business Wire, http://www.businesswire.com/cgibin/cb_headline.cgi?&story_file=bw.061803/231695068&directory=/google&header_file=header

[73] Wong Kenneth; "*Free/Open Source Software and Governments: A Survey of OSS Initiatives in Governments*". See http://opensource.mimos.my/OSScon2003cd/paper/full_paper/kenneth_wong.pdf

[74] Budget estimates for government 2005; http://mfin.gov.mt/page.aspx?site=MFIN&page=estimates

expenditure across Government to-date and the following figures might have left out some budget lines that the author was not aware of.

In the budgetary estimates for 2005, the Government of Malta made the following allocations:

		Recurrent			Capital		
Expenditure by Standard Item		Actual Expenditure 2003 Lm	Approved Estimate 2004 LM	Estimate 2005 Lm	Actual Expenditure 2003 Lm	Approved Estimate 2004 LM	Estimate 2005 Lm
House of Representatives							
5176	Information Technology (a)	--	--	57,000			
[Hosting of International Conferences]			30,000				
Total for 2005				57,000			
Ministry for Competitiveness and							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							116,000
(ii) Work-in-progress and new investment							48,000
Total for 2005					---	---	164,000
Ministry of Foreign Affairs							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							96,000
(ii) Work-in-progress and new investment							87,000
Total for 2005					206,023	265,000	183,000
Ministry for the Family and Social							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							240,000
(ii) Work-in-progress and new investment							175,000
Total for 2005					582,310	399,000	415,000
Ministry for Information Technology							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							27,000
(ii) Work-in-progress and new investment							15,000
Sub-Total					---	90,000	42,000
5017	eGovernment Programme	---	400,000	400,000			
Total for 2005				400,000			42,000
Ministry for Justice and Home Affairs							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							595,000
(ii) Work-in-progress and new investment							639,000
Total for 2005					693,251	1,146,000	1,234,000
Ministry of Education, Youth and							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							283,000
(ii) Work-in-progress and new investment							60,000
Sub-Total					502,947	378,000	343,000
7028	Information Technology in Government Schools				727,943	750,000	600,000
7029	Internet in Government Schools				249,470	300,000	200,000
Total for 2005							1,143,000
Ministry of Finance and Economic Affairs							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							988,000
(ii) Work-in-progress and new investment							567,000
Total for 2005					1,795,177	1,728,000	1,555,000
Ministry for Gozo							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							133,000
(ii) Work-in-progress and new investment							69,000
Total for 2005					136,123	206,000	202,000
Ministry of Health, the Elderly and Community Care							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							509,000
(ii) Work-in-progress and new investment							119,000
Sub-Total					862,012	763,000	628,000
7179	Equipment [and Information Technology] and Services - V Italian Protocol				---	1,702,000	1,078,000
Total for 2005							1,706,000
Ministry for Rural Affairs and the Environment							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							127,000
(ii) Work-in-progress and new investment							255,000
Total for 2005					240,296	243,000	382,000
Ministry for Resources and Infrastructure							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							98,000
(ii) Work-in-progress and new investment							68,000
Total for 2005					195,790	126,000	166,000
Ministry for Tourism and Culture							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							42,000
(ii) Work-in-progress and new investment							38,000
Total for 2005					75,101	79,000	80,000
Ministry for Transport and Communications							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							177,000
(ii) Work-in-progress and new investment							69,000
Total					287,590	387,000	246,000
Office of the Prime Minister							
7001	Information Technology						
(i) Infrastructure and application maintenance /support							229,000
(ii) Work-in-progress and new investment							339,000
Sub-total					373,154	690,000	568,000
5427	Microsoft Enterprise Agreement	---	500,000	500,000			
Total for 2005				500,000			568,000
Office of the President							
5176	(a) Information Technology				---	---	14,000
Total for 2005							14,000
TOTALS				957,000			8,100,000
Total Estimate expenditure for Government for 2005 in IT [Recurrent + Capital]							9,057,000

Despite a gross estimated expenditure within the Public Service in excess of Lm 9 M for 2005, no further breakdown of the above budget estimates was made available, and unfortunately there is no way of separating costs related to capital infrastructure on IT, and software applications.

3.6 Needs and Benefits of OSS to Government

The Government of Malta has different software needs than the commercial sector because of its unique mission and environment. Software attributes most important to the commercial sector include the choice of application, ease of use, service and support, price, reliability, and performance. However, more operationally significant attributes for software used across Governments are usually

- reliability,
- long-term supportability,
- security, and
- scalability.

Other attributes of significance to the Government include cost or price, availability and multiple distribution sources, and reputation.

While both the commercial and Government sectors are concerned about price and reliability, most commercial organisation generally have less demanding requirements for security, availability, and long-term supportability. However, these features are becoming more important in the private sector. Availability of software from multiple sources increases competition, resulting in higher quality at low prices. Long-term support is also important to businesses needing to access legacy data. Consequently if an open source product or process is deemed suitable and offers the required functionality, Government can take advantage of this to achieve significant cost savings. However it is important to note that OSS might not necessarily be the best solution and there definitely are potential benefits from using proprietary products or processes; including faster deployment time, improved quality and reliability, reduced development risks, and having a support system already in place.

The following diagram provides an overview of some of the costs and benefits of open Source software.

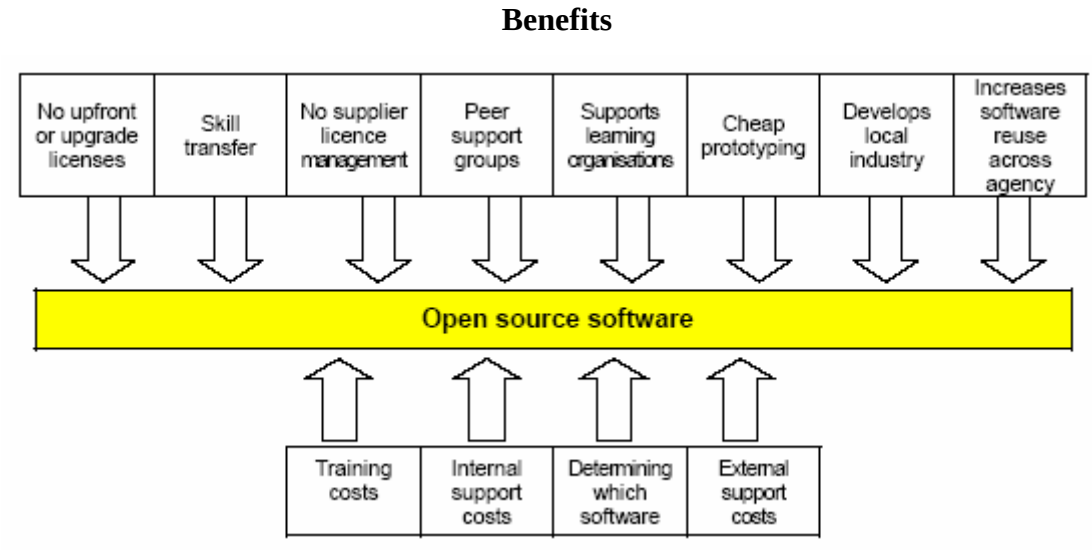

Figure 7: Costs and benefits of opens source software[75]

Other benefits include[76]:

3.6.1 Reduced Reliance on Imports

Most proprietary software developed is mostly owned by organisations in a few countries around the world. The US being a case in point and countries around the world pay huge amounts in software licenses that are imported. The large cost of these software licenses is a huge strain on Government finances and all the money leaves the country. OSS can be obtained at little or no cost and has potential savings on foreign exchange

[75] Simpson R., "*Does open source software have a place in your IT portfolio?*" Gartner; 2003, http://asiapac.gartner.com/events/noie.cfm ; some points gleaned from Department of Education, Government of Western Australia, ICT Open source application environment. (2003)
[76] Wong Kenneth; "*Free/Open Source Software and Governments: A Survey of OSS Initiatives in Governments*"; International Open Source Network; Malaysia. (August 2003). See http://opensource.mimos.my/OSScon2003cd/paper/full_paper/kenneth_wong.pdf

leaving the country, has a positive impact indirectly on employment, local investment base, tax revenue, etc. [77]

3.6.2 Developing Local Industry

Whatever money is spent on OSS in a country usually stays in that country, which leads to the development of local industry. It has been noted that there is a positive correlation between the growth of an OSS developer base and the innovative software capacities of an economy.[78] A report from the International Institute of Infonomics lists three reasons for this:

- Low barriers to entry: OSS is easy to obtain, use and learn from. Proprietary software tends to be much more restrictive, not just in terms of the limited availability of source code, but also because of licensing, patent and copyright limitations. Therefore OSS allows developers to build on existing knowledge and pre-built components, much like basic research.
- OSS is an excellent training system: The open and collaborative nature of OSS allows experts to examine and experiment with software concepts at virtually no direct cost to society. Proprietary systems are usually closed and do not encourage this experimentation and learning.
- OSS as a source of standards: OSS often becomes a *de facto* standard by virtue of its dominance in a particular sector of an industry. By being involved in setting the standards in a particular OSS application, a region can ensure that the standard produced takes into account regional needs and cultural considerations. [79]

3.6.3 National Security Issues

Because proprietary software is normally distributed as a binary, it is difficult to look at how the programme works. While this offers limited protection to the intellectual

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[77] Ghosh, Krieger, Glott, Robles, "*Free/Libre and Open Source Software: Survey and Study. Part 2B: Open Source Software in the Public Sector: Policy within the European Union*", (June 2002). http://www.infonomics.nl/FLOSS/report/FLOSSFinal_2b.pdf

[78] Sayo Phet, Wong Kenneth; "*Free/Open Source Software-A general introduction*". (2004). Retrieved on 08/11/04 http://www.apdip.net/documents/eprimers/foss/intro.pdf

[79] Ibid. Sayo

property of the software maker, it also creates a sense of mistrust and suspicion due to security concerns. This kind of mistrust has been cited as one of China's reasons for its adoption of OSS and one of the reasons other Governments are considering OSS. [80] IN the case of Malta, the Microsoft Enterprise Agreement offers Government access to Microsoft source code.

3.6.4 Open Standards and Vendor Lock-in

Open standards give users flexibility and freedom to change between different software packages, platforms and vendors. Standards by proprietary software lock Government into using software only from one vendor and makes it dependent on the vendor at a stage when all their data are in the vendor's proprietary format, and the costs of converting them to an open standard is prohibitive. Using OSS to avoid vendor lock-in is possible since they almost always use open standards and the source code is available.

3.6.5 Intellectual Property Rights (IPR) and Piracy

The global trade in pirated software of applications is estimated at nearly $29 billion in 2003[81]. Since the internet boom, software firms and media companies have seen a rapid proliferation in piracy of their software as online file sharing networks and "warez" trading sites make it easier to exchange all manner of copyrighted material. Software piracy is estimated to account for losses of $29 billion globally, and accounts for nearly 60 per cent of the $51 billion global software market. The Asia-Pacific region, Eastern Europe and Latin America continued to be the biggest piracy hotspots in the world, with more than half of all software installed on machines there being pirated versions. This problem is similarly widespread in Malta.

Software piracy occurs for many reasons, but one of the major reasons is due to cost. OSS software, as mentioned before, can be distributed with minimal cost. Encouraging the wide usage of OSS software can reduce the piracy rate in a country and therefore ease pressures on a developing nation with regards to compliance with IPR laws.

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[80] Kettman, Steve, "*Germany Denies Microsoft Ban*", Wired News, (March 2001) http://www.wired.com/news/politics/0,1283,42502,00.html

[81] "*Software piracy rate climbs*"; Times of Malta. 8th Jul 2004. See http://technology.timesofmalta.com/article.php?id=1398

3.6.6 Localisation

Countries where English is not commonly spoken can be at a serious disadvantage when it comes to the uptake and dissemination of Information and Computer Technology (ICT). If the country and language are not deemed to be economically important, proprietary software makers may not choose to produce a localised version of their software, thereby increasing the barriers to ICT usage. Users are able to modify OSS to suit the unique requirements of a particular cultural region, regardless of economic size. All said Microsoft introduced Maltese recently in its latest version of Windows XP[82] and is currently developing a badly needed Maltese spell checker. Mandrake Linux has supported a Maltese user interface since 2002.[83]

[82] http://www.microsoft.com/globaldev/DrIntl/faqs/winxp.mspx
[83] http://linux.org.mt/article/mdk-mt#N100AF

CHAPTER FOUR: THE GOVERNMENT BUSINESS CASE

OSS needs to be demonstrated as an economically viable method of supporting software and systems. OSS is not an underground fad; however it will not necessarily become a complete replacement for commercial software. On the other hand, OSS offers opportunities not necessarily available from the commercial sector.

The "Business case analysis model" below was applied to OSS products and processes, and the adapted framework was followed to analyze the viability of OSS products to Government IT managers.

The following figure illustrates the "Business Case Analysis Framework"[84] this paper is using.

[84] Kenwood A. Carolyn; "*A Business Case Study of Open Source Software*"; (October 2001). See http://www.mitre.org/work/tech_papers/tech_papers_01/kenwood_software/kenwood_software.pdf

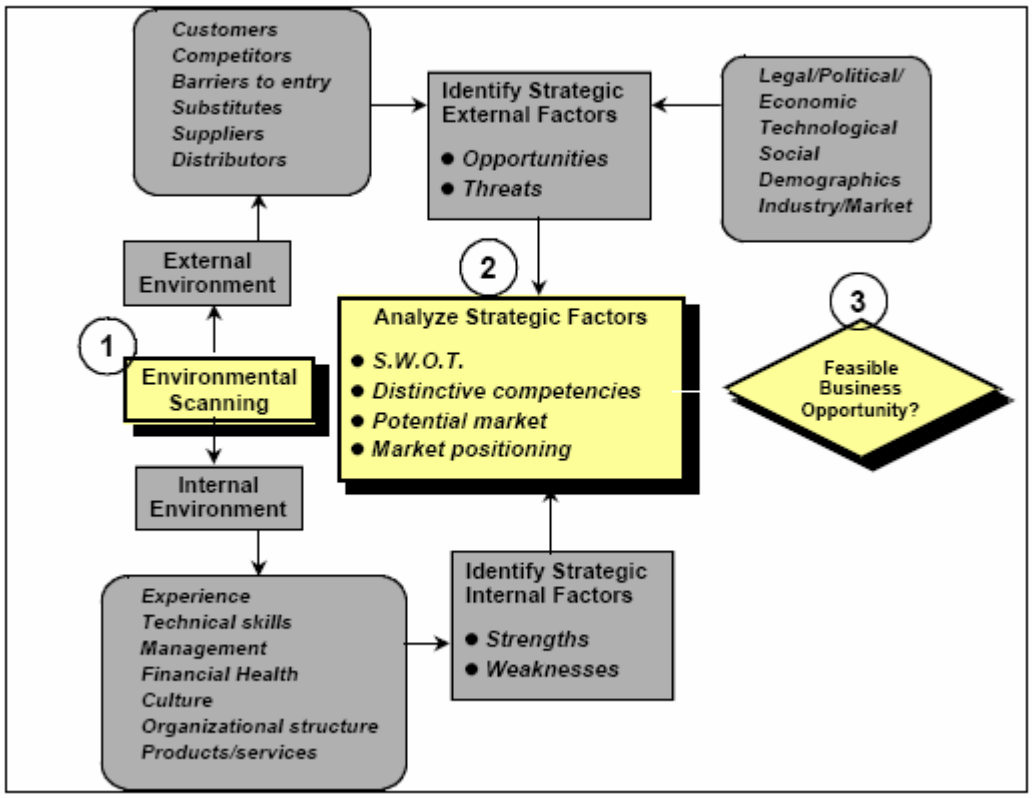

Figure 8. Business Case Analysis Framework Applied to Open Source Products and Processes

This model includes the following two steps followed, as well as the numerous inputs into the process that were utilized throughout the rest of this paper. First, this approach scanned the environment. The external environment was examined, including customers, competitors, barriers to entry, substitutes, suppliers, and distributors. The internal OSS community, including experience, technical skills, management, financial health, culture, organizational structure, and products and services was assessed. Strengths, weaknesses, opportunities and threats (SWOT) were identified from the environmental scanning and integrated to form a SWOT table.

The second step analyzed the major strategic factors identified in the SWOT analysis.

4.1 Environmental Scanning

Environmental scanning is being used in this section to acquire and use of information about events, trends, and relationships affecting Governments external environment, the knowledge of which would assist Public Administration in planning the future course of action with respect of the adoption of Open Source.[85] Environmental scanning is a tool that helps understand the external forces of change that will allow Government to develop an effective position and response towards OSS in the future while avoiding surprises, identifying threats and opportunities, gaining competitive advantage, and improving long and short-term planning[86]. Government's ability to adapt to its outside environment is dependent on knowing and interpreting the external changes that are taking place.[87]

4.1.1 External Environment Scanning

The environmental scanning in this paper is being done through the use of the PEST analysis framework.

A. PEST Analysis

PEST Analysis is a framework that strategy consultants use to scan the external macro-environments in which a firm operates. PEST is an acronym for the following factors:

- Political factors
- Economic factors
- Social factors, and
- Technological factors.

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[85] Aguilar, Francis J.; "*Scanning the Business Environment*". New York: Macmillan Co. (1967) and Wei Choo Chun; *Environmental Scanning as Information Seeking and Organizational Knowing*; PrimaVera Working Paper 2002-01; (January 2002). http://primavera.fee.uva.nl/PDFdocs/2002-01.pdf

[86] Sutton, Howard. *Competitive Intelligence*. New York: The Conference Board. (1988) See http://primavera.fee.uva.nl/PDFdocs/2002-01.pdf

PEST factors play an important role in the value creation opportunities of a strategy. However they are usually beyond the control of the Government and must normally be considered as either threats or opportunities. This section of the paper looks at trends in the outside world which could impact OSS and consequently the Government using the common Social, Technological, Environment, and Political (PEST) model.

Social and Cultural Environment

Social factors include the demographics and cultural factors which affect customer needs and the size of potential markets. Some social factors related to OSS include:

- the world's biggest potential markets are showing a keen interest in open source software[88]
- the open source community continues to generate high-quality, multi-platform and lingual software products
- the cost of providing local language support for increasing numbers of smaller markets cannot be justified by conventional commercial software houses
- PC users expect PCs to have office software installed at the time of purchase ideally without having to pay for it
- the average user's need for office software is being met comfortably by the features of current products
- as email and web browsing become more important in offices, users will expect these applications to be included in the their 'office suites'
- people are becoming more comfortable with online communities as way of working and co-operating around the world
- there is a tendency for employers to specify (e.g.) must have MS-Word skills rather than must have word processing skills which may deter potential users

Technological Environment

OSS use can be expected to grow as its concept becomes more widely understood and accepted. Development of the internet infrastructure is making access to the software

[88] See http://www.vnunet.com/analysis/1156787 (accessed 20/12/2004)

easier and is opening new possibilities for the average person to get involved in OSS 'communities'. Some technological factors related to OSS include:

- the recent bad press towards Microsoft products is raising an awareness of the danger of viruses especially with proprietary software[89]
- as Linux becomes mainstream other open source products like OpenOffice will become more acceptable
- spread of broadband access makes it easier for users to download the product, access web-based support and participate in Community activities. In Malta the rate of internet subscriptions per 100 population reached 21.3, up from 18.3 per 100 population recorded in the same period last year. The number of narrow band and broad band subscriptions reached 53,640 and 32,032 respectively.[90]
- the cost of producing CDs is declining steadily enabling cheap distribution of OSS
- the free distribution of OSS constitutes a formidable barrier to entry for new competitors

Economic Environment

As the proprietary software market matures, price becomes increasingly important as customers treat the product as a commodity[91]

- OSS remains free
- the price of software is becoming an increasing percentage of the purchase price of new computers
- conventional software license fees are unaffordable in many parts of the developing world and Government are being expected to cut costs that can be used elsewhere

[89] "*Target: Microsoft*"; The Economist Global Agenda; (Aug 26th 2003). See http://www.economist.com/agenda/displayStory.cfm?story_id=2003128
[90] http://www.nso.gov.mt/newsreleases/2004/news20504.pdf
[91] Nicholas Carr; *"IT Doesn't Matter"; (*May 2003). See http://www.nicholasgcarr.com/articles/matter.html (accessed 20/12/2004)

- the free license simplifies the spread of OSS across country, trading bloc, or tariff barriers
- Small/Medium Enterprises (SMEs) are an increasingly important sector in developed economies and OSS offers significant cost savings [92]

Political and Legal Environment

Increasing concerns about the way the US acts in world politics and lack of trust in multi-national corporations can help the spread of open source software. The increasingly aggressive protection of IPR by large corporations is designed to cause FUD (Fear, Uncertainty, and Doubt) among potential open source users and contributors, but may prove equally counter productive as the awareness of open source grows.

- Since the 9/11 disaster in New York companies and Governments are concerned about much more about security and using software that is dependent specifically on US companies.
- Open source software allows developing countries to take greater control over their systems and not have to rely on the good intentions of a large, foreign company.
- open source offers an opportunity for countries to grow computer skills among their own workforce
- environmental regulations are increasing pressure to prolong the life of computer equipment in markets like the EU
- Bad publicity from EU and US court cases is tarnishing the reputation of Microsoft. In March 24, 2004, The European Commission fined Microsoft a record $613 million for antitrust violations and ordered it to divulge certain protocols to competitors and to produce a version of Windows that does not include the Windows Media Player. This penalty was later suspended while a

[92] In Malta, there are between 35.000 and 40.000 companies registered in Malta, around 1200 are Small and Medium enterprises that employ more than 10 employees. SMEs employ circa 35% of the workforce; and account for nearly 90% of the industry. Source MFSA http://www.mfsa.org.mt

judge hears Microsoft's appeal. A Dec. 22, 2004 decision rejected Microsoft's appeal of the March penalty.[93]

- license violations, patents, and other IPR issues are being pursued with increasing severity
- there is believed to be a high volume of unlicensed software in use, even in 'developed' markets [94]
- In June 2003, Government signed an Enterprise agreement with Microsoft. Since this agreement impacts tremendously on the viability of OSS within Government it has been tackled separately in the following Section.

4.1.2 Internal Environment Scanning

The internal environmental scanning in this paper is being done through the use of a survey on OSS use in the Public Service of Malta. The gathering of information related to the internal environment has taken place through discussions with all 11 of the 14 Information Management Officers (IMO's)[95]. A questionnaire was presented to each IMO who provided the study with their replies to the questionnaire on the use of OSS on behalf of the Ministry and Departments they represent. (See Annex 2 for a full list of all the IMOs contacted and Annex 3 for a copy of the questionnaire used).

It was also deemed very relevant to this scanning exercise to dedicate a section on the Enterprise Agreement signed between the Government of Malta and Microsoft due to the significant 'implicit' impact it has on the use of OSS across the Public Service.

A. OSS Survey across the Ministries

The survey conducted provided the following results.

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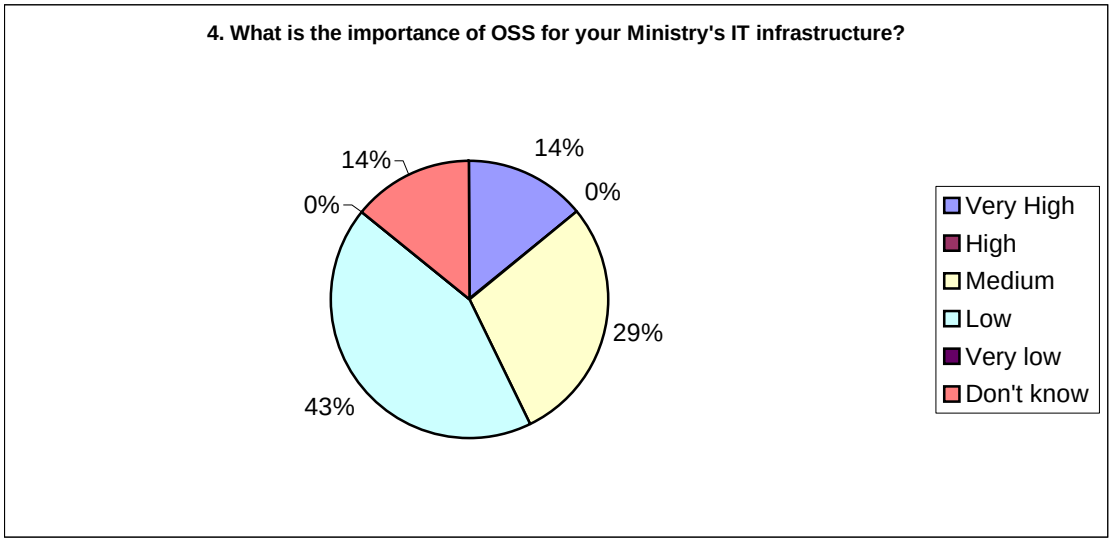
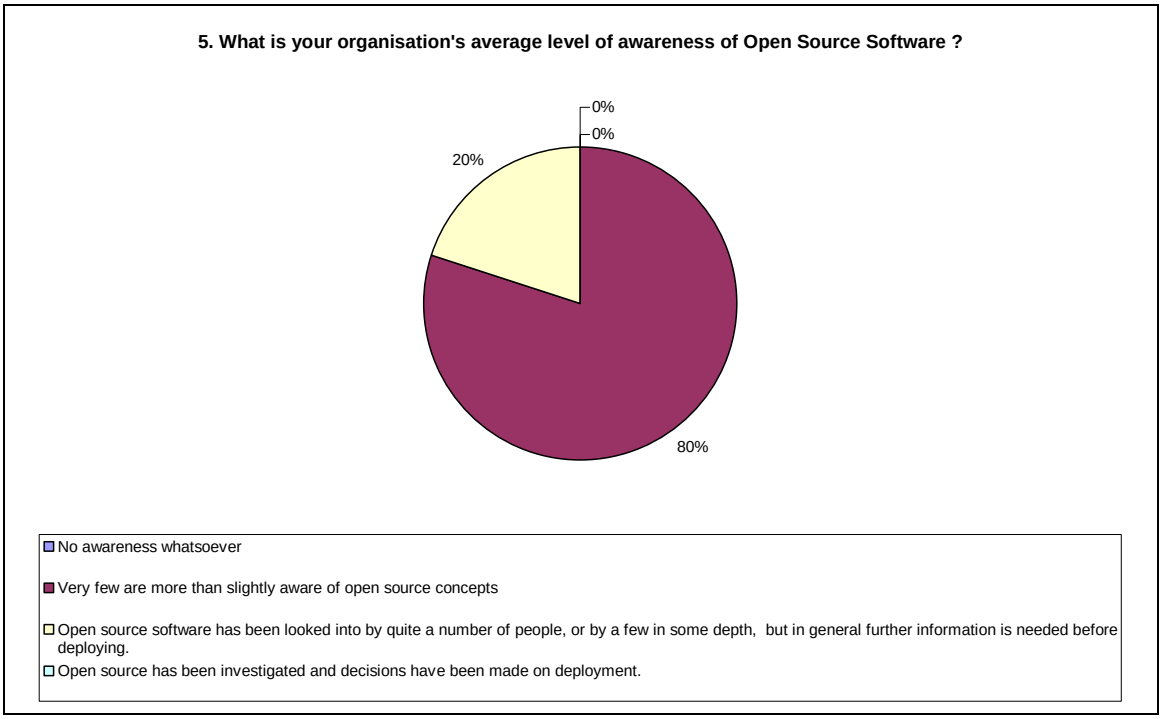
[93] http://en.wikipedia.org/wiki/Microsoft_antitrust_case

[94] "*Software piracy rate climbs*"; Times of Malta. 8th Jul 2004. See http://technology.timesofmalta.com/article.php?id=1398

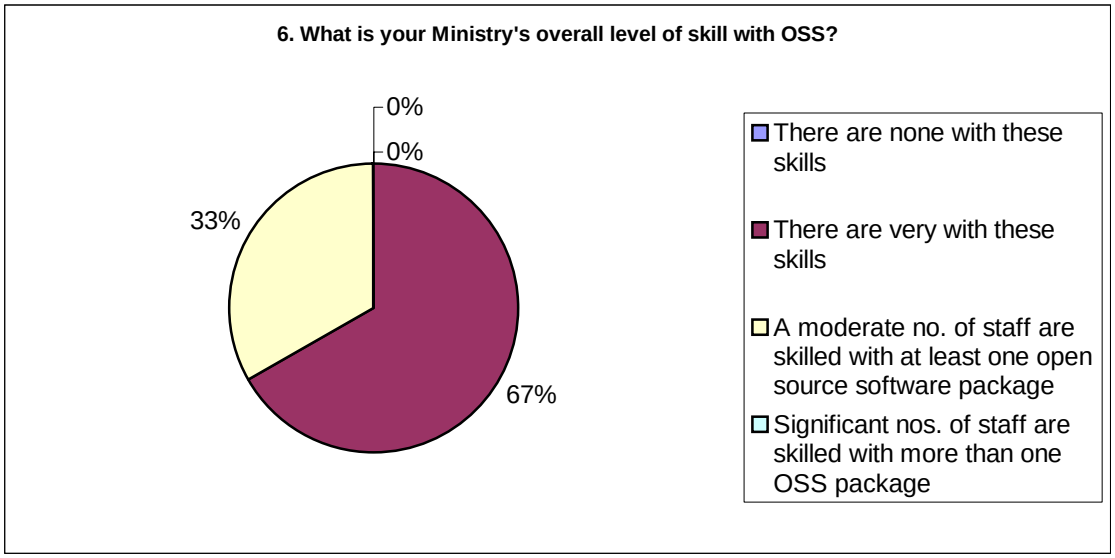
[95] The 1999 - 2001 ISSP for the Public Service proposed the establishment of an Information Management Units (IMU's) functions managed by IMOs to enable for the more effective management and optimisation of the ICT investment within the Public Service generally and the respective ministries specifically.



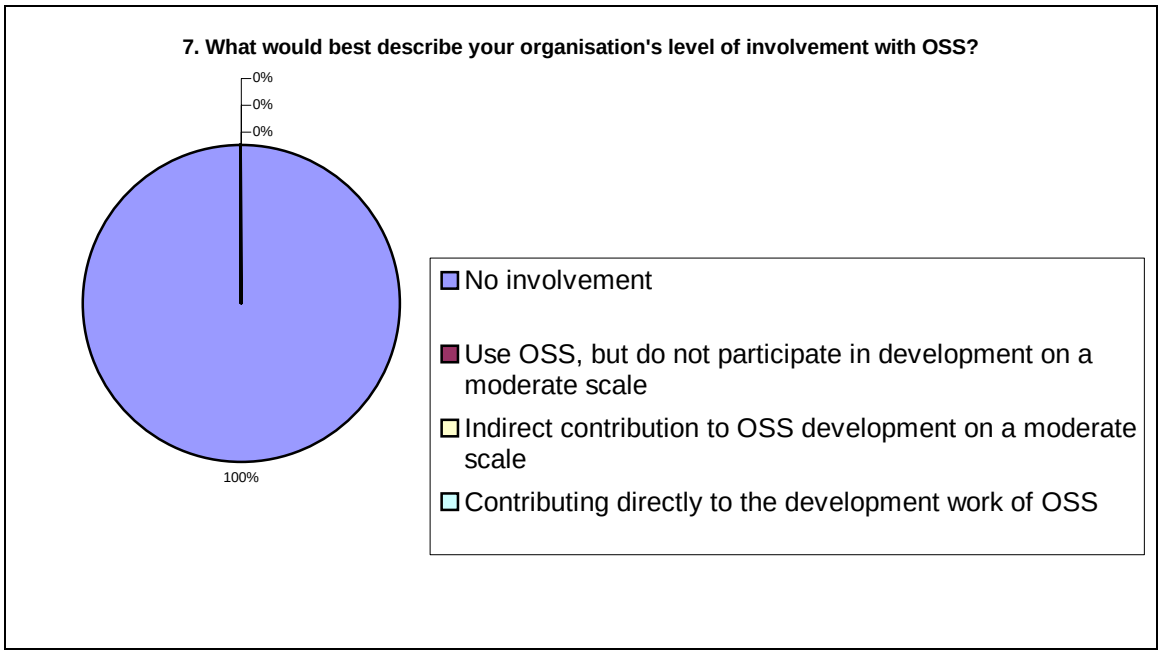
From this question it becomes obvious that there is far from a congruent understanding of the potential role OSS can play in Ministries' IT portfolio, and the majority of IMOs rightly indicate that it does not bear much importance on the current ICT infrastructure of their Ministry.



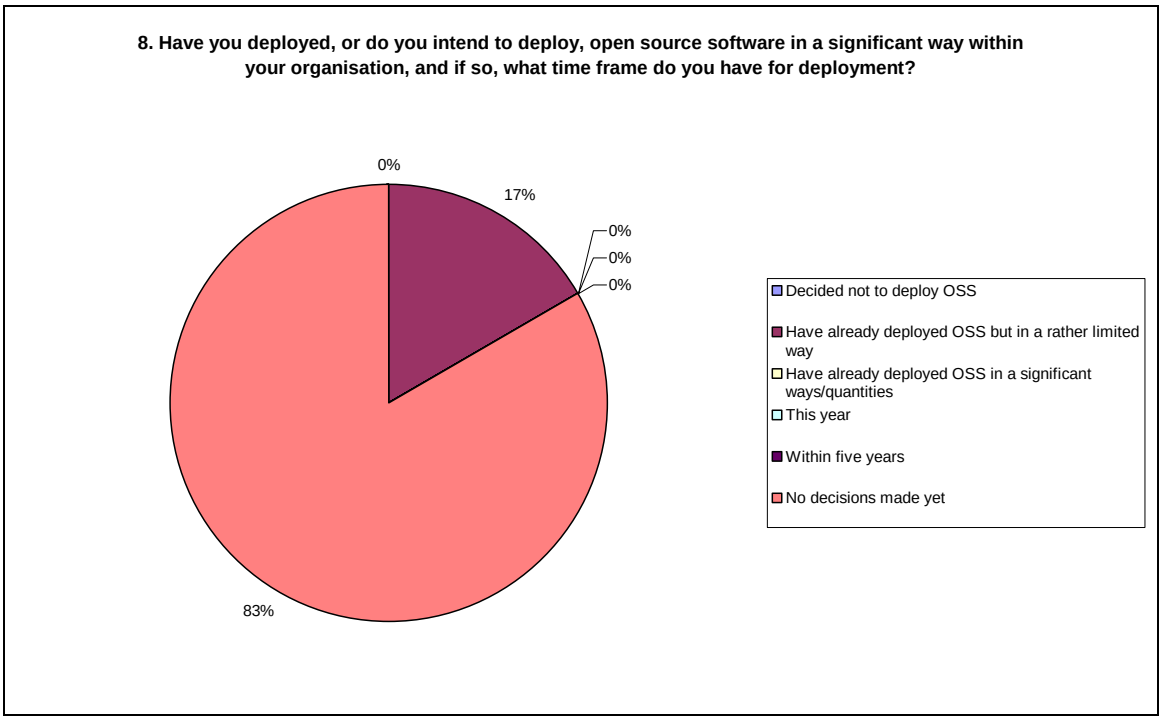
80% of respondents indicated that very few are aware of OSS concepts, and in many cases this applied even to the IMOs themselves.



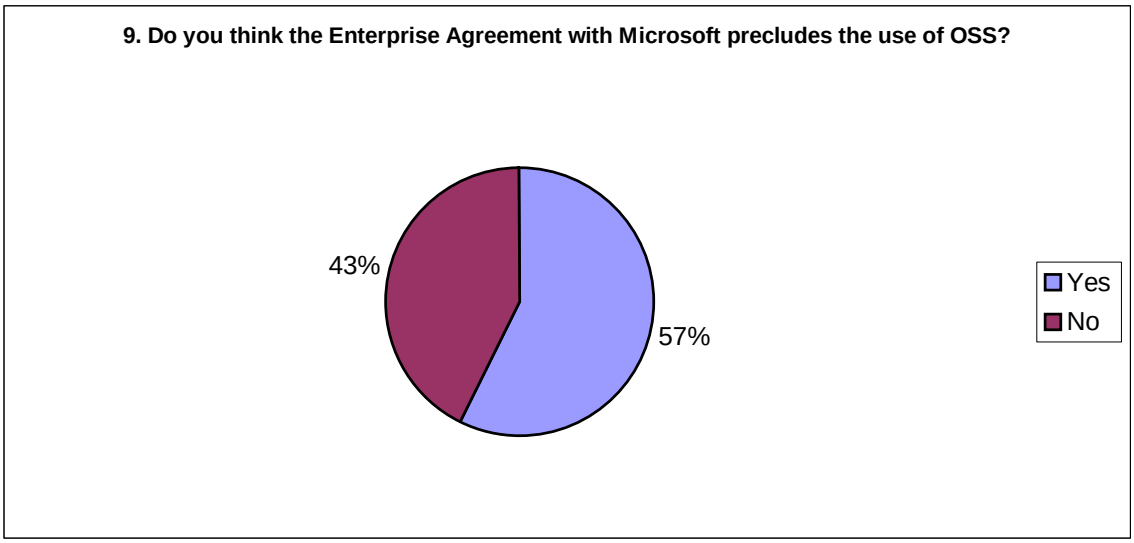
The response to this question clearly indicates that there hardly any in-house skills on OSS within the Ministries, and the 33% that have a moderate number of staff skilled with OSS are in relation to users of PDF creator.



Question 7 confirms the fact that all the Ministries show no involvement with OSS.



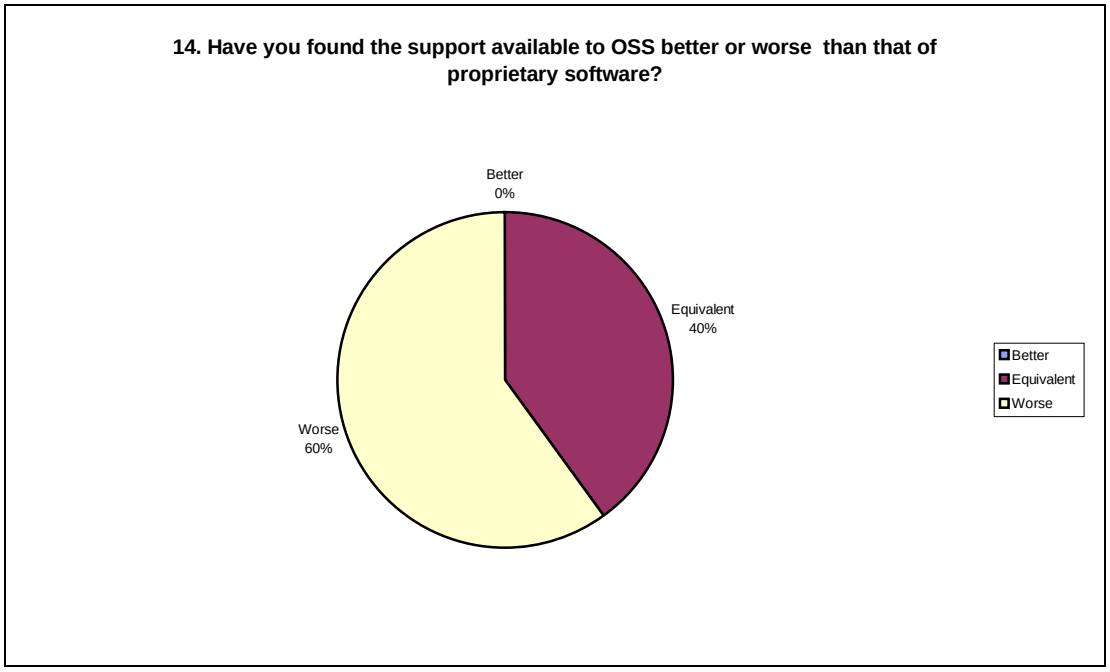
Only 17% of responses indicated that OSS was deployed and this was mostly related to the PDF creator initiative. No decisions have been made yet on other potential OSS deployments. Again question indicates clearly the fact that OSS has hardly been considered as a possible option for certain IT infrastructures.



This question provided an interesting response and it becomes clear here that 57% of

IMOs wrongly believe that the Microsoft Agreement precludes the use of OSS within Government. This is a wrong assumption since the Agreement does not explicitly preclude Government from using OSS solutions but such a reply is probably based on the fact that such an agreement unless backed by a policy initiative towards OSS makes it hard for IMOs to even consider switching away from their current proprietary software.

Questions 10-14 where not relevant to this exercise since none of the ministry have deployed any significant OSS products and consequently skipped these questions requested as suggested in the survey itself.



The few IMOs that were in a position to answer this question made it clear that most of them think that support available to OSS is harder to find and in most cases worse than that for proprietary software. However it is important to note that hardly any of these ministries have actually tried to find support and this was just a generic assumption and biased expectation.

There were a number of themes that emerged collectively from the rest of the survey questions and interviews conducted:

- IMOs understand the importance of reducing TCO and how licensing contributes to this, but are likely not to accept a reduction in IT performance (e.g. uptime, response times) in exchange for cost reduction.
- Therefore OSS adoption will not only be driven by cost reduction, but also maintaining, if not exceeding existing levels of IT performance.
- The overall perception of the concept of OSS is positively received, but IMOs do not seem interested in just buying the philosophy, but mostly the technology which is proven to help them run their operations.
- There is not a strong understanding amongst IMOs of the Open Source business model and the varying license terms available.
- At present OSS is simply not being used and will continue not to be used until they are instructed otherwise though a top-down approach.
- Perceptions amongst OSS users and non-users differ in that users have a better grasp of the cost and improved uptime benefits of OSS, although conversely have more concerns about support, based on their previous experiences of obtaining it. The concerns of IMOs are unfortunately based on FUD, and around the lack of track record and credibility of OSS. It seemed like most of them adhere to a principal that implies that if something is working fine, why change it.
- In order for OSS to be used more strategically, IMOs are waiting for Government to push it down across the Public Service. None of them intend to initiate an OSS initiative unless they are asked to do so.
- The issue of support delivery must be addressed as this is an inhibitor to OSS adoption, especially as OSS users have cited this as a key area of concern.
- Whilst overall cost reduction is clearly the responsibility of Central Government, most IMOs seem detached from the true cost of the IT operations under their responsibility.
- IMOs do not receive any input from Government regarding OSS and its ability to reduce TCO, and have little or no knowledge of this, and do not seem to be interested in pursuing the matter.

B. The Microsoft Enterprise Agreement

In a circular sent by the Office of the Prime Minister on the 13 June 2003[96], all the Public Service was informed that following Government's decision, the Malta Information and Training Ltd on behalf of the Central Information Management Unit (CIMU) entered into an Enterprise Agreement with Microsoft Corporation to cover the Microsoft licenses used within the Public Service. The full letter can be found in Annex Four. This agreement signed between the Maltese Government and Microsoft Corporation should translate into great benefits for our country. This is the second Malta-Microsoft agreement and it is expected that there will be reduced IT expenditure as a result of fixed and lower pricing resulting from large volume discounts complemented by Government efforts to consolidate its software procurement and thus rationalise cost. The full letter can be found in Annex Four.

While it is difficult to quantify the exact total value of the agreement, it is estimated that Microsoft will be investing roughly over Lm20 million in Malta and in the Maltese students over a period of three years. Under the deal, 70,000 Maltese students will also be given access to Microsoft software for a nominal fee.[97]

For a detailed breakdown of Microsoft licenses owned by Government in 2003 please see Annex 5

For a nation that is counting on Information and Communications Technology (ICT) to help address social and economic issues, the Microsoft Enterprise Agreement is very relevant. The initiative will help government to purchase and IT infrastructure that is better and cheaper, while enabling students to learn about computers and computing.

However, offering cheaper software to government and students is not just a 'donation' towards the public good, but it is also good for Microsoft's business and may limit the

[96] OPM Circular No. 29/2003 - Enterprise Agreement with Microsoft Corporation; COF/504/99 OPM Circular No. 29/2003. http://www.cimu.gov.mt/htdocs/content.asp?c=492

[97] http://www.cimu.gov.mt/htdocs/content.asp?

adoption of other kinds of software like OSS in this market. A number of points emerge related to government and students respectively. Software licenses are just part of the cost involved in supporting a Government ICT infrastructure, and the costs of deploying and maintaining such software are significant. As discussed earlier in this paper, Microsoft products have rapid product cycles and quick obsolescence, along with expensive long-term maintenance and support implications.[98] Open source software offers a more affordable and stable option, along with "thin-client" solutions[99] that can be run on older computers. The latest Microsoft products use far more computer resources than the open source alternatives, requiring relatively high-end systems with fast processors, lots of memory and hard disk space. Consequently Government will have to incur significant costs to upgrade any 'dated' systems. Also, students coming from a Microsoft environment will drive a need for Microsoft systems when they graduate and force businesses and government to adopt Microsoft products.

In many ways, the Enterprise Agreement is a smart short-term solution for Malta but, in the long-term, Malta needs to foster its own software development and capabilities. The Government should not be lethargic in facilitating a competitive domestic software development environment. If Malta continues to choose exclusively proprietary software, the costs in the long-term could be higher, and much of the expenditure will go out of the country.

The Maltese Government should focus on open source in its own development activities, its purchases, and fostering a local software market, while at the same time taking advantage of the Enterprise Agreement for its ICT infrastructure and students. There is no reason why Microsoft and open source software cannot coexist in Malta.

The Government, and the general public, should be aware of the implications of such an agreement, and plan wisely to gain the benefits without suffering the consequences. The hope is that Microsoft's move will be a catalyst to draw similar support from other companies, such as offers of hardware, networking equipment and training courses.

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[98] Lemos Robert; "*Is Microsoft losing ground to Linux?*; CNET;News.com; (November 1, 2002) http://msn-cnet.com.com/2100-1001_3-964310.html

[99] A term used for software applications that are designed to be especially small so that the bulk of the data processing occurs on the server.

4.3 SWOT Analysis Applied to Open Source Products and Processes

A SWOT analysis is an instrumental framework in Value Based Management and Strategy Formulation that helps identify the strengths, weaknesses, opportunities and threats for a particular organisation. Strengths and Weaknesses are internal value creating, or vice versa, factors such as assets, skills or resources a company has at its disposal relative to its competitors. Opportunities and Threats are external value creating, or vice versa, factors an organization cannot control, but emerge from either the competitive dynamics of the industry or from demographic, economic, political, technical, social, legal or cultural factors.[100] The following table[101] summarizes the key SWOTS of Open source software that were identified during the environmental scanning.

[100] http://www.valuebasedmanagement.net/methods_swot_analysis.html
[101] "Strategic Marketing Plan 2005 - 2010"; OpenOffice.org. See http://marketing.openoffice.org/strategy/v0.5.pdf

Strengths	Weaknesses
+ OSS is released under an open source license meaning it is **free** to acquire and distribute. + **Reduced costs and less dependency** on imported technology and skills + The licensing structure means OSS can benefit from Community involvement. + OSS origins as a single product that usually creates a tightly-integrated product. + **Reduced security risks** due to extensive review and access to source code. + **Source code is available** + The functionality provided by most OSS is comparable to the market-leading product. + OSS **uses open file formats** natively within the product. + OSS usually offers good file compatibility with other common office products. + Massive **programming expertise available worldwide**. + Research and development covered by volunteer labor + Accepted leadership structure + **Quick version release rate** (fixes, patches) + Parallel debugging/development + Code is more mature	- OSS source code is released under an open source license meaning it can be incorporated into other products within the restrictions of the license. - The **dependence on virtual developers causes uncertainty**. -Some OSS Communities are immature in governance and organisation. -OSS communities have no self-generated finances. -Lack of a professional management structure means that the enthusiasm of volunteers within the Community is not always harnessed effectively. - The size of the code-base makes it difficult for new hackers to master. - OSS does not always include integration with other software (e.g. email, web browser). - OSS does not always have basic compatibility with MS-Office which can hinder the migration of 'power users'. - OSS is **not always user-friendly** - The constraints of working cross-platform can make for a less than perfect 'fit' to individual platforms. -Most OSS installers are not as easy to use as native platform installers. - Most OSS lacks end user 'extras' such as hard copy manuals, templates, clipart, etc. - OSS does not usually come in an OEM pre-installation kit for PC suppliers. - OSS does not have a visible local support structure which is often claimed to be essential for the SME market. - Open source is synonymous with Linux, meaning they do not realise OSS is also available for their platform. - OSS is **considered to be less conventional** and can create Fear, Uncertainty, Doubt (FUD)[102] - OSS can sometimes be hard to originate

[102] 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.

Opportunities	Threats
+ The adoption of Linux is encouraging people to think more about open source. + The open source movement is showing healthy growth worldwide. + There is a range of cross-platform, multi-lingual, open source software. + The arrival of the Microsoft's XP range of products is forcing users onto another round of upgrades. + Microsoft's **increasing efforts in license enforcement** encourage users to seek alternatives, especially users without valid licenses. + The **proliferation of viruses** etc targeted at Microsoft software is encouraging users to look at alternatives. + PCs are now becoming widespread in countries where MS-Office licenses are simply unaffordable[103]. + **Internet connectivity** allows 24x7 monitoring + An Anti-Microsoft sentiment seems to be growing + Anti-competitive practices are under scrutiny now in the Justice Department's antitrust case against Microsoft, and by the EU Commission.	+ The office productivity marketplace is totally **dominated by Microsoft** with its MS-Office range of products. + The **enterprise agreement** with the Government of Malta implicitly precludes OSS unless it is supported by OSS policy. + The open source license regime means anyone can re-brand and redistribute the code under a new name. + **Microsoft can set de-facto industry standards** in areas such as look and feel, file formats. + Microsoft can afford to target specific markets with low cost variants of MS-Office. + Microsoft can use its virtual monopoly of the desktop operating system market to facilitate other products such as MS-Office. + Microsoft's roadmap for MS-Office shows closer integration with other Microsoft products, making migration more difficult. + Developments in patent legislation are creating a climate of 'FUD' around open source. + Users are expecting 'office suites' to include internet software - email, web browser, possibly calendaring. + OSS runs a risk of fragmentation + Threat from lack of version control

Table 2. Key Elements of SWOT Analysis Applied to Open Source Products and Processes

[103] In Vietnam, the cost of MS-Office represents 1.4 years' average local wages - Miguel de Icaza, OOoCon 2003

4.4 Analysis of the main strategic factors for OSS within the Public Service

This section attempts to elaborate on the SWOT of OSS that were not already discussed in sections 2.2 and 2.3 that dealt with the advantages and disadvantages of OSS.

4.4.1 Strengths

Price

The ever-increasing cost of proprietary software remains one of the major factors that are driving users and organizations to look at OSS. The harmonisation of pricing across the EU, driven by the provisions of a single economic market was quoted as a reason for a recent 20% rise in prices of Microsoft software.[104] However thanks to the second Malta-Microsoft agreement signed a few weeks ago, the Maltese Government will not shoulder these increases. Replacing some proprietary software products with OSS software would eliminate the licensing costs of those proprietary products.

Security

One of the most important issues for Government information and technology infrastructures remains security. Governments need to make sure that software they are using does not have any backdoor or malicious codes that would allow unauthorized access to sensitive data. This can only be done properly by looking at the source code which is usually only possible with OSS.

Another concern for Government is surely computer viruses. Viruses are increasing and can disable easily disable a large organisation like Governmental offices, thus impacting the economy.

Such incidents can be prevented by using OSS, which are till now considered to be relatively safer.

[104] "*Higher prices for Microsoft software to be 'in harmony' with the EU*"; Times of Malta. See http://technology.timesofmalta.com/article.php?id=1397

Massive Programming Expertise

Linux has a massive pool of programming expertise, and estimates suggest that there are over 120,000 programmers worldwide.[105] Linux developers are distributed internationally, and many foreigners support Linux as a means of reducing US technical domination. Open source development is self-scaling; that is the more valuable a project is, the more programmers will want to join.

Development covered by volunteer labor

Research and Development efforts in OSS are covered by volunteer labor that is worth about two billion dollars.[106] Programmers contribute to OSS code on the side, as a hobby or personal interest. Developers are motivated to contribute their time and without monetary reimbursement. They sometimes fix a bug or customize a programme for their own benefit and therefore for the benefit as others as well. However, as new commercial versions are emerging in the marketplace, this is beginning to change somewhat. OSS distributors often hire paid, full-time developers to improve the code and contribute to the growth of their OSS product.

Quick Release Rate

OSS in many cases releases fixes and patches faster than commercial software. For example, a Linux version released 34 versions in two years.[107]

Open source code

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, OSS will continue to exist. This is mostly due to the fact that since the code is publicly available, the user is not entirely dependent on one organization to maintain and support the software; and the user always has the choice to provide in-house maintenance and support to continue the product's life indefinitely.

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[105] Orzech, Dan, "*Linux and the Saga of Open Source Software*," Datamation; (February 1999). See http://hardware.earthweb.com/systems/article.php/608171

[106] Kaminsky, Dan, "*Core Competencies: Why Open Source is the Optimum Economic Paradigm for Software*," (March 2, 1999).

[107] Valloppillil Vinod, and Josh Cohen, Microsoft, "*Linux OS Competitive Analysis*"; Halloween II, (August 11, 1998). http://www.opensource.org/halloween/halloween2.php

4.4.2 Weaknesses

Lack of "Ownership"

Users want accountability and proprietary software offers something more tangible than the "open source process," and appears as more trusted to potential and current customers. Also, unlike OSS, proprietary companies can guarantee backward compatibility and can be sued if the product is not up to standard. There is also concern that open source projects lack a strategic direction.

Less User-Friendly

Although OSS products are working to improve their user-friendliness, its Graphical User Interface (GUI) is weak relative to other software products since they are mostly designed by techies for techies rather than for the non-technical user.

4.4.3 Opportunities

Internet Connectivity

The number and productivity of open source development teams expands with the Internet. The technology of the Internet enables OSS development and support to continue 24 hours a day, 7 days a week around the world. The growth of the internet will continue to expand open source projects by making them accessible to a larger number of people.

Competitive Support Structure

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 withstanding 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 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. [108]

Growing increasing Support

Anti-Microsoft sentiment is ever-growing, particularly throughout the open source community. Open source is often regarded as the only real solution to vendor lock-in and monopolistic practices.[109]

4.4.4 Threats

Risk of Fragmentation

Risk of fragmentation of the code base, or "*code forking*", occurs when several different versions of an OSS project's code base evolve.[110]This can occur when developers try to create alternative means for their code to play a more significant role than achieved in the original product code. Commercial UNIX implementations like SCO, Solaris and IRIX are examples of fragmented software. However, the Linux kernel code has not yet been forked, and the small amount of fragmentation that one finds between different Linux distributions is good because it allows them to cater to different segments. Users benefit by choosing a Linux distribution that best meets their needs.

Lack of Compatible Applications

The number of applications written for Linux is growing at a disproportionate rate compared to that of other mainstream operating systems. Because applications are so important to companies, many typically select the applications that meet their requirements and then select the operating system that best supports those applications. The more popular the application, the more users will already be trained for that application. So either potential Linux users need to be convinced that they can find software that is comparable to the proprietary applications they use or the required applications must be ported[111] to Linux.

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[108] Gillen, Al, and Dan Kusnetzky, "*Linux Overview: Understanding the Linux Market Model,*" IDC, (February 2000).
[109] Jordan, Peter, "*Nibbling Away at UNIX,*" VARBusiness, (January 14, 2000).
[110] [110] "*Use of Free and Open source Software (OSS) in the U.S. Department of Defense*", Mitre Corporation; (2 January, 2003), http://www.egovos.org/pdf/dodOSS.pdf
[111] Rewriting or modifying an existing sofware to run on a different system, language, or platform.

Need for Version Control

Version control can become an issue if the system requires integration and development. The developer must make sure that the versions to be integrated are compatible.

Trained Staff

This can be considered both an opportunity and a threat. It is an opportunity because recent IT university graduates are skilled with OSS, having used it as a learning tool in school. Researchers also commonly use OSS because of its wide availability. However, it is a weakness when the current skill base within an organisation is not trained in using OSS and are resistant to change to this 'new mindset'.[112]

4.5 Total Cost of Ownership (TCO)

Total Cost of Ownership (TCO) is a concept by which all costs associated with a capital purchase over a given time period are accounted for in the value assessment. It can also be thought of as the cost of owning and operating an existing asset at a given point in time. Both are useful in optimizing asset ownership.

OSS software has many cost advantages in various categories that result a cheaper TCO in many cases for most organisations. However, TCO is extremely sensitive to the set of assumptions you make and what has a smaller TCO depends on your needs and your environment. Costs and benefits are influenced by the platform environment, operating needs, and mission objectives. [113] First, identify what the requirements are, including the types of applications. You must then determine the architectural options that meet these requirements. Then, to determine TCO you must identify all the important cost drivers and estimate their costs before making software purchasing decisions. A MITRE report[114]

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[112] Zuliani Paolo; "*An Experience of Transition to Open Source Software in Local Authorities*". Presented at the E-Challenges 2004 conference, 27 October 2004 http://www.cospa-project.org/Assets/resources/eChallenges%20e2004%20Zuliani.ppt

[113] Wheeler A. David; "Why Open Source Software / Free Software (OSS/FS, FLOSS, or FOSS)? Look at the Numbers!"; (January 15, 2005) http://www.dwheeler.com/oss_fs_why.html#tco

[114] "*Use of Free and Open source Software (OSS) in the U.S. Department of Defense*", Mitre Corporation; (2 January, 2003), http://www.egovos.org/pdf/dodOSS.pdf

developed a complete taxonomy of TCO factors that are believed as the most important for evaluating the costs driving OSS.

Direct Costs		
Software and Hardware		
Software		
	Purchase price	
	Upgrades and additions	
	Intellectual property/licensing fees	
Hardware		
	Purchase price	
	Upgrades and additions	
Support Costs	Internal	
	Installation and set-up	
	Maintenance	
	Troubleshooting	
	Support tools (e.g., books, publications)	
External		
	Installation and set-up	
	Maintenance	
	Troubleshooting	
Staffing Costs		
	Project management	
	Systems engineering/development	
	Systems administration	
		Vendor management
	Other administration	
		Purchasing
		Other
	Training	
De-installation and Disposal		
Indirect Costs		
Support Costs		
	Peer support	
	Casual learning	
	Formal training	
	Application development	
	Futz factor[115]	
Downtime		

Table 2. Cost Element Taxonomy for OSS and Linux

[115] Futz factor is included by GartnerGroup as an indirect cost. GartnerGroup describes this term as the labor expense when the end-user exploits corporate computing assets for his own personal use during productive work hours.

4.5.1 Literature review of TCO of OSS

Other literature cites diverse quantitative data and qualitative opinions on the total cost of ownership and benefits for OSS compared to traditional COTS alternatives. Some of these opinions follow:

1. OSS costs less to acquire initially however the term free does not really apply in the monetary sense, because "free" in "free software" refers to freedom, not price and you will still spend money for paper documentation, support, training, system administration, etc just as you do with proprietary systems. However the actual programmes in OSS distributions can be acquired freely by downloading them in most cases. A study[116] that compared the initial costs of Linux with Windows. Here's a summary of their analysis (in 2001 U.S. dollars):

	Microsoft Solution	OSS (GNU/Linux) Solution	Savings by using GNU/Linux
Company A (50 users)	$69,987	$80	$69,907
Company B (100 users)	$136,734	$80	$136,654
Company C (250 users)	$282,974	$80	$282,894

Table 3: Cost OS comparison

2. Upgrade/maintenance and long-term costs are typically far less for OSS systems. For example, upgrading a Microsoft system will typically cost around half the original purchase. In contrast, a Linux system can be downloaded for free, or simply re-purchased and the single upgrade be used on every system.
3. OSS does not impose license management costs and avoids nearly all licensing litigation risks. Proprietary vendors make money from the sale of licenses, and are

[116] "*Linux vs. Windows: The Bottom Line*"; Cybersource Pty Ltd.; (2001) http://www.cyber.com.au/cyber/about/linux_vs_windows_pricing_comparison.pdf

imposing increasingly complex mechanisms on consumers to manage these licenses. Consequently organisations must keep careful track of license purchases. This means that organisations must impose strict software license tracking processes, purchase costly tracking programmes, and pay employees to keep track of these licenses and perform occasional audits. In contrast, there's no license management or litigation risk in using OSS software.

4. OSS can often use older hardware more efficiently than proprietary systems, yielding smaller hardware costs and sometimes eliminating the need for new hardware.
5. Cybersource's 2002 study[117] found TCO savings of 24% to 34% when using OSS instead of Microsoft's proprietary approach.
6. A "Cost of Ownership Report" [118] by Netproject reported that the TCO with Linux on the desktop was 35% that of Microsoft Windows (a 65% savings).
7. Even Microsoft has admitted that its products are more costly than OSS. For some time Microsoft has tried to convince users that its products are somehow less costly. However, as documented in The Register[119], Microsoft CEO Steve Ballmer in 2002 admitted that Microsoft has not "figured out how to be lower-priced than Linux.

These arguments were elaborated further by The Swedish Agency for Public Management in a report titled "Free and Open Source Software - a feasibility study; Appendix 1: Extensive survey"[120]. The report shows a few examples of migration from proprietary software to OSS. The following conclusions were reached:

Initial costs for 2.000 workplace installations: [121]

[117] "*Linux vs. Windows: Total Cost of Ownership Comparison*". Cybersource. See http://www.cyber.com.au/cyber/about/linux_vs_windows_tco_comparison.pdf
[118] "*Cost of Ownership report*" by Netproject. http://www.netproject.com/opensource/coo.html
[119] "*Ballmer 'fesses up to Linux/Windows cost FUD*"; (July 2002). http://www.theregister.co.uk/2002/07/16/ballmer_fesses_up_to_linux/
[120] "*Free and Open Source Software - a feasibility study; Appendix 1: Extensive survey*"; Statskontoret; (2003) http://www.statskontoret.se/upload/Publikationer/2003/200308A.pdf&e=747

	Software in computer (PC as client)		Server based software (thin client)	
	Microsoft	OSS	Microsoft	OSS
Per workplace Installation €	1 662	1 660	1 249	932
Total million €	**3,32**	**2,50**	**2,72**	**1,86**

Yearly costs for licenses and changeover of hardware for 2.000 workplace installations:

(Thousand €)	**Software in computer (PC as client)**			**Server based software (thin client)**		
	Microsoft upgrade		OSS	Microsoft upgrade		OSS
Upgrade	After 2 yrs	After 6 yrs		After 2 yrs	After 6 yrs	
Per workplace Installation	507	181	193	340	225	106
2.000 installations	**1 014**	**537**	**386**	**679**	**450**	**213**

These figures were reconfirmed in a later study by The Danish Board of Technology in a later report called"*Open Source Software – in digital public administration*".[122]

4.5.2 Cost comparison for Malta

From discussions with the people responsible for the Enterprise Agreement at the Ministry of IT and Investments, it is estimated that the last agreement covers circa 13,000 PCs and is estimated to cost Government around Lm 8 Million over the next five years from 2004-2009.

This Agreement is based on a yearly renewal license model and is costing Government circa 200 US dollars (Lm 71.15) [123] for every PC within the Public Service, and 235 US

[122] "*Open-source software - in e-government Analysis and recommendations drawn up by a working group under the Danish Board of Technology*"; (October 2002)
http://www.tekno.dk/pdf/projekter/p03_opensource_paper_english.pdf
[123] MTL/USD 3.0464 as at 05/01/2005

dollars for each PC in the Public Service. The license includes Software Assurance Agreement[124] that covers the Microsoft operating system XP, Microsoft Office Suite and a Core Access License[125].

Consequently a basic cost comparison on the acquisition factor between Microsoft and an OSS distro[126], like RedHat Desktop selling online at $179 per installation[127], would be roughly as follows:

	Microsoft		**OSS**	
	Per year		**Open license**	
	$	***Lm***	***$***	***Lm***
OS & Desktop				
1 unit	235	71.15	179	**58.88**
13000	2.600.000	1.004.934	780.000	**765.460**
Over 5 years	13.000.000	**5.024.670**	**-**	**765.460**

Potential savings on licensing alone using OSS over 5 years: Lm 4.259.210

Please note that the above estimates do not include any of the cost elements identified in the taxonomy in the section above, and refer to the basic licensing costs alone. A case-by-case analysis would be necessary in order to quantify other relevant costs. Costs for Microsoft server licenses where not possible to obtain due to the confidential nature of the Agreement, however it is fair to assume that since current expenditure on the Microsoft OS and desktop suites are in the region of Lm 5 M out of a total expenditure of Lm 8M over 5 years, an estimated Lm 3M are expected to be spent on Microsoft server and database licenses over the 5 years.

[124] Software Assurance is an agreement which provides Microsoft volume licensing customers with support and tools to help maintain both server and desktop efficiency and supplies the user with the latest software upgrades and new product versions released during the term of coverage.
[125] The Core CAL includes CALs for Microsoft Windows® Server, Microsoft Exchange Server, Microsoft Systems Management Server, and Microsoft SharePoint™ Portal Server. The Core CAL offers a convenient way to license basic server components across desktop computers.
[126] Distro = distribution
[127] http://www.redhat.com/apps/download/

4.6 Proof of Concept Trials at CIMU

In October 2002, the Central Information Management Unit (CIMU)[128] developed a Proof of Concept project around the Open Desktop concept.[129] Proof of concept projects comprise a sequence of four phases or stages, based on Deming's Methodology: Plan, Do, Check, Act (PDCA) cycle. Although the approach was developed for manufacturing, it has been used by several companies for the introduction of new methodologies and tools in existing mature environments.

1. At the Planning phase the necessary studies, research, knowledge and skills build-up are undertaken along with the identification of the factors that affect the success of the project to be undertaken.
2. The Doing phase is where all aspects of implementation unfold such as; product/technology deployment, user training and data migration.
3. The Checking phase is were support, monitoring and maintenance of the solution happen along with a campaign of fact finding to identify how the concept is unfolding in the environment.
4. At the Act phase, a recommendation is put forward based on the facts collected and any attendant action to issues, initiated in order to close of the project. When live tests are done in live environments this phase ensures that the users involved in the project remain with a satisfactory solution adequate to their business needs.

It is important to note that due to the Microsoft Enterprise agreement signed in July 2003, the CIMU employees responsible for the project were instructed to shelf the proceedings until further notice. Consequently the trial stopped at the Check phase.

The first component to receive attention during this trial was Sun StarOffice 6.0[130] as a replacement for the Microsoft Office suite. This product was chosen over other Open

[128] http://www.cimu.gov.mt
[129] Spiteri Joseph; Open Desktop Proof of Concept report; CIMU http://www.cimu.gov.mt/documents/open_desktop_proof_of_concept_article.pdf
[130] StarOffice software is an affordable alternative in office productivity suites that runs on multiple operating systems, including Solaris Operating Environment, Microsoft Windows, and Linux. http://www.sun.com/software/star/staroffice/6.0/index.xml

Source alternatives due to maturity and support available. A Lab exercise was executed with the intention of identifying the severity of documents compatibility. The intention of the exercise was to get a good notion of the issues related to MS Office documents being imported in StarOffice and reduce see how users worked with StarOffice. The results showed that there are no major issues and as such preparations for deployment were initiated.

The product was initially deployed on the PCs of 18 CIMU employees. A survey was conducted after 1 month of use with the intention of calibrating the remaining implementation. In this survey no particular issues where noted and users were noted as quite satisfied with the suite.

A survey was then conducted following the deployment of StarOffice 6.0 to all members of CIMU. The scope of this survey was to condition any further deployment of the StarOffice 6.0 Suite within the Government of Malta.
The target audience of the questionnaire had 3 months of time, between mid July till end October 2002, in which to use the OSS suite. The Microsoft suite was also available to them, and the users could choose whichever suite they preferred.
Based on the outcome of the survey, no major differences were noticed with respect to proprietary software. The differences noticed were in the command jargon of the software and minor formatting problems. But apart from these, no major issues were encountered, even when it came to cross-platform compatibility between the OSS dimension and the popular Microsoft Office suites. Above all minimal impact on user productivity was measured in the pilot study.

1. **The response to the questionnaire was positive and high**. This must have been the effect of corporate sponsorship, involvement of high-level management and instructions in September 2002 to communicate with the CIMO's in StarOffice format only. Obtaining appropriate levels of support are essential to ensure that the rollout is as smooth as possible. However, it is important that a much more representative number of users is used, ideally in excess of 50 users or more. For the scope of this survey, the

number of people in this survey was sufficient and provided just enough information to form an opinion.

2. According to the usage of the StarOffice Suite during this test, it is obvious that not all modules of the suite where used, and **a few users made regular and repeated use of the suite despite the availability of the Microsoft suite**. However some employees did point out that he/she found it difficult to default to StarOffice with the Microsoft Office suite on his/her desktop.

3. From the responses collected to questions exploring the satisfaction levels reached in meeting the users' expectations, **the overall average indicates that** 55**% were satisfied**.. According to Question 2 the following ratings have been observed:

• 55% are satisfied by the usability (average rating – 3.6)
• 55% are satisfied with the response time (average rating – 3.5)
• 50% are satisfied by the reliability (average rating – 3.7)
• 44% are satisfied by the overall quality (average rating – 3.4)
• 39% are satisfied with the functionality required (average rating – 3.3)

A user found difficulties in using tables. His comments were based on comparing same feature with Microsoft Office and he explained that "*at times StarOffice seems to have a mind of its own and one needs to succumb to it rather than fight it*". It becomes clear that users are trying to negotiate with the functionality in StarOffice using the conventions and manners we are now accustomed too in using Microsoft Office over the years. This shows that **training is extremely important to build new skills and persuade a mind shift**.

4. From the responses collected for the level of satisfaction with **the training references provided - 61% were dissatisfied**. The training reference consisted of two URLs hosted on the SUN website that included a CBT[131] on the use of StarOffice 6.0 and an FAQ. The only reasons we can attribute to this response is that this material was not compatible with the way most of the users involved in the project learn. This kind of training has been deliberately offered on the assumption that there was no need for dedicated training

[131] Computer-based training

and to provide an 'unprepared' environment. This alone justifies that the training product used undergoes a tougher evaluation.

5. According to responses received in respect to support with issues with the suite, **83% were satisfied that solutions were provided**. This is an indication that the product is maintainable and that effectively one part-time employee could handle requests by 18 people.

6. From the responses collected with respect to users' perception whether the software **increased personal productivity during the evaluation – 55% were satisfied**. It has been noted that **those few users that made repeated and regular use of the product actually reported the highest rating in this opinion**.

8. From the questions related to 'functionality', it can be seen that were the software suite has been used, **the most basic application features were identified**.

Most of the features mentioned as missing by the users were actually available but would require more basic training on the use of the suite.

In conclusion, the trials gave very encouraging results and based on the facts collected during the Planning, Doing and Checking phases it was agreed that StarOffice is a viable solution for the Public Service. Further trials on a larger scale where recommended, and CIMU was in the process of initiating a policy recommendation to Government to start migrating gradually basic PC users towards the StarOffice suite. However, this pilot was abandoned in late 2004 due to the Microsoft Enterprise Agreement.

CHAPTER FIVE: RECOMMENDATIONS

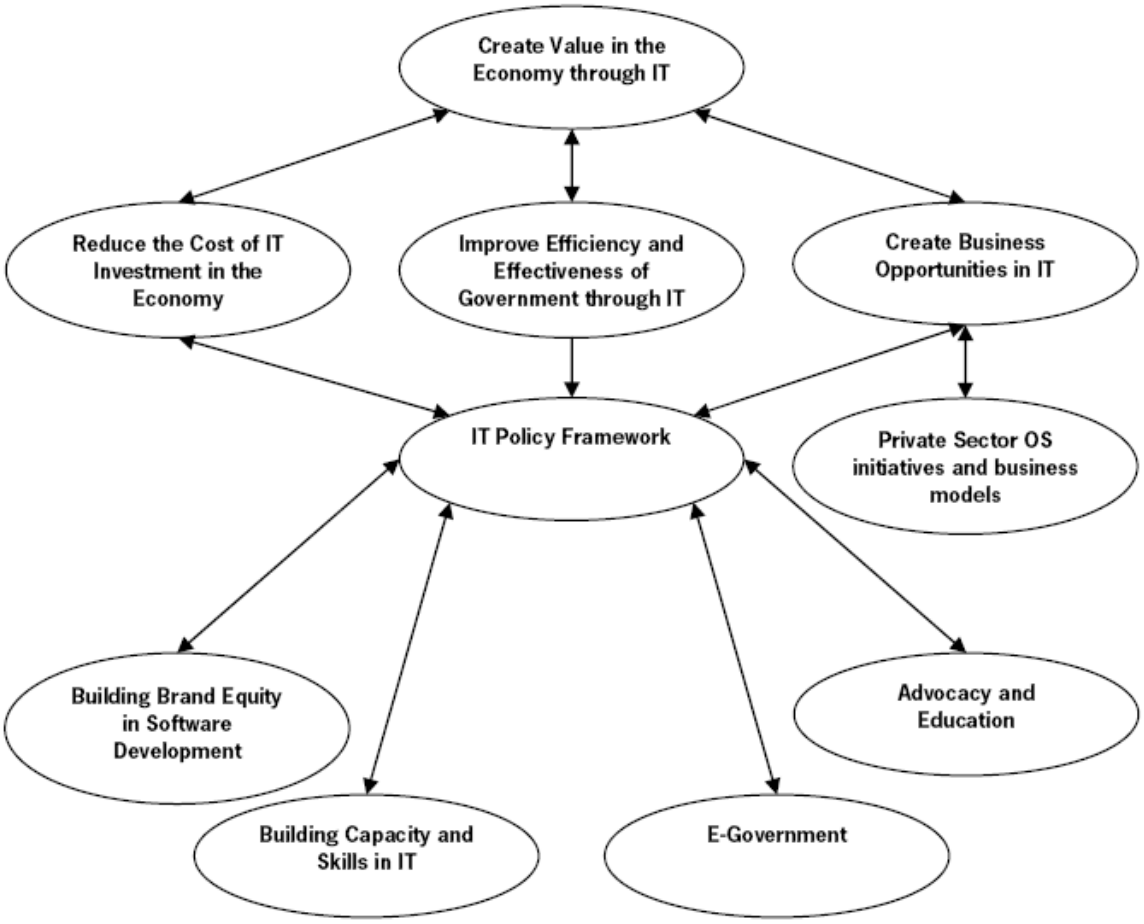
Overall, public sector interest in OSS is intensifying for reasons that include:[132]

- Significantly increased costs imposed by new licensing schemes
- The need to mitigate the risk of domination by a single software platform
- The realization that technology expenditures have not benefited domestic ICT industries
- Lowering the cost of e-government
- Choosing open source products is increasingly "good enough" to address requirements

Different levels of involvement in OSS are possible within Government, ranging from merely using software that is available, to contributing to software development by an OSS community, to making the source code of one's own software freely available. In view of the analysis above we can anticipate a limited support scenario towards OSS within the Government of Malta, and in all probability it makes most sense to ask how Government can benefit from open source software and use it for its own advantage, rather than the other way around. Government needs to invest time and resources to assess the feasibility of open source software in particular areas of interest, and identify some strategic open source projects they can use and perhaps contribute towards. Potential ideas include the current eGovernment, eHealth and Educational Action Plans. But in the meantime, there is no clear reason why Government should not make use of OSS to replace certain mission-critical proprietary software, and initiate a phased deployment of OSS Desktop applications. In the long term, this will give tangible results, especially in the form of greater acceptance of open source software also amongst the public in general, due to the effect that its use in Government would have on society.

[132] "*Open-Source Software Running for Public Office*", Gartner Group, (April 2003)

The strategy map below demonstrates how open source strategic initiatives can serve the value-creating objectives for Government that have been mentioned above[133].



5.1 Proprietary Software or Open Source Software?

As with any software selection process, the decision to adopt OSS products should begin with a "fitness for purpose" test. This should be followed by an assessment of the maturity of the product, the viability of the developer community and the product's market presence. If the results are positive, then particular circumstances such as prohibitive purchase costs or the need for access to the code may dictate the final choice in favor of the OSS product. These two factors in particular are driving OSS deployments

[133] Weerawarana Sanjiva; Weeratunga Jivaka; *"Open Source in Developing Countries"*; Sida; (January 2004). http://www.sida.se/content/1/c6/02/39/55/SIDA3460en_Open%20SourceWEB.pdf

in education, governmental and research institutions, especially in developing countries like Malta. Finally, adequate levels of maintenance and support must be available from internal resources or from third parties such as commercial vendors or the community at large.

OSS products are not recommended in contexts that require strong vendor commitments and accountability. Other areas where OSS products are weak relate to the availability of management tools, GUI interfaces and support from established systems integrators.

A Gartner report[134] provides the following recommendations that provide a basis on which to decide whether to go for an OSS adoption.

OSS should be adopted:

- Where there are clear functionality advantages
- Product maturity, active development and market presence are evident
- Where software costs prohibit alternatives
- Where there is a need to modify or tune the source code
- Where there are internal maintenance and support skills or external (commercial or community) resources
- Appropriate licensing terms are in place

When to Consider Proprietary software

- Strong and large selection of management tools required
- Strong vendor commitment of support and accountability required
- Broad systems integration community
- Environment needing high availability and scalability
- Requirements for easy-to-use graphical interfaces
- Need to protect intellectual property
- Need to maintain a competitive advantage

[134] Driver Mark and Weiss George; "*The Future of Linux and Open Source Software*"; Gartner Symposium ITEXPO, (October 2001).

Once you do choose to go for an OSS product, the same Gartner report continues by recommending that users follow these steps:

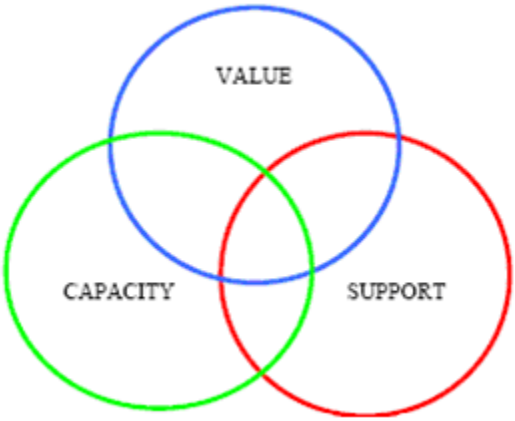
- Determine the role(s) for OSS
- Make an impact study (migration, ROI, legacy acquisition)
- Drive high-level buy-in
- Plan/leverage resources and skills
- Delegate an open-source project leader
- Run pilots and proofs of concept
- Determine vendor accountability

5.2 Success Factors for OSS Adoption

A number of success factors for the implementation of OSS are available to Government[135] and need to be ensured. The recommendations this paper makes in Section are based on the following success factors

1. implementation should produce **value**,
2. **capacity** to implement and maintain has to be adequate,
3. and sufficient **support** for the initiative must be given by all key players. [136]

[135] Moore Mark H; "*Creating Public Value*"; Harvard University Press, 1995
[136] "*Using open source software in the South African government*", A proposed strategy compiled by the government Information Technology Officers' Council; (January 2003). http://www.oss.gov.za/docs/OSS_Strategy_v3.pdf



The VCS Business Case Model

Value offered by OSS has been examined extensively for many countries and potentially for Malta. There is no doubt that under the right circumstances OSS can offer value to the Maltese Government and citizens. Economic value includes contributions to greater efficiency, saving of foreign currency, possible savings on acquisition, and opportunities to stimulate SME development. From a social perspective value can be derived from such things like wider access to information, or providing an instrument for IT training.
Part of the OSS recommendations are aimed at using analytical tools to judge whether OSS implementation will deliver superior value in the environment in question, thus basing decisions to migrate to OSS on rational argument.
The recommendations include steps to expand and consolidate the **capacity** needed to implement and support OSS solutions. Such support includes the ability to provide information, expert advice and development assistance; while offering training aimed at providing basic skills to all users in an establishment where OSS is implemented, more advanced skills to expert users and in-depth training to developers. Building capacity needs to be an important focus in the immediate future.
Ensuring political **support** is also crucial and an intense campaign is necessary to garner involvement and ownership by policy decision makers. This is also necessary with the Chief Information Management Officers, Department Heads, IT professionals and computer users in general at he various ministries. Support has to be based on knowledge and understanding of OSS, which can generate commitment to implementation.

5.3 Policy recommendations

The recommendations below allow for OSS to be considered by the government without unfairly disadvantaging companies who choose to follow a closed-source model.

- Provide OSS information to key decision makers and demonstrating the advantages and business principles of OSS adoption.
- Provide training for OSS developers and users
- Resume proof-of –concept trials that were initiated and frozen in 2002.
- Do not encourage nor discourage the open-source software development model as a matter of national policy. Open-source and closed-source models both have merits.
- Do not regulate companies' choice of with whom to share source code, except in government contracts where a demonstrated security concern dictates the government having access to source code.
- Actively support “open *standards*” and “open *protocols*.”
- Leverage the strengths of the OSS model in government-sponsored research environments
- Make government purchasing decisions based on:
- Product's suitability for the required task
- Product's ability to communicate using open standards
- Company's ability to support its software
- Appropriate rules for accountability should be sought to ensure the proper use of public money in the purchase of Government’s ICT infrastructure
- Provision of services for the organization and dissemination of information related to open source. This would be very useful, since currently there is no point of aggregation for general interest software, special interest software, and documentation for open source projects.
- Funding of open source projects, including the provision of general facilities for open source development. A low-budget funding scheme like the Research, Technological Development and Innovation National fund should be ameliorated to facilitate the possibility for the funding of small OSS projects. Among other

areas, this funding should promote the development of the missing software elements that can be considered fundamental, and promote the collaboration between European developers involved in OSS projects with Malta.

- Promotion of projects related to documentation, translation and localization of free software. These projects are of paramount importance for the widespread adoption of open source solutions by the public in general, Government and SMEs in particular.
- Ensure the freedom to build free software implementations which can interoperate with proprietary interfaces. The freedom to use inverse engineering techniques to understand proprietary protocols and interfaces is necessary for building free software applications which can interoperate with them.
- Improve the current legal framework so that calls for tenders are open to free software solutions
- Information dissemination can be achieved through presentations, publications, conferences/workshops on OSS.
- Creating a space for experimental implementation of OSS products and the OSS development model, to learn whether OSS can be successful within Government and possibly a wider adoption by the general public;
- Maintaining an OSS website for release of information as well as for stimulating dialogue. A local effort already exists by a local NGO but this should be strengthened [137] and supplemented by a more objective online presence.
- Promotion of training and education on free software products. One of the most important barriers to the adoption of free software is the need of training for users. In many cases, it is difficult to find entities providing training on OSS that are of good quality and affordable.
- Creation of an office to help institutions take advantage of free software. This office would help all local entities in the process of evaluation and development of open source software programmes.
- Specific recommendations of use of free software. A big effort is needed to help all levels of the Public administration to consider open source solutions as valid

[137] Malta Linux User Group http://www.linux.org.mt/

offers. The same could be said in terms of support to small and medium companies willing to benefit from open source. The PDF Creator was such a recommendation that has proved to be useful.

- Research about the economic and social impact of open source software is also necessary. The economic and social impact of open source is still difficult to measure and explain. Research in these areas should be supported by the Government, as a way of developing tools for better allocating resources for maximizing the benefits of open source across Government and the general public.
- Encouraging the participation of entities in the Public Service and private sector to participate in Open Source projects of a transnational nature, through specific R&D funding programmes like the Information Society Technologies programme[138]. This is already happening in Malta through projects like TOSSAD, which is expected to start February 2005.[139] Other interesting opportunities like those offered by COSPA[140] are also available and should be taken advantage of.

5.4 Potential Software for Migration

Open Source solutions have now proved their way in infrastructure deployment over several years and a number of public sector bodies worldwide now use them as a matter of course. This section recommends ideal areas in the Government software stack that can and should be considered for OSS deployment.

5.4.1 ICT Infrastructure

OSS products are particularly relevant to infrastructure requirements like fire walling, DNS services, Internet proxy services, file and print sharing services, primary

[138] http://www.cordis.lu/ist

[139] The TOSSAD project aims at improving the outcomes of the F/OSS communities throughout Europe through supporting the coordination and networking of these communities by means of state-of-the-art studies, national program initiations, usability cases, curriculum development and the development of collaborative information e-bays and web-based groupware. By conducting these actions on an international European level, with inclusion of the ACC and NMS countries, the TOSSAD project will create sufficient momentum for a general acceptance and coordinated boost of F/OSS development.

[140] ?????

and backup domain controllers as well as other forms of deployment like messaging services and groupware. Such OSS packages include Apache, Samba, and PHP, Perl and Python. These are all scripting languages used to great effect on websites. Open Source software proves in practice to be highly secure and robust, with second-to-none conformance to published open standards.

> *"The crucial message from experience of using standards-based infrastructure components is that the outcome is not always the most leading edge functionality, but is coupled with robustness, security and a lack of supplier lock-in."*[141]

Desktop

Open Source desktop software offers one of the easiest and most clear opportunities for the use of OSS within Government. Software like Sun's StarOffice and OpenOffice are available for Open Source platforms and also for Windows. They provide broadly the same functionality and a high degree of compatibility with Microsoft Office, but still have problems with interoperability with the Microsoft standard. The Mozilla web browser has established a degree of popularity and is a very good replacement to Internet Explorer. A number of other products like PDF Creator[142] are also available, and has already been deployed informally across the Public Service. A phased and gradual implementation of StarOffice is now possible, especially in offices that have a limited need for application features like call centres, etc.

Databases

Open Source database packages have developed a strong presence. At the entry-level MySQL is extremely popular for intranet and website type of deployments. While MySQL lacks a number of features that make it appear limited when compared with mid-range commercial products, PostgreSQL compares well in comparison and is establishing a good reputation in the database market.

Servers

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[141] Kanellos, Shankland. "*Should Government mandate open source?*", CNET News.com. (12 August 2002) http://zdnet.com.com/2100-1104-949241.html

[142] http://www.cimu.gov.mt/htdocs/content.asp?c=735

Linux is probably by the most popular deployment platform for most Open Source software solutions, and particularly relevant to the Server environment due to its robustness and scalability.

5.6 Conclusion

Open source software is becoming one of the most interesting software areas of the information technology landscape within Government, generating a level both from the private sector, but especially from Governments across Europe. However, as comes out clearly in this paper the Government of Malta has not been considering OSS seriously nor encouraging the phenomenon to grow in Malta.

The impact of open source technology is expected to be quite noticeable in the software industry, and in society as a whole. It allows for novel development models, which have already been demonstrated to be especially well suited to efficiently take advantage of the work of developers spread across all corners of the planet. It also enables completely new business models, which are shaping a network of groups and companies based on open source software development. And it has, in general, a very positive impact as an enabler for the creation of new markets and business opportunities.

We have tried to provide to the reader a relatively detailed and as complete as possible introduction to the open source software landscape. We hope to have shown the main characteristics of this technology and shed some light on the economic feasibility of the model. After this background information, we have ended the document with a non-exhaustive list of recommendations to the Government of Malta.

The underlying feeling is that open source software has already started to modify the rules in the information technology industry, and will produce significant changes in years to come. Given these facts, it is clear that if Malta's Public Administration where to adopt open source technologies, as discussed in the above recommendations, it will have a huge competitive advantage; and that society in general can benefit a lot from this early adoption. Malta is in a good position to take early advantage of open source, and it

definitely help Malta get stronger in it ICT aims due to the unique and productive cooperation with other countries necessary for OSS deployment and use.

For a nation that is counting on Information and Communications Technology (ICT) to help address social and economic issues, the Microsoft Enterprise Agreement is very relevant. The initiative will help government to purchase and IT infrastructure that is better and cheaper, while enabling students to learn about computers and computing. However, it may also limit the adoption of other kinds of software like OSS in this market. In many ways, the enterprise Agreement is a smart short-term solution for Malta but, in the long-term Malta needs to foster its own software development and capabilities. The Government should not be lethargic in facilitating a competitive domestic software development environment based on OSS. If Malta continues to choose exclusively proprietary software, the costs in the long-term could be higher, and much of the expenditure will go out of the country. The Maltese Government should focus on open source in its own development activities, its purchases, and fostering a local software market, while at the same time taking advantage of the Enterprise Agreement for its ICT infrastructure and students. There is no reason why Microsoft and open source software cannot coexist in Malta.

Open source is not nameless, faceless, and it's not charity. Nor is it solely a community effort. To move away from proprietary software brings with it issues that have to be considered. These issues include the costs associated with:

- Software transition and migration
- Exit costs from proprietary software contracts
- Expertise
- Cultural change

Annexes

Annex 1: Ministries and Departments in the Public Sector

Office of the Prime Minister **(OPM)**

Public Service

EU Internal Coordination
Planning and Priorities Co-ordination

Information

Internal Audit and Investigations
Central Information Management Unit
Management Efficiency Unit
Government Printing Press

Defense
Armed Forces

Malta Council for Economic and Social Development

Ministry of Finance **(MFIN)**

Finance
Budget Office
The Treasury
Inland Revenue
Indirect Taxation
Customs and Excise
Contracts

Economic Policy

Relations with Central Bank
Financial Regulation

Malta Statistics Authority

Ministry for Justice and Home Affairs **(MJHA)**

Parliamentary Affairs

Courts of Justice
Attorney General's Office

Local Government
Police
Immigration
Airport Security
Correctional Services
Civil Protection

Passports
ID Cards
Citizenship and Expatriate Affairs

Land
Joint Office
Notary to Government
Public Registry
Land Registry
Civil Registration

Ministry of Education, Youth and Employment **(MEYE)**

Education
Higher Education (including MCAST and tourism studies)
Science and Technology Policy
Examinations

Youth
Sport and Sport Complexes

Employment and Training
Industrial and Employment Relations
Occupational Health and Safety
Cooperatives
Libraries and Archives

Ministry for Tourism and Culture **(MTAC)**

Tourism

Culture and the Arts

Cultural Heritage

Theatres and Mediterranean Conference Centre
National Orchestra

Ministry for Competitiveness and Communications **(MCMP)**

Competition Policy
Small Business and the Self-Employed
Trade Services

Consumer Protection
Malta Standards Authority
Intellectual Property

Civil Aviation
Malta Maritime Authority
Malta Communications Authority

Wireless Telegraphy

Ministry for Resources and Infrastructure **(MRES)**

Malta Resources Authority
Oil Exploration

Building Industry Consultative Council
Manufacturing and Servicing
Construction and Maintenance

Public Cleansing

Ministry for Gozo **(MGOZ)**

Gozo Affairs

Ministry of Health, the Elderly and Community Care **(MHEC)**

Health

Elderly and Community Care

Ministry for Investment, Industry and Information Technology **(MIIT)**

Government Investments, including:
- Air Malta p.l.c.
- Maltacom p.l.c.
- Malta Shipyards
- Water Services Corporation

- Enemalta Corporation
- Malta Freeport Corporation
- Public Broadcasting Services

Privatisation

Information and Communications Technology
Data Protection

Investment Promotion
Malta Enterprise

Ministry for Rural Affairs and the Environment **(MRAE)**

Rural Development
Agriculture
Afforestation
Horticulture
Fisheries
Aquaculture
Veterinary Services
Animal Welfare

Environment
Waste Management Strategy Implementation
Malta Environment and Planning Authority

Ministry for Urban Development and Roads **(MUDR)**

Coordination of Urban Development Projects

Malta Transport Authority

Ministry for the Family and Social Solidarity **(MFSS)**

Social Policy

Family Policy
Child Policy

Solidarity Services

Social Security
Social Housing

Equality

Ministry of Foreign Affairs **(MFA)**

Relations with the European Union

Relations with Foreign and Commonwealth Countries
Relations with International Organisations and Institutions

International Economic Relations
External Trade

EU Information

Annex 2: Information Management Officers

Office of the Prime Minister
Position Vacant
Tel.: 22996365

Ministry for the Family and Social Solidarity
Mr. Alan Grima (Acting IMO)
Email: alan.grima@gov.mt
Tel.: 25903304

Ministry of Education, Youth and Employment
Mr. Edward J Caruana
Email: edward.j.caruana@gov.mt
Tel.: 21 231048

Ministry of Finance
Mr. John Spiteri Gingell
Email: john.spiteri-gingell@gov.mt
Tel.: 25998242

Ministry for Tourism and Culture
Mr. Albert Vella
Email: albert.vella@gov.mt
Tel.: 22919117

Ministry for Competitiveness and Communications
Position Vacant
Tel.: 21485100-5

Ministry for Justice and Home Affairs
Mr. Anthony Geraldi
Email: anthony.geraldi@gov.mt
Tel.: 21490713

Ministry for Resources and Infrastructure
Mr. Winston Pirotta
Email: winston.pirotta@gov.mt
Tel.: 22997258

Ministry for Gozo
Mr. Mario Galea
Email: mario.c.galea@gov.mt

Tel.: 21561482

Ministry of Health, the Elderly and Community Care
Mr. Clifford Schembri
Email: clifford.schembri@gov.mt
Tel.: 22992300

Ministry for Investment, Industry and Information Technology
Mr. Joe Mamo
Email: joe.mamo@gov.mt
Tel.: 21244041

Ministry of Foreign Affairs
Position Vacant
Tel.: 21 242191

Ministry for Rural Affairs and the Environment
Mr. George Falzon
Email: george.falzon@gov.mt
Tel.: 2295 2102

Ministry for Urban Development and Roads
Mr. Andrea Stellato
Email: andrea.stellato@gov.mt
Tel.: 2598 2737

Central Information Management Unit
Ms Nathalie Schembri
Email: nathalie.schembri@gov.mt
Tel.: 25992840

Annex 3: Survey on the use of open source software in Malta's public service

SURVEY ON THE USE OF OPEN SOURCE SOFTWARE IN MALTA'S PUBLIC SERVICE

You are kindly asked to fill out the questionnaire below and return via email, fax or snail mail to:

Brian Restall at the Malta Council for Science and Technology; Villa Bighi, Kalkara CSP 12, Malta
Or via email brian.restall@mcst.org.mt

By not later than the 15 December 2004

In case of queries please do not hesitate to get in touch on:
(+356) 2360 2134 Direct Dialing; (+356) 7946 7079 Mobile; (+356)2166 0341 Fax

General Information

1. Name of Ministry: **Number of Departments in the Ministry**

2. Number of separate computer systems that your Ministry provides software and software support for:

3. Number of employees employed by the Ministry

In what follows, the term 'organisation' is used for the entity for which you are providing responses. If you are able to respond on behalf of the whole Ministry or department please do so, even if you have to make rough estimates.

Section 1 _ Open Source Software

4. From your point of view, what is the importance of Open Source Software for your Ministry's IT infrastructure? Is the importance…

☐0 Very high
☐1 High
☐2 Medium
☐3 Low
☐4 Very low
☐5 Don't know

5. What is your organisation's average level of awareness of Open Source Software[143]?

☐0 No awareness whatsoever
☐1 Very few are more than slightly aware of open source concepts.
☐2 Open source software has been looked into by quite a number of people, or by a few in some depth, but in general further information is needed before deploying.
☐3 Open source has been investigated and decisions have been made on deployment.

6. What is your organisation's overall level of skill with open source software?
This question is concerned with skill in using and administering open source software packages and software, and not with the open source software awareness.

☐ 0 There are none with these skills
☐ 1 There are very few with these skills.
☐ 2 A moderate number of staff are skilled with at least one open source software package.
☐ 3 Significant numbers of staff are skilled with more than one open source software package.

7. What would best describe your organisation's level of involvement in open source software?

☐ 0 No involvement
☐ 1 Use open source software, but do not participate in development to any extent.
☐ 2 Indirect contribution to open source software development on a moderate scale., e.g. filing bug reports, project administration, etc
☐ 3 Contributing directly to the development work of open source software projects on a significant scale. (including documentation).

[143] Open Source Software is defined as software which is released under one of the OSI approved licenses. For a more complete definition, see: http://www.opensource.org/docs/definition.php .

8. Have you deployed, or do you intend to deploy, open source software in a significant way within your organisation, and if so, what time frame do you have for deployment:

☐ 0 Decided not to deploy open source software
☐ 1 Have already deployed open source software but in a rather limited way
☐ 2 Have already deployed open source software in significant ways/quantities
☐ 3 This year
☐ 4 Within five years
☐ 5 No decisions made yet

9. Do you think the Government of Malta's Enterprise Agreement with Microsoft Corporation precludes the use of Open Source software use in the public sector?

☐ 0 Yes ☐ 1 No

If you have not deployed open source software, skip to the next section

10. What proportion of software deployed in your organisation is available under an open source license? (by numbers of packages, and by numbers of copies)

11. What proportion of your software budget do you estimate was spent on open source software (including support and maintenance)?

12. The following table is a selection of open source software packages. Please indicate whether you are *Aware* **of each package or have** *Deployed* **any one.**
You may tick more than one

Package	**Aware**	**Deployed**
GNU/Linux (Operating system)	☐	☐
OpenOffice.org (Office package)	☐	☐
PDF Creator	☐	☐
Mozilla/Konqueror/Firefox (Web browsers)	☐	☐
Evolution (Outlook clone)	☐	☐
Octave (Matlab clone)	☐	☐
MySQL/PostgreSQL (Database servers)	☐	☐
Apache (Web server)	☐	☐
Samba (Windows-compatible file sharing)	☐	☐
Gaim (Instant messenger client)	☐	☐
VI/Emacs (Text editors)	☐	☐

13. What benefits has, or could, open source software provide to your organisation?
You may tick more than one

☐ 0 Saving on Total Cost of Ownership (TCO)
☐ 1 Able to modify source for specific purposes
☐ 2 Better response with bug fixes and/or support
☐ 3 Less reliance on a particular vendor
☐ 4 Better interoperability with other products due to open standards
☐ 5 Other:

Open source Software and users' perception

14. On average, have you found the support available for open source software better or worse than that of non-open software?

☐ 0 Better
☐ 1 Equivalent
☐ 2 Worse

15. What sort of problems did you face, or expect to face, when using Open Source software?
You may tick more than one

☐ 0 Migrating to open source
☐ 1 Training staff
☐ 2 Finding skilled programmers/designers
☐ 3 Getting support
☐ 4 Higher costs in the long term
☐ 5 Interoperate with other systems
☐ 6 Maintaining the software
☐ 7 Other, Please specify

16. Have you found, or do you expect, that the maintenance and support demands of open source software are higher than those of proprietary software?

☐ 0 Yes ☐ 1 No

Please feel free to ignore questions 17 and 18 if you feel that you don't have the information or are unwilling to provide it.

17. Please estimate your organisation's expenditure on software licenses in 2004:

18. Please estimate your organisation's expenditure on software support in 2004:

Participation in further studies

19. Name of person who filled this questionnaire

20. Would you be willing to be contacted for participation on further research into this subject?

☐ 0 Yes ☐ 1 No

21. If Yes, please provide contact details for yourself or anyone else that is able to assist:

Annex 4: OPM Circular No. 29/2003 - Enterprise Agreement with Microsoft Corporation

COF/504/99 OPM Circular No. 29/2003

OFFICE OF THE PRIME MINISTER
Auberge de Castille
Valletta CMR 02

13 June 2003

Permanent Secretaries
Directors General
Directors

ENTERPRISE AGREEMENT WITH MICROSOFT CORPORATION

I am pleased to inform you that following Government's decision MITTS Ltd on behalf of CIMU has entered into an Enterprise Agreement with Microsoft Corporation to cover the Microsoft licenses used within the Public Service. In this context the word 'enterprise' means the Public Service and the Agreement is for three years.

The Enterprise Agreement will, on the one hand, place the Public Service at the leading edge of technology, as we can now adopt the new Windows XP platform as standard across the Public Service, and on the other hand, establish a sustainable framework that guarantees authentic Microsoft licenses at prices that are advantageous to Government.

It is pertinent to point out that the Enterprise Agreement covers three categories of personal computers:

- Personal computers and laptops that are classified as Terminals that normally have only the operating system installed and no other Microsoft software.

- Personal computers and laptops that have the operating system and the Office suite installed but are not networked. These are referred to as stand alones.

- Personal computers and laptops that have the operating system, Office suite and client access licenses (CALs) installed and form part of the network infrastructure. These are referred to as networked PCs.

It is now incumbent upon senior managers in Ministries and Departments to take the

necessary action to exploit the Enterprise Agreement for optimum benefit. In this regard, the following is to be noted:

(i) MITTS Ltd has been appointed by CIMU as its agent to manage the implementation of the Enterprise Agreement.

(ii) The implementation process relating to the Enterprise Agreement is complex in terms of magnitude and scale and must not be underestimated. It does not simply imply the change of one operating platform to another but demands migration of data as well as the testing of existing business applications to ensure that they are compatible to the new platform. Where it is relevant and of business value, it may also involve the migration from 16-bit applications. MITTS Ltd has to manage and thus stagger the implementation of this migration; the private sector will be contracted in to fast track, in so far that it is possible, the migration process to ensure an early return on investment. Principles for the migration process are being articulated by CIMU following consultation with MITTS Ltd. These principles will be circulated as instructions to the Information Management Officers (IMOs) in a meeting to be scheduled by CIMU early next week.

(iii) Of particular note amongst the migration principles are the following:

(a)New and existing PCs (including laptops) of Pentium III and IV level, should have their software upgraded to the new XP standard. In undertaking such action for existing PCs, Departments must operate within the migration principles established and through their respective Ministry IMOs reach agreement with MITTS Ltd on a migration plan.

(b)Migration to the new XP standard is not technically feasible in respect of existing PCs that are of Pentium II level and lower. Migration to the new standard would require a PC of at least Pentium III level and therefore the migration should only take place on a business need basis and subject to budget availability.

(iv)Effective from today, Ministries and Departments are directed to procure Microsoft licenses either from MITTS Ltd or from any supplier designated by CIMU as a Trusted Distributor. CIMU in conjunction with MITTS Ltd will explain to the IMOs the new procurement framework.

It is important to underline that in order to reap the maximum benefit from this Agreement, Ministries and Departments are to procure hardware only through the Trusted Distributors. Outside the Enterprise Agreement, Ministries and Departments may have to incur extra costs to upgrade their personal computers and laptops to comply with CIMU standards.

(v)The number of Microsoft licenses and upgrades used by Ministries and Departments during any one year will be referenced, validated and accounted for in accordance with the provisions of the Enterprise Agreement. This reconciliation audit will be conducted every year by the CIMU commencing twelve months after the effective date of the Agreement.

In this respect, accurate and up to date inventory records of the desktop equipment and Microsoft products are to be maintained by the Ministries and Departments, and reported to MITTS Ltd as CIMU's agent in the implementation of this Agreement. The relevant information requirements will be distributed at the information session which is due to be held.

(vi)Funding for the respective Ministry portion of the Enterprise Agreement license as well as the costs relating to the migration process will be financed from the respective Ministry ICT vote. The Budget Office, acting on the recommendation of CIMU, will inform each Ministry of the financial value that will be charged to the said Ministry in 2003. Ministries are to factor in the cost of the Enterprise Agreement when undertaking the 2004 ICT planning process.

It should again be emphasised that the Enterprise Agreement will only make business sense and be cost effective to the Government if Ministries and Departments desist from acquiring Microsoft software outside the parameters of the Enterprise Agreement or outside the procurement principles referred to above.

It should also be noted that future Microsoft software and Microsoft licence upgrades for the operating systems should also only be procured under the provisions of the Enterprise Agreement.

J R Grima
Permanent Secretary, OPM

c.c Information Management Officers [144]

[144] http://www.cimu.gov.mt/htdocs/content.asp?c=492

Annex 5: Microsoft Licences in the Public Service for 2003

Microsoft Licences in the Public Service for 2003

	Version																	
Application	1.2	2	3.1	3.11	3.51	4	6	6.5	7	95	97	98	2000	4.00.2	4.00.3	XP	Ent.	Grand Total
Application Center Srv													3				7	10
Exchange Server													1				2	3
ISA Server													2				2	4
Office Pro									11		577		273		52	868		1781
Office Pro AE											336		79			410		825
Office Std		1					1				1161		950	236	160	1603		4112
Office Std AE											196		253			495		944
Project Std													26					26
Small Business Server													1					1
SMS Server	1	4																5
SQL Svr Dev Edt													2					2
SQL Svr Std								1	1				32				3	37
SQL Svr Std 1 CPU													27					27
Win Adv Server													4					4
Win Pro													1					1
Win Server			17	52									163				2	234
Win NT Server					3	94							9					106
Win NT Server AE						18							73					91
Win										402		98	71			268		839
Win (AE)										113		32				5		150
Windows OS Prof																191		191
Windows OS Prof AE																79		79
Grand Total	1	5	17	52	3	112	1	1	12	515	2270	130	1908	236	212	3277		9472

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