

Declaration of Independence: The LiMux Project in Munich

The German city of Munich is migrating its computers to open source and GNU/Linux, both on desktops and servers. Rather than lowering IT costs, the main motive is the desire for strategic independence from software suppliers. In May 2008, the city released its Wollmux template management system as open source software under the EUPL on the OSOR platform.

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Organisation and political background

The city of Munich is migrating its desktop computers from Windows to GNU/Linux. After preparations began in 2003, the city's basic client , a customised version of Debian GNU/Linux, is being deployed on a growing number of PCs since fall 2006.

The LiMux project puts great emphasis on becoming independent from software suppliers. Florian Schießl, the deputy project coordinator for LiMux, explains: Microsoft has shown us what it means to be dependent on a vendor. Until 2003, the city was using Microsoft Windows NT 4 across the board, and was by and large satisfied. When Microsoft decided to end the support for this operating system, this meant that hardware and important procedures would eventually stop working. It was from this experience of being totally at the mercy of an external party that we wanted to take the road to more independence , Schießl says.

The City commissioned a consultancy to study several solutions, both proprietary and open source, with regard to their cost effectiveness, technical feasibility and strategic implications. The result of this preliminary study phase from 2001-2003 was a tie between a Microsoft-based solution and an open source variety.

The Microsoft solution would have made it necessary to introduce an Active Directory system, which would have meant a strong lock-in and would have caused significant follow-up costs. The total cost for the proprietary solution were calculated to be 35 million Euro, against 37 million Euro for GNU/Linux (both including all costs beyond the solution itself, such as personnel and training costs, over

Quick facts

<i>Project name</i>	LiMux
<i>Sector</i>	Administration
<i>Start date</i>	2001 (the migration itself started in 2005)
<i>End date</i>	2012
<i>Objectives</i>	Strategic independence from software suppliers
<i>Target group</i>	Munich's city administration
<i>Scope</i>	Local
<i>Budget</i>	12.8 million Euro
<i>Funding</i>	Local
<i>Achievements</i>	Migration on track. Nearly 10% of desktops already using the local GNU/Linux client. 60% of desktops using OpenOffice. Efficiency gains through IT consolidation. Innovative template management application Wollmux released under free software license (EUPL).

five years). While the proprietary solution was deemed to be slightly more cost-effective over the full period, the strategic advantage of being free to take its own IT decisions led the city council to decide in favour of the migration to GNU/Linux.

Together with SuSE/Novell and IBM, the city worked out a detailed concept for the migration during 2003 and 2004. During summer 2004, the project was put on hold while a study was conducted to clear up legal insecurities related to software patents. The actual migration has been running since 2005.

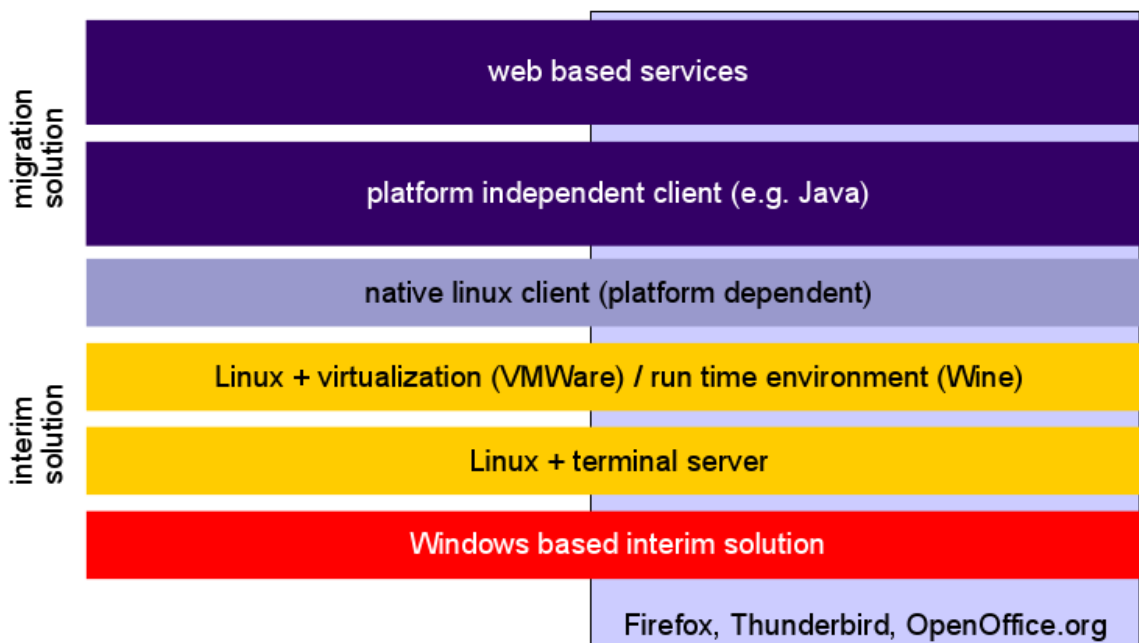
Most parts of the city's administration choose a soft migration, first installing the open source applications Thunderbird, Firefox and OpenOffice on Windows computers. The migration to OpenOffice also introduces a new system for managing templates, called Wollmux. In a second phase, the departments then roll out the GNU/Linux basic client.

The next step, for now taken by the larger departments of the city administration, is to migrate to OpenOffice (again on Windows). This gradual approach keeps the demand for training and support services manageable. Schießl, who is also in charge of public relations for the LiMux project, says that in August 2008, 8500 of the city's 14.000 workplaces are using OpenOffice.

The final step involves replacing the current operating system with the city's Debian-based variety of GNU/Linux. There are currently 1.200 workplaces running this basic client, or almost 10%. Rather than aiming to migrate every single computer in the administration to free software, Schießl says that the goal is 80% + X by 2012. The remaining computers are currently running Windows NT 4 or Windows 2000.

Proprietary software will be used where a migrations is either impossible or not cost-effective. This particularly concerns specialised administrative software packages. Munich uses 300 such programs. The city's preferred solution is to see these applications become platform independent and run them inside a web browser. If this is not possible, the alternatives are to

- run the program on Windows inside a virtual computer, on a GNU/Linux client
- use the Wine emulator to provide a runtime environment
- run the program on a terminal server



LiMux migration scenarios for business applications

If all these varieties are impossible, the application will be run on a Windows system.

According to the migration plan, OpenOffice should be deployed on all workstations by 2009, both on GNU/Linux and Windows. This will also complete the internal move to the ODF document format.

The migration has led to substantial changes in Munich's IT service and support concept. The city "has reinvented the wheel many times" in the past, says Schießl. Each department ran its own IT, using several different Windows clients, and setting up its own support processes.

An example for the inefficiencies that decentralisation has led to is the number of document templates prepared by the city's various departments. In 2006, this was a staggering 13.700 - "almost one for every employee", as Schießl points out.

The migration also offers an opportunity to standardise the city's heterogeneous IT environment. The LiMux project team provides all departments with the same GNU/Linux basic client operating system, which allows for a great number of configuration options. It also handles the software distribution infrastructure. Each department then manages configuration, roll-out and support of the client according to its own schedule. The project team is available for second-level support and modification requests.

Since the project started in 2004, Munich has spent about four million Euro on contracts with several hundred external companies and freelancers. Their services ranged from consultancy for the migration to OpenOffice to classical programming work for the city's Debian-derived GNU/Linux client operating system.

The initial client was designed and customised together with a consortium of the firms [Gonicus](#) and [SoftCon](#). As the city administration builds up its own competencies in this field, more and more of the work is being insourced: "We won't be able to do everything in-house, but the share of work done externally is moving down from perhaps 70% to 30%", Schießl explains.

During the current office migration, the city relies strongly on external help. Once the migration is concluded, most of the support for the running software will be handled internally.

With user trainings, the situation is similar. Initially, external trainers taught employees how to use the various new programs. With time, the city plans to rely more and more on those of its own employees who have become interested in a certain piece of software to run the trainings for their colleagues.

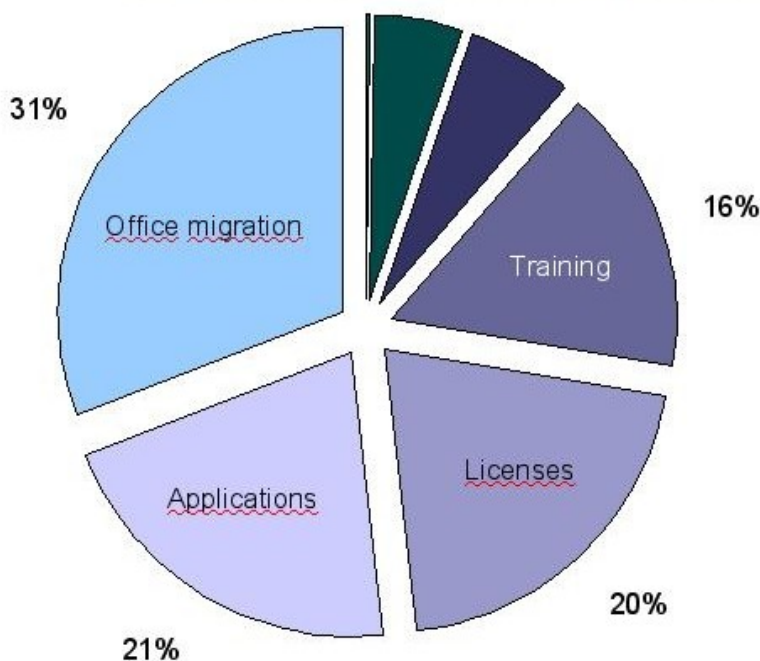
Schießl says that the city has never faced any problems at all in finding support for its IT systems. On the one hand there is the option of building up in-house knowledge and on the other there is a wide array of commercial service providers, most of them small and medium enterprises (SMEs), many of them located in the region of Munich. A special advantage of open source over proprietary software is the large and vibrant community, which is frequently able to solve problems quickly.

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Budget and Funding

Contrary to what is often assumed, cutting costs was not the main reason for the migration. The motivation is independence: "During the project period we're not expecting to save money. But now we're able to decide on our own how we want to spend our IT budget in the long run", explains Schießl. The city wants to judge for itself when and how to update its operating system and applications. It also wants to determine whether its own IT staff should perform the update, or whether an external service provider should be contracted. "Really controlling our costs, being able to decide in each case whether we really want to spend the money or not, was the decisive factor for us", the deputy project coordinator says.

This increased control is expected to reduce IT costs in the long run. But in the mid-term, we need to clean up the sins of the past, and pay the exit costs from a proprietary solution. This means that there aren't any savings over the five-year period we're looking at, Schießl says.



Distribution of budget-effective costs (EUR 12.8 million)

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The budget-effective cost of the LiMux project is 12.8 million Euro over five years. Schießl says that so far, significantly less money has been spent than was planned, since up to now fewer clients were migrated than originally intended.

Trainings, the migration to OpenOffice and the adaptation of specialised administrative software are the top three cost items of the project, being approximately equal in size. If staff time spent in training gets is figured in, then these become the biggest cost item, making up 38% of the project's total cost, which then jumps to 35 million Euro.

So far, the city has spent four million Euro on contracts with external service providers, most or all of them located in Germany (often in Munich itself). While Schießl admits that this is probably not enough to give a significant boost to the local economy of a city where the IT sector has traditionally been very strong, we do think that four million Euro flowing back into the national economy are not an insignificant amount.

Over the next five years, the city expects to save three million Euro on software licenses. Further savings may result from reusing applications developed elsewhere in the public sector, and sharing new developments with other partners, such as the German Foreign Office.

The city's demand for open standards and open source services leads to greater competition in the IT market and might result in further cost advantages in the long term. Free software and open standards are a wonderful way to make it easier for SMEs to enter the market, and to benefit from the great potential these companies have, especially here in Germany", argues Florian Schießl.

There are a number of dedicated staff for the LiMux project. Six people work full-time in the project headquarters. 16 are dealing with the office migration and the development of the basic client. Controlling and external assistance involves 8 staff members.. Roughly another 100 employees have limited roles in the project, which they perform in addition to their ordinary work.

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Technical issues

The client operating system is based on Debian GNU/Linux, but modified by the city to suit its needs. The basic client for desktop systems uses Debian 4.0 ("Etch"), the KDE desktop, OpenOffice 2.x, the mail client Thunderbird, the Firefox web browser and the GIMP image editor. In the background, the city relies on the FAI installation back-end for software distribution, and an application named Gosa (Gonicus System Administration) for the web-based management of a large number of client machines.

To iron out the system's teething troubles, the project team first conducted pilot migrations in three departments that volunteered for the purpose. Before migrating a department, Matthias Braun and his colleagues in the migration support team take a close look at the particular situation in that section, and work out a solution with the local system administrators.

The LiMux migration itself begins only when the ground is thus prepared. Again, each department can choose which migration path it wants: either moving all services to the new operating system in one bold stroke, or a so-called soft migration in several stages.

During such a soft migration, the administrators first deploy OpenOffice, Firefox and Thunderbird on computers still running a version of Windows. In a second step, they switch to the new operating system. In order to minimise the impact of any problems that may occur, the first systems to be migrated are those that are not frequently used for contact with other sections of the city's administration, and do not have to exchange documents between different office program suites.

Until the end of 2008, each of the city's departments will have a LiMux germ cell . These are groups of 30-50 workstations that will be migrated to the LiMux client. Even in departments that are sceptical towards the migration, this helps the IT staff to become familiar with the software. This approach also allows the LiMux project team to learn about the specific technical requirements of each department, and address them before the full-scale roll-out of the software.

The migration support team acts as second-level support for the system administrators of each department, coming to the rescue when they are faced with a problem they cannot solve on their own. Most of the support requests concern either the software distribution system, or the integration of specific hardware. By default, the LiMux project team focuses on supporting the hardware the city has acquired in large volumes via framework contract. Parts of or periphery devices that have been bought through other channels may require special solutions.

Demand for support is usually greatest in the days after users have finished training and are faced with their new tools the first time. Most of these support requests can be solved by the local administrators, others are passed on to the migration support team. In the departments that have already completed the migration, support team member Matthias Braun says that the demand for support decreases after one or two months. The number of support requests eventually settled at a level that was lower than before the migration.

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Office suite compatibility

One effect of the migration is that different office software suites will often be used to work on the same document. Though OpenOffice has managed to achieve a high degree of compatibility with Microsoft's proprietary document formats, especially complex files can sometimes cause problems. The LiMux team deals with this problem both on the technical and the organisational level.

The team maintains a guideline to creating documents , which collects known interoperability problems between OpenOffice and Microsoft Office. The guideline recommends solutions and workarounds, e.g. suggesting not to use a certain formatting. When building new document templates, the team works to make sure that they are fully functional in both programs, though this

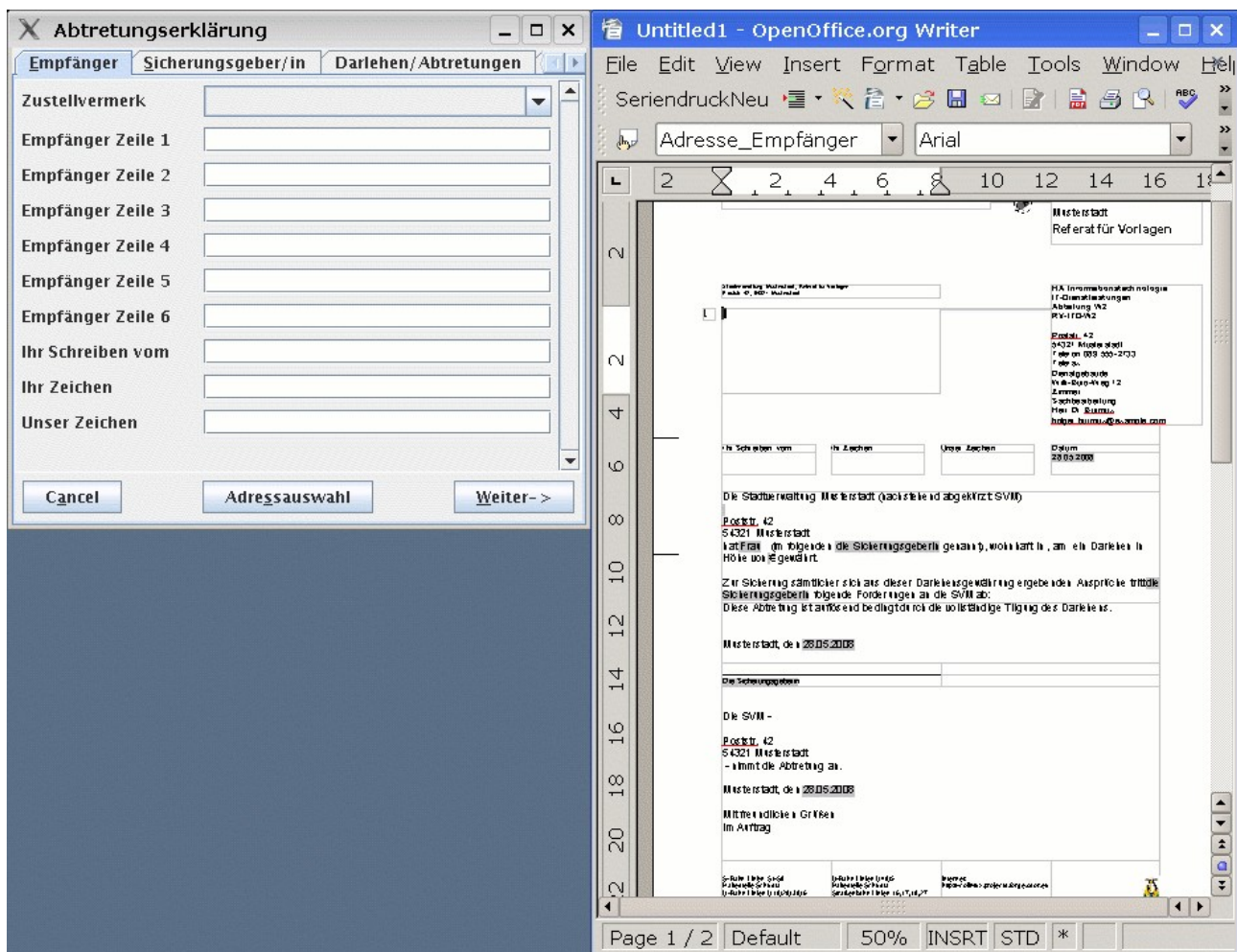
can't always be achieved.

But Schießl points out that we will always receive documents from citizens that will be difficult or impossible to use in OpenOffice. For these cases, each department is (or will be) equipped with a head station, a computer that continues to have access to Microsoft Office. This may happen either on a standard PC running Windows, in a virtual machine or through a terminal server. Usually located in a department's IT section, the people handling these stations are equipped with the know-how to convert files as necessary and hand them over to the intended recipient.

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The Wollmux plugin

The Wollmux application is a critical piece in the migration puzzle, and perhaps its most widely acclaimed success so far. Running as a plugin for OpenOffice, Wollmux provides the city's employees with personalised templates and forms. It includes numerous usability features and plausibility checks. For administrators, Wollmux offers a centralised and comfortable way of providing and maintaining templates.



Entering data into a Wollmux form

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Wollmux consists of four components:

- a letterhead system that completes the corporate letterhead with each user's data
- a system that helps with generating and filling in forms

- a text module system that lets staff build texts from existing modules
- a system to assist with paper-based work flows, printing different document versions as required by internal markings

Wollmux now has many of the functions the city's employees need. But a number of features are still missing, particularly in the area of usability. Christoph Lutz, head of the section OpenOffice.org/Wollmux in the project, says that this doesn't usually cause problems for users: Usually they only use the core functions they really need.

Wollmux is developed in-house by the city administration. Two developers have been working full-time on the plugin since 2005, says Lutz. The application was designed in intense consultation with the city's departments, to make sure that their needs could be met. The development has been running since the beginning of the migration, and will continue for the foreseeable future.

A current focus for development is the mail merge feature. Though standard OpenOffice offers a function of that kind, it turned out to be too complicated for the city's employees. Thus the team created a mail merge tool bar which is easier to handle and looks almost like in the old times, says Lutz.

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Legal issues

The legal questions raised by the migration project can be summarised into two sets of issues. One concerns software patents. In summer 2004, the introduction of software patents in Europe being hotly discussed, the project was put on hold, and the city commissioned a legal study to clarify the patent-related legal risks it would be exposing itself to by using open source software.

The result was that software patents concern proprietary software to the same degree as free software, so the city would not incur any additional risk by using this type of software. In the course of these considerations, Munich also became a vocal opponent of software patents.

The other question was how to make Munich's improvements to open source software available to the community. Schießl says that the German legal situation regarding this question is "not easy", especially because of liability issues. The city's legal department has been mulling the question for some time. Though it looked favourably on the GPL, the most widely used free software license, it was the recently released EUPL that really took things forward. Because it is adapted to the European legal situation, it addresses concerns such as statutory liability. This made the city feel comfortable enough to release its Wollmux template manager as open source software.

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Change management

Managing and communicating the migration is a key challenge, on a level with the technical issues to be solved. The city administration is not only big, it is also a complex environment with heterogeneous decision structures, and the migration is not universally welcomed.

O On the one hand, says Schießl, various small technical grievances are sometimes aggregated into one big problem. This is handled by addressing each individual problem, solving them where possible, but also acknowledging that some problems simply do not have a solution.

On the other hand, the migration brings the opportunity for different sections of a department to improve their everyday-cooperation by learning to communicate on a different level.

Motivating employees to be open to the new software on the computers is therefore critical to the acceptance of the migration. The project team is building this acceptance in a number of different ways.

Performances, presentations and demonstrations let people become familiar with the new applications. Mux, Munich's adaptation of the Linux penguin mascot Tux, helps to create sympathy and build a common identity. Information about the progress of the migration is distributed through e-mail, the intranet, newsletters, forums and wikis. The project is also marketed via flyers, posters, give-aways and lotteries. Staff have received an open invitation to point out defects and help to improve the basic operating system.

A challenge faced by the project was to develop tailored communication strategies to explain the migration to different groups within the administration. An office worker is best addressed with information that is relevant to his daily work, or an attractive desktop environment which is very much in contrast to senior manager or a political decision maker who is more interested in hearing about efficiency and cost effectiveness.



Mux, the LiMux mascot

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Training

Training costs figure relatively prominently in the project's budget. But this is intentional, as Schießl explains: "We could simply have designed a one-page flyer explaining the differences between Microsoft Office and OpenOffice, and distributed that to everyone. Instead, the city decided to seize the opportunity afforded by the migration to raise the skill levels of the staff, and train them to use the new software more effectively. Some of our employees didn't know how to make full use of Microsoft Office either. Raising skill levels isn't something that is tied to open source software.

In the course of the migration, the city has also thoroughly redesigned its IT training concept. In the past, all staff would attend trainings lasting three or four days to learn about all features in Microsoft Word. The new concept is modular. There is a basic training in word processing that everyone attends. After that, there are shorter modules on different topics that employees attend according to what is required by their activities, for example training on form letters or text modules. Everyone can choose which modules they need for their daily work.

The second set of trainings targets the system administrators, teaching them how to deploy and run the new software. The other concerns the employees, who are being taught to use their new tools efficiently for their daily tasks.

At the beginning of a migration, it is typically a department's administrators who need training. Not only do they have to learn how the new system works; they also need to learn to work efficiently with the distribution system that the mayor's department has set up.

Their training needs vary a lot. Technical staff who have worked with GNU/Linux already before the migration naturally have a much easier time than their colleagues from departments that were

using Windows exclusively. Administrator trainings typically last for four intensive days.

Training is tightly coupled with the migration. When a department makes the switch, it usually does so one area after the other. Workers are trained when their area is up for migration, so that they can soon apply in practice what they have learned in the training sessions.

In addition to these trainings, the project team has prepared an e-learning environment, the "LiMux Lernwelt" (learning world). With this tool, employees can repeat training lessons and consolidate their understanding of various programs from their desk, at their own convenience and their own pace. In 2007, this "learning world" won the European e-learning award eureleA. The jury applauded the application for its new approach to training public sector employees.

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Effect on government services

One of the goals of the migration is to make contacts between citizens and the administration work more smoothly. This is one of the reasons why the project period was extended, since we want to avoid a situation where we quickly migrate one department, and the next day we discover that it's not able to provide services to the citizens any more, says Schießl.

The administration is increasing its use of the Open Document Format (ODF), implemented in OpenOffice and numerous other applications. "It's going to be interesting to see how the world around us will react to this decision taken by us and many other administrations, such as the German Foreign Office, and the public sector in the Netherlands and in France."

Schießl acknowledges Microsoft's promise to

implement ODF in its own office applications from 2009, but is curious whether this announcement will really be matched by actions.



Splash screen displayed during start of LiMux basic client

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Cooperation with other public bodies

In April 2008, the City of Munich and the German Foreign Office announced their cooperation on the topic of free software and open standards in public administrations. In a first workshop, experts from both sides highlighted similar interests in the areas of IT strategy, in the migration to the GNU/Linux operating system and OpenOffice. The two organisations are now planning to launch several joint projects.

Both public bodies widely use Debian GNU/Linux, Thunderbird, Firefox and OpenOffice. They are faced with similar challenges in migrating administrative procedures. Together they are planning to roll out GNU/Linux to 25.000 desktop computers. Already, the two organisations present themselves jointly at trade shows.

The LiMux project has turned into a beacon of sorts where the use of open source in the public administration is concerned. In the first half of 2008 alone, more than 50 representatives from a dozen other public administrations and consultants have visited Munich to learn about the migration project.

On May 29 2008, the city of Munich released Wollmux on the OSOR platform under the EUPL. Schießl says that people from other public administrations across Europe had frequently asked whether Munich would be able to share the program. After the legal department gave its green light, the city was more than happy to publish the software. It hopes that as it gets used more frequently, more bugs will be found, reported and fixed by the LiMux project team as well as as by others. It also hopes that other administrations will add new functions to Wollmux and share those, which would let Munich profit from improvements made elsewhere.

Munich's Deputy Lord Mayoress Christine Strobl sees the release of Wollmux as a clear advantage for Munich: The free distribution of our results and solutions is a consequent step towards greater openness, and towards independence from individual software companies. She added that Munich has the goal of releasing other applications under free software licences in the future.

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Evaluation

Achievements

According to Schießl, open source software is now used on all of Munich's desktops. The deployment of the Mozilla Firefox browser and the Thunderbird e-mail client to all computers was completed in mid-2007, including those computers still running Microsoft Windows. OpenOffice has been deployed to 8.000 desktops so far. The Wollmux application is being used in eight of the city's twelve departments.

The GNU/Linux basic client is currently in use on 1.200 desktops. The Mayor's office and the cultural department have been migrated completely, while numerous other departments are beginning the migration process.

In May 2007, the LiMux basic client was certified for its usability and user friendliness by the TÜV quality assurance service. This award is the first of its kind for a GNU/Linux-based desktop environment ever.

The city has made good use of the opportunity to consolidate its IT services during the migration, and has managed significant efficiency gains. The number of document templates has been reduced by some 30%. Business processes have been optimised, freeing up productivity equivalent to 80 staff. By conducting much of the work in-house, the city administration builds up valuable know-how. This will make future developments and adaptations a lot easier.

Munich's administration has become largely independent from individual software suppliers, buying the services it needs from any partner it likes. This promotes competition in the local market for software and services.

The city is now also firmly in control of its IT costs, with reductions likely to become possible in the middle term. Reductions in license costs are already visible. Since the city has access to the source code for the software it uses, it can handle maintenance and security issues in any way it chooses. Munich's administration is also able to comply with demands for the protection of personal data, since its software applications can be audited to see whether confidentiality really is assured.

By relying on open standards across the board, such as the ISO-certified Open Document Format (ODF), the city not only gains independence from software suppliers, but also greater flexibility in its internal processes. Since the specifications for ODF are publicly available, administrative programs developed by the city can output their data directly in this format, without the need to run it through an office suite.

Open standards also allow Munich to make sure that the data it stores remains readable in the very long term. With proprietary formats, there is the risk that once the application for reading is no

longer available, the data is in effect lost. Since many public bodies have the obligation to preserve data for decades, this represents a significant advantage.

In June 2008, the LiMux project drew praise from EC competition commissioner Nellie Kroes, who said there were serious security concerns for governments and businesses associated with using a single software supplier. She applauded the City of Munich for using software based on open standards, along with the German Foreign Ministry and the Gendarmerie Nationale, a department of the French police force: "No citizen or company should be forced or encouraged to choose a closed technology over an open one, through a government having made that choice first."

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Lessons learned

Schießl says that the project team has learned two major lessons in the course of the LiMux project. First, that it is absolutely necessary to convince people to be ready and open for change; and second, to break complex technical problems (none of them are unsolvable , says Schießl) into small tasks, so they can be handled more easily.

"LiMux is not a technical project", he says. Initially, the team approached the migration as a classical IT problem, but the real issues turned out to be different. "It's all about managing change for and with people."

"Convince employees and managers (especially in the IT area of the administration) to be open to change, to take them by the hand and lead them down the new road. This has nothing to do with technology. It's about emotions." Users need to feel that they are being taken seriously. It is just as important to secure political and managerial backing for the project and its strategy. This helps to minimise resistance and speed up progress.

Interim solutions such as the soft migration strategy have worked well, since they make it possible to move forward without disrupting the system. Standardised solutions reduce the coordination effort, and the resulting homogeneous systems are easier to support. Another helpful approach is to test small solutions in limited areas, and then scale up the lessons learned there.

In the course of the project, the project team has built intensive outside contacts to exchange knowledge and experience. Both other public administrations working with open source and the open source community have proved to be valuable partners.

Future plans

By the end of 2009 a large part of the city administration should be using the basic client and running open source applications.

All remaining departments are scheduled to begin the migration process during 2009. Since most choose the path of soft migration, this will also mean deploying free software to run on Windows clients, such as OpenOffice.org, Firefox, Thunderbird, and the image editing program Gimp. Both the basic client and the Wollmux plugin will continue to be developed.

Conclusions

Munich's use of free software is clearly strategic. Rather than spending its money on buying software licenses, the city only pays for adapting programs to its own particular needs. This is a degree of freedom and flexibility that users of proprietary software usually do not enjoy. Open source software and open standards make it possible for SMEs to fully participate in the competition for the city's business.

There are perhaps two main lessons to be drawn from Munich's experience. The first one is that

such a large-scale migration requires careful analysis and planning, as well as a clearly defined goal. It bears repeating that in Munich this goal is the strategic independence from software suppliers. Lower IT costs are a welcome side-effect, but autonomy is more important.

LiMux highlights the importance of advancing with great care. At the cost of pushing back the end date of the migration, the project team has studied, tested, adapted, and tested again. New software is only deployed after the utmost care has been taken to ensure that it will not disrupt the administration's work.

The second lesson is that the organisation itself poses a challenge that is at least equal to that presented by the technology. Lack of acceptance and outright resistance can be more substantial obstacles to the deployment of a software solution than any technical problem. The LiMux project has been successful so far because at every stage, it has made sure that its different stakeholders were behind the effort.

Having the backing of the political decision-makers is a necessary condition, but it is not sufficient in itself. Anyone attempting something similar must also address the concerns of the people who will be the everyday users of the software. They often have years of learning invested in the existing system, and must be assured that the new solution brings enough advantages to warrant the effort of relearning deeply ingrained processes.

Managers may be sceptical of the disruption that new software and processes can cause. They may be convinced by the cost savings and efficiency gains on offer. IT staff are heavily affected by changes in the software environment, and need to be brought on board as well. Addressing the concerns of these stakeholders is not trivial, and requires a detailed communication strategy. While it is unlikely to eliminate every bit of resistance, this is something that the LiMux project has largely accomplished. The project's prestige has of course helped.

The city started this project at a time when the use of free software was still widely seen as something exotic. Perhaps the most innovative aspect of LiMux is that from the start of its analysis, Munich included the possibility of an open source solution, and followed through when this solution was projected to be the most advantageous in the long term.

This courageous decision is now paying off. Munich has become an internationally recognised example for the strategic use of free software, attracting commensurate attention from other public administrations as well as from industry and academia. The migration is well on track, and its successful completion is now only a matter of time. Things did not always look so rosy in the past, when scepticism sometimes seemed to prevail, especially when the project was put on hold due to legal uncertainties. Along with the overhaul of its IT infrastructure, the migration will leave Munich not only with an efficient IT system but also with the privilege of independent decision making thanks to open source software.

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Links

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- Wollmux [release announcement](#)
- Announcement of [cooperation](#) with German Foreign Office
- [Wollmux](#) on OSOR
- LiMux [items](#) on OSOR
- Announcement of [TÜV certification](#) of basic client
- [Speech on open standards](#) by European Commissioner for Competition Nellie Kroes

- Article [[html/pdf](#)] by Volker Grassmuck: Joe Karaganis, Robert Latham (eds.): The Politics of Open Source Adoption. Social Science Research Council, May 2005.
- European eLearning Award ([eureleA](#))

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This study is based on interviews with [Florian Schießl](#), Deputy Project coordinator of LiMux; [Christoph Lutz](#), leader of the section [OpenOffice.org/Wollmux](#); and [Matthias Braun](#), LiMux migration support team.