FLEXIBILITY & THE CITY

The city of **Bergen, Norway,** consolidates with Linux

BY CAROLINE JOYCE

It could be said that choosing an operating system (OS) is like searching for a new car. You want your new wheels to be dependable, safe and secure, economical and easy to drive. Buying a car—if you do the proper amount of research and number crunching—isn't something you'll end up doing on a regular basis. Nor is searching for the right OS for your IT environment, which is why the IT department for Bergen, Norway's second largest city, hit the books in early 2003 to find the right solution for its consolidation needs.

Tightening the Purse Strings

Bergen, located in southwestern Norway, is home to roughly 240,000 people. Once the capital of Norway, the city is almost 1,000 years old and is struggling to keep up with today's technology and the budget constraints many city governments face. So, when the challenge of consolidating the city's education network—consisting of 100 Microsoft* Windows NT* servers—surfaced, the city needed an affordable solution. According to Ole-Bjørn Tuftedal, the city's chief technology officer, "It was beginning to be a nightmare to administer all of those decentralized servers."

Keeping the city's tight budget in mind, the IT department looked into a few alternatives before deciding on Linux*. One alternative was basing the education network on Windows* servers. But, says Tuftedal, they found Windows would be "more expensive, both because of higher licensing costs and partly because Linux scaled better than Windows. It's been scaled to serve 6,000 concurrent users. We could implement the server solution with less hardware than had we done it with Microsoft Windows, so that's why we decided on Linux." Because of the difference in licensing and support costs alone, the city of Bergen expected to save 50 percent on the servers.

When it came down to it, Bergen's IT department compared the UNIX*/Linux team with Microsoft and found that the former was more stable and secure than Windows.

The town of Bergen, known for its fishing industry, is located in southwestern Norway.

Also, the single-desktop origins of Windows complicated enterprise management; there were problems with scaling, complexity and multi-user environments. In addition, Windows came with increased labor costs and frequent upgrades and patching.

The city of Bergen has 100 schools, each having its own server prior to consolidation. Altogether, there are 32,000 students and 4,000 teachers using the network with an average of 20-30 computers in every school. After some test phases, the school began implementing the transition to Linux in the fall of 2004, migrating one school every day to the new servers. "The transition so far has been very smooth and successful and even better than we had hoped when we started," says Tuftedal.

The affordability of Linux hasn't lost its appeal on the rest of Norway. Geir Lislerud, territory manager for Public Sector in Norway, says an increasing number of schools in Norway are adopting Linux because of the cost, security and system availability.

Bergen is one of many cities facing tight budgets. According to Tuftedal, "In Europe it's a trend that the public economy is becoming tighter; you have less money and at the same time you have an increasing number of tasks and responsibilities. [Cities] have to take a serious look at what types of spending they do."
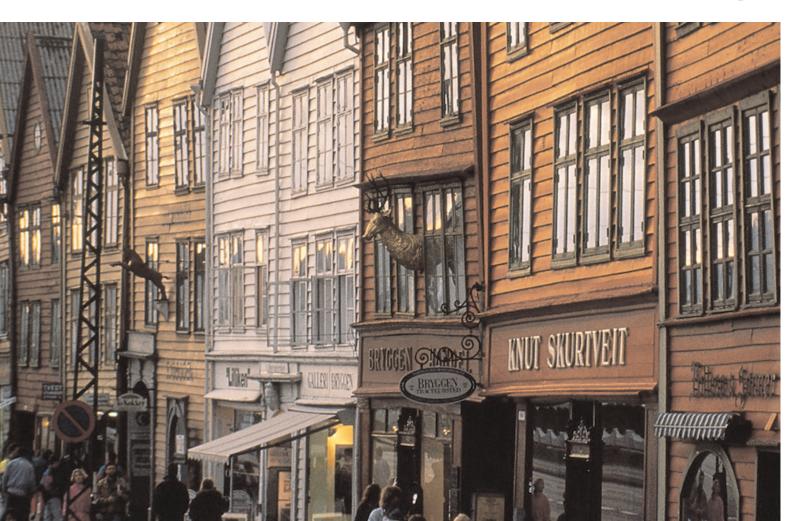
Lislerud tells the same story, saying the number one issue governments face is cost. "Cost is definitely number one in the government sector in Norway because they have a very tight budget; this is true in other countries as well," he says.

Bergen also deployed Linux on the city's database servers. About 30 servers run all of the city's important critical databases, such as health care and social services, with 20 of them running the HP-UX version of UNIX and 10 of them running Microsoft Windows, according to Tuftedal. Consolidation was necessary because "many of the servers are getting old and as a result, support costs are rising," he adds.

"A couple of years ago, we had 75 database instances on seven different versions of Oracle; eight different versions of OSs and several hardware architecture versions," says Tuftedal. "So, in a situation with high licensing and support costs, we saw that we could get better prices and better performance by upgrading the hardware to an industry-standard hardware. And so that we no longer had just one vendor for the servers, we chose 64-bit titanium-based servers running SUSE LINUX."

There are at least 16,000 employee-users of the city's systems on 300 servers, all of which are running Windows. The IT organization's staff of 80 must keep a watchful eye on the 10,500 PCs in 450 city locations. But, according to Lislerud, that doesn't seem to be a problem.

"The IT department in Bergen is staffed with extremely well-educated people," says Lislerud. "They're very well-trained. They're doing extremely well."

Cents and Flexibility

Besides security and cost, flexibility is another aspect of Linux that appealed to Bergen's IT department. Tuftedal has worked with IT personnel in other European cities and says the open-source software allows the "public sector to collaborate, to learn from each other's experiences, to join together and create solutions."

Lislerud also says that flexibility is a key, "I think the flexibility for running on Linux is great with open standards ... it's good to have more than one opportunity when you want to run software."

The IT department in Bergen considers the open standards and open-source aspects of Linux as the way of the future. With the open standard comes the freedom of choice and an "open, democratic business model." The result, says Tuftedal, is "faster development and more innovation, leading to independence from vendors and greater competition, which results in lower prices and better service.

"I think the whole open-development model is also seen to be positive because when the source is open and known then anyone can learn how it works and can contribute by building on and modifying." "Therefore, from a city point of view, this is a stimulus for having new local enterprise that in the future can develop software."

With the trend to adopt Linux snowballing through Europe, Tuftedal says he's been traveling frequently.

"We've been in contact with several cities, both in Norway and in other European countries," says Tuftedal. "I've traveled to several cities and met people, corresponded with them and so on; we have built a network of contact in several countries. That's been useful too; to get more information about local experiences and to have shared our solutions and our experiences with others."

What helps this collaboration is the fact that the cities aren't competing against each other to get ahead; rather, they're aiming toward the same goal and can help one another.

Testing, Testing

To get a feel for how the students would adapt to Linux on the desktop, Tuftedal says the IT department set up tests in several schools. "We have done tests looking at Linux desktop and in particular the pupils like it. We were using SUSE LINUX Professional 8.2 with the KDE desktop and the Open Office software, which was popular; they found it easy to use," explains Tuftedal.

Not even the language barrier seemed to discourage the students using Linux on the desktop during the test phase. Tuftedal says the IT department was a bit behind schedule, so the students had to use the English version of Open Office. Even though students were tested on the Norwegian version of Windows and the English version of Open Office, Linux still came out on top.

Bergen's IT department also included a challenge to the students in the testing: they wanted them to try and crash the

system. Tuftedal took into consideration all of the vandalism that might occur in a school and said the students were given the challenge of creating chaos for both the Windows and Linux setups. A consulting firm came in to "harden" the Windows setup, and had planned on "hardening" the Linux setup as well, but ran out of time.

"They tested the hardened Windows setup versus the standard Linux setup. Still, [the students] managed to do a lot of things they shouldn't have been able to do with the Windows setup, but they were not able to—in any way—crash or change the Linux setup," says Tuftedal. "From a stability and security point of view, the results from Linux were positive."

Bergen's IT department took into consideration the fact that the teachers are city employees, which means they still have to use the Windows desktop. However, if and when the time comes for teachers to move to Linux on the desktop, it appears they'll be ready. They too were given the opportunity to test Linux on the desktop.

"The teachers saw that they could build on everything they've learned from using Windows software, so it wasn't a large transition," says Tuftedal. "We thought the quick implementation would create too many small problems for the teachers. For example, the keyboard shortcuts may be

different in MS Word than in the writer application of the Open Office.

"What we decided to do is implement the Microsoft desktop for the pupils this year and then we'd start the second project in the first part of next year to look more thoroughly at how we can implement the Linux-based desktop for the pupils and still have a way of making the teachers' everyday life not as complicated."

Not only did the teachers find their adjustment to Linux seamless, the students were able to do their normal, everyday tasks without missing a beat.

"All the typical applications they would use during the day, such as Web browsing, writing and the typical office software that was connected with the desktop itself, all the things integrated in the KDE desktop, they found easy and intuitive," says Tuftedal. "Without getting any form of instructions on what would be different using Linux, they just logged on and started using it. They could find their way around and do their own stuff."

The Future Looks Bright

The goal is to have all of the city's schools migrated over to Linux by early 2005. Most of the schools were migrated by the end of December 2004, but since a few schools are in remote locations, the migration process took longer in some cases.

"We have a small number of the schools that are so remotely located that we presently don't have a high band-width fibre-network connection, instead they use an ADSL (phone line) connection," says Tuftedal. "These schools with a lower-bandwidth connection will be migrated in January."

Also with the new year comes the possibility of the startup and design of a Linux-based desktop for the students and employees. Currently, the PCs are still running Windows, while the servers are running Linux.

"This is because the school teachers have to use the standard employee desktop, as well as the student desktop. To avoid confusion and small everyday complications for the teachers, we decided to make the student desktop the same as the employee desktop in the first phase," says Tuftedal.

"We have some legacy application systems that are either integrated with Internet Explorer, Microsoft Office or Microsoft Windows. Therefore, it's a longer process to change the desktop of the employees, but in 2006 we'll start the project to look at the next generation of the employee desktop. In the meantime, we're optimistic about creating a Linux desktop for the students that can be smoothly integrated with the teachers' desktop needs."

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