Government Experience with Open Source on the Desktop

Lessons Learnt from Public Sector OSS Deployments

Microsoft

CONTENTS

Foreword

Over the years, Government organisations have deployed open source software on the desktop with the hope of driving down operational costs and to promote better interoperability between systems.

This document details the outcomes of many of these projects and attempts to summarise the findings and learning. The purpose is not to position one type of technology over another. Indeed, the document provides examples of how open source works well with other software implementations. The overriding goal is to demonstrate that a prescriptive decision to pre-select one type of technology over another does not guarantee success – be it economic, organisational, or technical. Indeed, we believe that open source delivers best value when combined with other technologies in mixed infrastructures.

The Government organisations referenced here have learned from experience that technology selection is a *matter of choice* based on fit for purpose and benefit to the citizen and taxpayer – read on to learn why.

Introduction

Public Sector CIOs around the world place enormous emphasis on openness and interoperability; driving value by ensuring that information passes seamlessly and securely between systems regardless of age, vendor or development model.

Open source software (OSS) has been a part of this evolution and is a common piece of the modern heterogeneous IT environment. However, OSS has often proved less successful on the desktop.

In successive waves over the last decade, organisations have tried to prescribe OSS for the desktop in order to cut costs and deliver value. Time and time again, CIOs have found that such prescriptive deployments fail to deliver the expected returns.

Open source – as the Linux and Android operating systems have shown – can be an effective development model and open source solutions have been successful in scenarios like the cloud or some server workloads. However, many of the highly publicised migrations to open source desktops have failed, been abandoned or reversed.

Are there common causes to discover or lessons that could be learned to prevent organisations repeating the errors of the past?

This white paper reviews 30 available cases from every part of the public sector across the world to understand why attempts to mandate or prescribe OSS solutions for the desk-top so often fail to meet expectations.

The paper offers recommendations for those considering future large scale software migration projects so that they are better placed to realise the benefits of open source while avoiding or mitigating the risks.

Time and time again, CIOs have found that prescriptive deployments of OSS fail to deliver the expected returns.

Background

Approaches to IT are evolving. IT environments are typically more complex than in the past. Legacy applications and different generations of hardware have resulted in most organisations today having highly heterogeneous IT environments.

The capability and reach of IT systems have also grown over time so that there are now ever greater levels of interoperability between software, information and people.

Trends and developments like cloud computing, Bring Your Own Device and the new world of work bring great flexibility to organisations even as they place greater demands on the IT department:

- To do more with less
- To improve personal productivity
- To enable new models of working: anytime, anyplace.

Modern productivity suites are closely integrated applications that drive efficiency and enable collaboration and communication. Spreadsheets and word processing packages draw information directly from ERP systems and line of business applications and often feed critical information back into the heart of the system.

> The capability and reach of IT systems have grown over time so that there are now ever greater levels of interoperability between software, information and people.

As CIOs and IT leaders have pursued greater openness and interoperability, they have embraced open source, exploring its potential and deploying OSS solutions where they add value. Why, then, has OSS been less successful on the desktop?

At the beginning of the century, there were a number of highly publicised "migrations" to open source desktops, especially in the public sector. Some of these have been successful; some, even after seven or eight years, remain "in progress" while others have failed, been abandoned or reversed.

The following section looks at seven cases from public sector organisations around the world. It is followed by a summary of a further 23 cases. Together, these illustrate some common themes encountered by attempted OSS desktop migrations and suggest steps that organisations can take to avoid encountering problems.

Case Review

City of Helsinki, Finland

The Finnish capital's administration has approximately 21,000 desktop PCs. In December 2011, the IT department published a report summarising the findings of a comprehensive study into the feasibility of migrating their desktops to OpenOffice[1].

The study consisted of three projects along with a review of other migrations in public sector organisations in Finland and across Europe. The projects were:

- A Workstation project that looked at the IT management issues of deploying OpenOffice to its 21,000 PCs: distribution, administration, updates and user support.
- A Usability project that surveyed users on efficiency and productivity. This project also examined dependencies and interoperability between various software systems.
- A Calculation project that used models established by IT analysts Gartner to determine the true cost of migration.

The city calculated that over a seven year period, a migration would prove 74% more expensive than continuing their existing use of Microsoft Office.

There were so many dependencies between different systems within the administration that the study could not identify even a single department where it would be feasible to migrate to an alternative system.

In publishing the report, Helsinki's CIO Markku Raitio concluded that,

> "There is no rationale to replace the proprietary office suite by another product."

Instead, he felt that greater openness, and greater value, would be achieved by investing in an open data strategy to make more of the city's information publicly available and by supporting the local software sector.

"Instead of changing the office product, we focus on developing the ICT ecosystem by opening up more and more public datasets and engage our external ecosystem to create value to the community. For us, it will pay off more."

Markku Raitio, CIO, City of Helsinki

Primary Issues Encountered	
Cost	🟡
Interoperability	🟡
Productivity	🟡
Skills to Support	

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[1] The original report is available here: http://www.hel.fi/static/public/hela/Kaupunginhallitus/Suomi/Esitys/2012/Halke_2012-01-30_Khs_4_El/C04F5ACC-C298-4DA2-8B0E-A0FC089C0E1F/Liite.pdf. The English translation is available at: http://www.docstoc.com/docs/121215460/Helsinki-Open-Office-Survey-Translation.

Department of Education, Republic of the Philippines

The Department of Education (DepEd)[2] manages 44,200 schools and 23 million students in the Philippines. The department's primary responsibility is "to provide its students with the skills, knowledge and values to become caring, self-reliant, productive and patriotic citizens".

In line with its vision, DepEd has recently prioritised the use of technology in schools, bringing the student to computer ratio down from 25,000:1 to 40:1. 97% of secondary schools now have a computer lab with at least 40 computers.

The project started in 2004[3] and initially DepEd deployed a mix of desktops with about 50% running open source OpenOffice and Linux. The other 50% used Microsoft Office and Windows. The Department expected the open source desktops to be less expensive but found that the costs of deployment, support and system administration were much higher than anticipated. As their IT investment grew, these issues became significant:

> "We received feedback from the school IT administrators that the computers running OpenOffice had more technical issues, to the point that some computers were unusable. ...With both Linux and OpenOffice, IT administrators found it difficult to find support when they had problems." Mari Paul C. Soriano, Director for Technical Services, Department of Education of the Philippines

DepEd also found that teacher and student productivity was being impaired by the open source solution, an important consideration as teachers in the Philippines are typically responsible for creating their own materials. By contrast, those using the commercial solution found it easier to create materials like multi-media presentations that aid learning.

A further concern for DepEd was the preparation of students for the workplace. Estimating that 90% of students would enter a workplace that uses Microsoft Office, DepEd wanted to ensure it was fulfilling its responsibilities.

"For us, the cost to deploy and support computers with OpenOffice and Linux is about 33 per cent more than the cost for Office 2010 and Windows 7."

Mari Paul C. Soriano, Director for Technical Services, Department of Education of the Philippines

Primary Issues Encountered	
Cost	🟡
Interoperability	
Productivity	🟡
Skills to Support	🟡

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[2] See: http://www.deped.gov.ph/
[3] Source: http://www.ischools.ph/blog/2011/11/08/ending-to-start-anew-ischools-project-starts-close-out/

In 2010, DepEd reviewed its desktop strategy and decided to standardise all of its computers for secondary schools on Microsoft Office Professional Plus 2010 and Windows 7[4].

Forsyth County Schools, Georgia, USA

The productivity impact experienced in the Philippines was also a major reason for the decision by Forsyth County Schools to abandon its open source solution.

Forsyth County Schools is a highly regarded school district just north of Atlanta, Georgia. It educates more than 35,000 students across 413 square miles and many of its schools have been named "Georgia Schools of Excellence" by the state's Department of Education. Forsyth County Schools has earned a number of state and national awards for its leadership in technology innovation.

In 2008, faced with tightened budgets, the district decided to deploy OpenOffice on approximately 20,000 computers to reduce software licensing costs. However, the initiative failed to deliver the expected value.

Compatibility problems affected students, teachers and administrators. They also affected students and their parents in the home as they struggled to open documents. These issues included the ability to access pre-existing materials (which frequently required re-formatting), translation of advanced features like macros and the ability to exchange information with stakeholders beyond the schools' systems.

After less than a year, the district took the decision to return to using Microsoft technology, boosting productivity and optimizing the district's technology resources.[5]

> "Students are using the desktop productivity toolset they are most likely to encounter in higher education and the workplace, so they are better prepared for their future.

"Problems with compatibility, which barely registered during our pilot deployment, grew to enormous proportions once we deployed into production ... People were spending 30 to 50 per cent more time than they had in the past to create and modify documents—activities that constitute the staple of the work or school day."

Bailey Mitchell, Chief Information Officer, Forsyth County Schools

Primary Issues Encountered	
Cost	
Interoperability	🟡
Productivity	🟡
Skills to Support	

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[4] Source: http://www.microsoft.com/casestudies/Microsoft-Office-Professional-Plus-2010/Department-of-Education-of-the-Philippines/Department-of-Education-Helps-Prepare-Students-for-Workforce/4000010893

[5] Source: http://www.microsoft.com/casestudies/Microsoft-Office-Professional-Plus-2007/Forsyth-County-Schools/School-District-Scraps-Open-Source-Solution-Boosts-Productivity-by-50-Percent/4000008223

Beaumont Hospital, Dublin, Ireland

Productivity and interoperability between the organisation and its stakeholders – along with the consequent cost of getting those wrong – were important factors for the Beaumont Hospital in Ireland.

One of Ireland's largest hospitals, Beaumont is the principal teaching hospital for the Royal College of Surgeons in Ireland and enjoys close links with Dublin City University.

In 2002, the hospital deployed an OSS desktop solution based on StarOffice, the Skyrix email solution and Zope content management[6]. In 2007, Beaumont took the decision to revert to Microsoft Office, primarily because compatibility of data between the hospital and a range of external organisations had been identified as essential to the hospital's strategy. It was felt that the Microsoft solution addressed this and a number of other issues, such as spreadsheet functionality and presentation quality, in a manner more acceptable to the hospital's extensive user community.

> "Familiarity, functionality and portability are the three big things that moving back to Microsoft gives us. Staff are now able to bring material with them to work on at home, or they might be sending a particular document and they're not having to worry about whether the recipient can open it." Donal Rorke, IT Manager, Beaumont Hospital

Greater familiarity has meant lower training costs and reduced requirement for IT support. Employees are more productive and the use of familiar applications supports flexible and home working[7].

"There is less time spent formatting and fixing things. I'm sure productivity has improved as a result of the staff working with tools with which they are familiar."

Donal Rorke, IT Manager, Beaumont Hospital

Primary Issues Encountered	
Cost	🟡
Interoperability	🟡
Productivity	🟡
Skills to Support	

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[6] Source: https://joinup.ec.europa.eu/elibrary/case/migration-open-source-software-%E2%80%93-beaumont-hospital-dublin-ireland-0

[7] Source: http://www.microsoft.com/ireland/casestudies/content/BeaumontHospital.html

Ministry of Foreign Affairs, Germany

The ability to communicate seamlessly with stakeholders is uniformly and vitally important for public sector organisations.

In 2008, the German Ministry of Foreign Affairs announced that it was migrating all of its 11,000 desktops to Linux and other open source applications[8]. This decision was widely covered in the IT press at the time and was apparently driven by a desire for lower costs[9].

However, in 2011, the ministry cited "urgently needed collaboration features" for its decision to revert to a commercial solution:

> "The ministry and its offices in foreign countries must be able to rely on a fast, frictionless and uncomplicated communication with many a national and foreign administration, organisations and enterprises. Because of the heterogeneous mix of document formats, including Microsoft's wide-spread binary formats, the Foreign Office must continue to support these proprietary formats." Statement by Ministry of Foreign Affairs, Germany

In response to questions in parliament, the ministry further explained that it had also experienced problems with cost and usability[10].

At the same time, the German government wrote that it would continue to support open source software wherever "it is useful and economical"[11].

Primary Issues Encountered	
Cost	🟡
Interoperability	🟡
Productivity	🟡
Skills to Support	

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[8] Source: https://joinup.ec.europa.eu/news/de-foreign-ministry-cost-open-source-desktop-maintenance-far-lowest
[9] Source: http://www.itexaminer.com/german-foreign-ministry-starts-open-source-blitzkreig.aspx
[10] Source: http://www.linux-magazin.de/content/view/full/59695 (in German)
[11] Source: https://joinup.ec.europa.eu/news/de-interoperability-forces-foreign-office-proprietary-desktop

City of Maykop, Republic of Adygea, Russian Federation

Maykop is the capital of the Republic of Adygea, part of the Russian Federation located in south-east Europe.

In 2010, the city administration embarked on a project to reduce costs by migrating to an open source desktop solution. As reported by open.cnews.ru, the project met with a number of problems that caused the administration to abandon the open source desktop but to retain Linux as an important part of its server infrastructure.

At the migration stage, the IT team encountered problems with a lack of Russian language support for migrating to the Linux client. They were also unable to deploy an important line of business application on top of the open source platform.

Document fidelity was a significant issue after the move to OpenOffice raising the risk of data loss and having a negative impact on staff productivity. Documents were frequently rendered incorrectly and with information missing because of incompatibilities between OpenOffice and commercial file formats.

Productivity suffered as users required re-training to use OpenOffice. This increased costs and demand on IT specialists[12]:

> "Having obtained certain experience with OSS, I can say: to get yield, it needs to be chosen just as products of other vendors; you should analyse where and why to use it and the most important thing – you should immediately plan costs for 'free software' as subscriptions to Linux commercial distributions and consultants' work." Sergey Selin, Head of Information Administration, City of Maykop

"Our mistake was that we thought about OSS as a magic wand that would help solve all the problems free of charge."

Sergey Selin, Head of Information Administration, City of Maykop

Primary Issues Encountered	
Cost	🟡
Interoperability	🟡
Productivity	🟡
Skills to Support	🟡

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[12] Source: http://open.cnews.ru/top/2012/04/28/administraciya_maykopa_otkazalas_ot_spo_i_kupila_produkty_microsoft_487474 (in Russian)

The Punjab IT Labs Project, Punjab, Pakistan

The Punjab province is Pakistan's most populous and most developed region. It is home to 90 million people and comprises densely populated cities – like the capital Lahore – and more rural districts.

The Government of Punjab established the Punjab IT Labs Project to give every pupil in the region access to a computer, bridging the digital divide between urban and rural populations. The project has so far established 4,286 IT labs across all 36 districts of Punjab.

In commencing the project, the government evaluated a wide range of alternative options including OpenOffice and Linux. However, they settled on Microsoft's technology because of the level of support available from the existing network of Microsoft partners. Other factors in the decision included:

- Usability of the software
- Broad use by government agencies
- User familiarity.

By using Microsoft virtualisation technology, the project was able to reduce IT costs from US $8 million to US $3 million across its estate of 64,000 desktops. With support from IT partner firms, the project was delivered in just 110 days[13].

Primary Issues Encountered	
Cost	🟡
Interoperability	
Productivity	
Skills to Support	🟡

"We selected Microsoft Office over other options like OpenOffice, because the latter is complex for the user ... Deploying OpenOffice would require us to conduct several training sessions and provide continuous support. We would not cope,"

Sidney Leusson Angulo, Coordinator of Computer Services, Secretaria de Educacion, Municipio de Cali

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[13] Source: http://www.microsoft.com/casestudies/Microsoft-Application-Virtualization/Government-of-the-Punjab/Government-of-the-Punjab-Chooses-Microsoft-Over-OpenOffice.org/4000011205

Further Examples

The following table summarises the above and other examples from public sector organisations around the world that were reviewed in preparing this white paper. It includes a number of cases that have been widely covered in the IT press and which deserve brief comment:

Cities of Birmingham and Bristol, UK

In 2005, the UK government's Office of the Deputy Prime Minister established the Open Source Academy (OSA) with funding of £1.3 million (US $2.1 million). The OSA's remit was to accelerate the adoption of OSS across the UK Public Sector[14] and its members included the councils of Birmingham, Bristol, Cheshire and Shepway along with the National Computing Centre and University of Kent. Birmingham (as the largest metropolitan council in Europe) and Bristol received significant press attention at the time but both encountered problems.

Birmingham had difficulty with available skills and overall cost. Having received £500,000 (US $0.8 million) in funding, and with a target to deploy 1,500 computers, the council succeeded in rolling out only 200 Linux PCs[15].

In 2010, after 5 years of OSS implementation, Bristol City Council announced that it would henceforth adopt a policy of using OSS and commercial software together, based on a business-case analysis of value. It deployed Microsoft Office 2010 and Windows 7 on all council PCs but continues to evaluate OSS as appropriate. Its 2011 evaluation of an OSS email solution encountered security problems[16] but in 2012, the council announced the adoption of a document management system from open source vendor, Alfresco[17].

The OSA project ended in March 2006. Today, all the organisations involved continue to use commercial software solutions predominantly across their organisations.

"The best option for us was a combined infrastructure based on Microsoft but with OSS and IBM".

Sergey Selin, Head of Information Administration, City of Maykop

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[14] Source: http://www.zdnet.com/critical-open-source-initiative-to-crack-public-sector-3039193838/
[15] Source: http://www.zdnet.com/large-public-sector-linux-project-flops-3039284683/
[16] Source: http://www.techweekeurope.co.uk/news/bristol-councils-open-source-push-hits-security-buffers-41091
[17] Source: http://www.computerweekly.com/news/2240161756/Bristol-Council-opts-for-open-source-electronic-document-management

City of Munich, Germany

In 2003, the city administration of Munich announced its decision to migrate its software systems to OSS. The LiMux project, started in 2004, is still in progress and will not be completed until 2013 at the earliest. By January 2012, after 8 years of deployment effort, 15,000 PCs were running OSS applications FireFox, Thunderbird and OpenOfice. The administration aims to have migrated 12,000 PCs to the LiMux version of the Linux operating system by the end of 2012[18], an ongoing project which has yet to be completed nine years after the decision to move to OSS

The city's Schools department, citing demand for "standard software", chose a commercial route and in July 2012, migrated 28,000 desktops initially to Microsoft Windows XP and then to the latest versions, Microsoft Office 2010 and Windows 7[19].

City of Vienna, Austria

In 2005, the city of Vienna announced that it would migrate all of its desktop PCs to OSS using Linux and OpenOffice[20]. However, the city found it difficult to find open source alternatives to critical applications and, in 2009, they announced that Linux and Windows would continue to co-exist across the organisation[21].

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[18] Source: http://www.pcworld.com/article/252921/munich_mayor_says_switch_to_linux_saved_money_reduced_complaints.html
[19] Source: http://www.h-online.com/open/news/item/Munich-school-network-to-be-migrated-to-Windows-XP-1195535.html
[20] Source: http://www.zdnet.com/vienna-to-softly-embrace-linux-3039185440/
[21] Source: http://www.h-online.com/open/news/item/Vienna-Windows-and-Linux-to-coexist-892081.html

Year	Organisation	Primary Issues Encountered			
		Cost	Interoperability	Productivity	Skills to Support
2000	Central Scotland Police, UK[22]		🟡	🟡	🟡
2001	Solothurn Canton, Switzerland[23]	🟡	🟡	🟡	🟡
2002	Asker Municipality, Norway[24]	🟡	🟡	🟡	
2002	Beaumont Hospital, Dublin, Ireland[25]	🟡	🟡	🟡	
2003	Kreis Mettmann, Germany[26]		🟡		
2004	Akershus County, Norway[27]	🟡	🟡	🟡	
2004	City of Bergen, Norway[28]		🟡		
2004	Department of Education, Philippines	🟡		🟡	🟡
2004	City of Munich, Germany[29]		🟡		
2004	London Borough of Newham, UK[30]	🟡	🟡	🟡	
2004	Volgograd Education Committee, Russia[31]	🟡			🟡
2005	City of Barcelona, Spain[32]	🟡	🟡		
2005	City of Birmingham, UK[33]	🟡			🟡
2005	City of Bristol, UK[34]	🟡	🟡	🟡	
2005	Sarpsborg Municipality, Norway[35]	🟡	🟡	🟡	🟡

[22] Source: http://www.microsoft.com/en-us/news/press/2005/aug05/08-11CSPPR.aspx
[23] Source: http://www.h-online.com/open/features/A-crash-landing-for-Linux-1082048.html
[24] Source: http://www.digi.no/869407/asker-gir-opp-openoffice (in Norwegian)
[25] Source: http://www.microsoft.com/ireland/casestudies/content/BeaumontHospital.html
[26] Source: http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?casestudyid=4000006738
[27] Source: http://www.digi.no/860211/ogsaa-akershus-kutter-ut-openoffice (in Norwegian)
[28] Source: http://www.zdnet.co.uk/news/application-development/2006/09/05/pioneering-desktop-linux-project-put-on-ice-39282685/
[29] Source: http://www.h-online.com/open/news/item/LiMux-project-management-We-were-naive-958824.html
[30] Source: http://www.onwindows.com/Articles/London-Borough-of-Newham-supports-modernisation-with-Microsoft/1516/Default.aspx
[31] Source: http://download.microsoft.com/documents/customerevidence/24179_Volgograd.doc
[32] Source: http://www.libertaddigital.com/internet/el-ayuntamiento-de-barcelona-rompe-su-compromiso-y-no-usa-software-libre-porque-es-demasiado-caro-1276306340/ (in Spanish)
[33] Source: http://www.zdnet.co.uk/news/it-strategy/2006/11/13/large-public-sector-linux-project-flops-39284683/
[34] Source: https://www.bristol.gov.uk/committee/2010/ua/ua000/0930_8.pdf
[35] Source: http://referanser.microsoft.no/office/ny-plattform-sparer-millioner/ (in Norwegian)

Year	Organisation	Primary Issues Encountered			
		Cost	Interoperability	Productivity	Skills to Support
2005	City of Vienna, Austria[36]		●		
2006	Ministry of Justice, Belgium[37]	●	●	●	
2007	City of Freiburg, Germany[38]		●		
2007	City of Geneva, Switzerland[39]	●			
2008	Forsyth County Schools, Georgia, USA		●	●	
2008	Ministry of Foreign Affairs, Germany[40]	●	●	●	
2008	Secretaría de Educación de Cali, Colombia[41]		●	●	
2008	State of Terengganu, Malaysia[42]	●	●		
2009	Orange County Public Schools, Florida, USA[43]	●		●	
2010	Kochi Prefecture, Japan[44]	●	●		
2010	City of Maykop, Republic of Adygea	●	●	●	●
2010	City of Reykjavik, Iceland[45]	●	●		●
2011	City of Helsinki, Finland	●	●	●	
2011	Punjab IT Labs Project, Punjab, Pakistan	●			●
2011	Polytechnic of Zagreb, Croatia[46]	●		●	

Table 1 Summary of Primary Issues Encountered in OSS Desktop Deployments

[36] Source: http://www.h-online.com/open/news/item/Vienna-Windows-and-Linux-to-coexist-892081.html

[37] Source: https://joinup.ec.europa.eu/news/be-lack-training-impedes-open-source-pilot-justice-ministry

[38] Source: http://joinup.ec.europa.eu/news/lacking-support-other-administrations-freiburg-ends-use-open-source-office

[39] Source: http://www.20min.ch/ro/news/geneve/story/Le-Municipal-dit-adieu-aux-logiciels-libres-15007488 (in French)

[40] Source: http://www.linux-magazin.de/content/view/full/59695 (in German)

[41] Source: http://www.microsoft.com/latam/educacion/col_casos.aspx

[42] Source: http://www.zdnet.com/malaysias-schools-get-openoffice-org-2062045435/; http://www.microsoft.com/casestudies/-/Terengganu-State-ICT-Unit/Malaysia-ICT-Program-Transforms-Education-and-Local-Economy/4000010021

[43] Source: http://www.microsoft.com/casestudies/Microsoft-Office-2007-Suites/Orange-County-Public-Schools/Large-School-District-Weighs-TCO-of-Microsoft/4000005095

[44] Source: http://www.microsoft.com/casestudies/Microsoft-Office-System/Kochi-Prefecture/Japanese-Prefecture-Government-Chooses-Microsoft-Office-Over-OpenOffice.org/4000007087

[45] Source: http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?CaseStudyID=4000008779

[46] Source: http://www.microsoft.com/casestudies/-/Polytechnic-of-Zagreb/Polytechnic-Modernizes-Communication-and-Collaboration-Platform-to-Save-300-000/4000011013

Findings

These projects all originated from a desire to save money and create value for government and its citizens. However, the overwhelming message from the 30 cases reviewed here is that OSS desktop deployments guarantee neither the savings nor the interoperability that are often the prime aims of such projects.

In many cases, the organisations and the users suffered further from productivity losses and through difficulty in finding and hiring the required skills to support the deployment. These issues further added to the cost burden of the projects.

The cases reviewed failed to deliver because of unanticipated problems. In some cases, those problems were technical – e.g. an inability to connect with vital line of business applications. More often the problems were "business" problems, such as:

- Inability to communicate effectively with stakeholders;
- Productivity losses through lack of training or the need to manage incompatible document formats;
- Difficulty sourcing the skills to support new systems;
- The unforeseen cost of all of these issues along with higher costs of system management or administration.

Generally, the cases reviewed encountered at least two – and sometimes all four – of the following issues:

- Interoperability
- Productivity
- Skills to support
- Cost

> Interoperability – in its broadest sense – was a big issue for organisations whose migrations failed to meet expectations.

OSS alone does not enable interoperability

Desktop systems are no longer "stand-alone". As systems become more citizen-centric, data entered on a web-site by a resident can flow directly to a word-processor produced work order or a departmental spreadsheet. Within government, complex spreadsheet models draw information from, and feed information into, line of business applications while government-sourced open

data is analysed by employees and citizens alike in spreadsheets and databases, pulled into presentations and represented in reports.

Interoperability – in its broadest sense – was a big issue for organisations whose migrations failed to meet expectations.

Sometimes the problem was technical, as for Solothurn, Asker or Maykop (which was unable to run a vital line of business application on its open source platform).

In many cases, the problem was one of communicating and exchanging information with other departments, with citizens, customers, suppliers or other stakeholders. For Germany's Ministry of Foreign Affairs, the need for "fast, frictionless and uncomplicated communication" was the deciding factor in their move back to commercial software in 2011. As long ago as 2000, lack of compatibility with the systems of partner organisations was a deciding factor for Central Scotland Police's move back to commercial solutions.

User productivity is often impeded

An unanticipated loss of productivity – often accompanied by complaints from users – was another common problem. Even organisations that had piloted their open source desktops before full deployment, like Forsyth County Schools, were taken aback by the scale of problems once they went live.

The productivity loss came from several sources. Partly it was related to problems with document, data and application interoperability discussed above but lack of adequate user training was also a cause, as with the Belgian Ministry of Justice. Some organisations wrongly assumed that little or no training would be required when transitioning to a new system. Others failed to budget adequately for on-going training and user support, including the needs of new employees unfamiliar with less common interfaces and functionality.

"People were spending 30 to 50 per cent more time than they had in the past to create and modify documents."

Bailey Mitchell, Chief Information Officer, Forsyth County Schools

Some organisations, like Forsyth Schools, found that even proficient users were less productive when using the open source desktop compared to the Microsoft solution.

Skill shortages can be expensive to resolve

A number of organisations found it difficult to find the required IT skills to complete their migration and to maintain it in a cost-effective manner once it was live.

As DepEd in the Philippines found, IT administrators often encountered problems they could not resolve and finding support was difficult. Similarly, the City of Maykop was unable to find local (Russian) language support for its Linux desktop migration while Reykjavik discovered it would need to import the required skills from Denmark.

For the Punjab IT Labs Project, the easy availability of IT skills from a broad network of Microsoft partner firms was critical to their decision to deploy a Microsoft solution rather OpenOffice.

Unanticipated costs can be significant

In most cases, organisations found that resolving the above issues added to the cost of deploying their OSS desktops.

There are other costs too – such as the on-going cost of support and system administration (e.g. managing security updates) – and many OSS desktop migrations were reversed or abandoned when total costs became much higher than anticipated.

Orange County Schools in Florida avoided disappointment by conducting a thorough investigation into total cost of ownership (TCO) before embarking on a migration. They found that an open source desktop would increase direct costs by nearly 30%.

Sarpsborg Municipality in Norway switched from open source to a Microsoft solution and generated an annual saving of 15 million Kroner (US $2.6 million).

Some organisations, such as the City of Helsinki[47], have taken the view that openness can better be achieved by

> "We are preparing our children to be ready for the workforce and providing them with skills they can use after graduation."
>
> *Mari Paul C. Soriano, Director for Technical Services, Department of Education of the Philippines*

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[47] Source: http://joinup.ec.europa.eu/news/helsinki-aims-open-data-resigns-itself-it-vendor-lock

investing in making public data more open, and in encouraging the local software economy, than on solving all the interoperability challenges that would come with a migration to OpenOffice.

Skills for the future

Almost all the educational organisations studied felt it was important to use and teach the technologies that were prevalent in the workplace or in higher education. Not only does this support the needs of the economy in general but it nurtures the local software economy with future technical skills and future demand.

As Svetlana I Mishatkina, head of the Volgograd Education Committee said:

> "Students need to learn the technologies that are used everywhere in real life."

Where Open Source succeeds

This paper has so far focused on distilling out lessons learned from a large number of publicly known reversals; cases where organisations reversed a large-scale migration towards using open source solutions on the desktop.

However, open source is also used extensively and successfully in a wide range of situations. Often, as with the City of Maykop, success comes from using open source alongside commercial solutions rather than prescribing one model against the other.

This hybrid approach to technology is increasingly popular. IT environments have become more complex and consumerisation of IT requires increased interoperability and data portability across devices and platforms. A few examples include:

Redlands School, Sydney, Australia – Redlands, like many schools around the world uses the OSS learning management system Moodle as a core part of its teaching infrastructure. When looking to create a complete online learning platform, the school used an open source plug-in

"By using open-source and commercial software, we don't have to build everything from the ground up and we get a great ecosystem of tools and support."

David Mariani, Vice President of Engineering, Klout

from Microsoft to link Moodle to Microsoft's Live@edu cloud-based email system[48].

Klout Inc., USA – In an example from the private sector, "big data" pioneer Klout (which helps individuals and organisations measure their online influence[49]) was able to build a business intelligence solution marrying Microsoft's SQL Server with open source Hadoop and Hive to combine robust, proven technologies with their own custom applications[50].

Universidad de Tarija, Bolivia – The university developed an application to deepen their understanding of graduates' employment success. Developing the application using Microsoft .Net, the project team used open source mono.net to run the application on Linux servers:

> "The Microsoft application integration allows us to use free open source libraries, avoiding the use of commercial licenses and maintaining a low cost project for college." Héctor Fernando Lozano Jaramillo, Project Advisor, Universidad de Tarija[51]

Aegis Foundation, Poland – The foundation supports the community of open source developers in Poland. In February 2012, Aegis and Microsoft announced a partnership to develop and promote interoperability, open standards and open data especially with regards to OSS projects running on Microsoft's Azure cloud computing platform[52].

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[48] Source: http://www.techworld.com.au/article/383881/sydney_school_marries_moodle_live_edu/
[49] See: http://klout.com
[50] Source: http://www.microsoft.com/casestudies/Case_Study_Detail.aspx?CaseStudyID=710000000129
[51] Source: http://www.microsoft.com/multicountryamericas/casos/caso_universidad_tarija.aspx
[52] Source: http://www.microsoft.com/poland/centrumprasowe/prasa/12_02/08.aspx (in Polish)

Recommendations

The cases reviewed in this paper cover a period of twelve years from 2000 to 2011.

Throughout this period, the fashion for prescribing wholesale migrations to OSS desktop solutions seems to have come in waves, most notably in 2004-5 and again in 2011-12.

Yet, the problems encountered remain the same.

Open source software, like commercial software, is a development model. Neither good nor bad in itself, OSS is highly successful in some scenarios, less so in others. The important point is to make technology decisions based on clearly understood business need and on objectively calculated business value rather than on the basis of a mandated or prescribed development model.

The following recommendations are intended to help decision-makers across the public sector avoid the common pitfalls, misunderstandings and mistakes of the past and to select the appropriate solution for their particular current and future needs.

Always conduct a holistic needs and cost/benefit review

Like any other business project, it is essential that any IT decisions are based on a comprehensive review of *all* relevant factors. Consider and evaluate everything that may change as a result of a proposal.

Orange County Schools carried out a thorough examination of total cost of ownership (TCO) to evaluate all costs over the full lifecycle of the software alternatives. As well as licence and support costs, they considered the costs of training, document conversion, employee productivity, the cost of writing interfaces to all related applications, the cost of future administration and maintenance across the IT environment and every other cost that would be impacted.

"In evaluating options, directors should seek to ensure effective, efficient, and acceptable use and delivery of IT in support of current and future business objectives."

International Standard for Corporate Governance of Information Technology, ISO/IEC 38500:2008

Similarly, Helsinki's review included studies of technical and user feasibility as well as a comprehensive modelling of costs.

Building a thorough business case beforehand can identify the true, total cost. It can also help to identify issues that would otherwise remain unforeseen; as Reykjavik found when it realised that it would need to hire and transport the necessary skilled personnel from other countries.

This type of comprehensive analysis is not necessarily easy to do but it is vital if costs are to be accurately determined. There are a number of recognised tools and methodologies that can help, such as the WiBe 4.1 Framework[53], originally for the German Ministry of the Interior and now widely applied across Germany at federal, state and municipal level. It has also been used and referenced by the European Union and by public and private sector organisations across the world including: Henkel, T-Mobile, Olivetti and the Government of India[54].

Adopt an IT strategy based on business value

It is essential that decisions to deploy particular technologies are made on a pragmatic – rather than dogmatic – basis. A number of organisations, in seeking to drive best value from their IT budgets, have now adopted such a policy. For example, the IT strategy of the Austrian Justice System states that:

> "The decision between commercial software solutions and open source solutions should be made in the individual concrete case after undertaking a holistic review, taking account of economic aspects."[55]

A similar approach is seen in the report by the Dutch Court of Audit for the Dutch Government[56] which concluded:

> "Regarding the advantages and disadvantages, opportunities and risks of introducing open

"Whether certain advantages and disadvantages, opportunities and risks are applicable in a specific situation can only be determined by studying the conditions in that situation and through specific market research of the available software products and services."

Report of the Dutch Court of Audit

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[53] See: http://www.eu.wibe.de/

[54] Source: http://www.wibe.de/referenzen/referenzen.html

[55] Source: http://www.justiz.gv.at/internet/file/8ab4ac8322985dd501229ce2e2d80091.en.0/it-strategy+of+the+austrian+justice+system+v2.2+2010-06-03.pdf

[56] Source: Open Standards and Open Source Software in Central Government, March 2011, Court of Audit: http://www.courtofaudit.com/english/Publications/Audits/Introductions/2011/03/Open_standards_and_open_source_software_in_central_government

technology, we concluded that there are many but they are not universally applicable. Whether certain advantages and disadvantages, opportunities and risks are applicable in a specific situation can only be determined by studying the conditions in that situation and through specific market research of the available software products and services."

In adopting an international standard for the Corporate Governance of Information Technology (ISO/IEC 38500:2008), the International Standards Organisation highlighted the importance of placing IT "in support of current and future business objectives"[57].

Conclusion

The ultimate conclusion to be drawn from the findings in this paper is that IT decisions must always be driven by business need, on a pragmatic basis, underpinned by a thorough and holistic needs and cost/benefit review.

Open source software is an important piece of today's heterogeneous IT environments and there are many examples of successful integration of open source technologies in Enterprise infrastructures. However, those successes have been driven by the business case: choosing the appropriate solution for the situation, using OSS and commercial software alongside each other where appropriate and not seeking to limit technology options by mandating any particular development model.

Following this paper's recommendations will support the best decision for any given situation:

- Always conduct a holistic needs and cost/benefit review
- Adopt an IT strategy based on business value.

To learn more about Microsoft's approach to openness, interoperability and commitment to open standards visit www.microsoft.com/openness.

"The decision between commercial software solutions and open source solutions should be made in the individual concrete case after undertaking a holistic review, taking account of economic aspects."

IT Strategy of the Austrian Justice System

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[57] Source: http://www.iso.org/iso/catalogue_detail?csnumber=51639