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For many companies, migrating from Windows to Linux makes sense. The reasons are compelling: greater stability and reliability, lower cost, access to application source code, greater security, and conformity with open standards, according to numerous independent studies and industry experts.

But for those charged with spearheading the actual migration, the project may seem difficult, unwieldy, or untenable. They may fear unanticipated technological roadblocks as well as employees reticent to give up the tools they are used to using.

Before launching into a migration, make sure your reasons for migrating are business-driven. "You'll fail if you start a migration from the ideological side instead," notes Stefan Werden, leader of the Linux architecture team for Novell SUSE for Europe, the Middle East, and Africa.

To make that decision, conduct a thorough cost-benefit analysis, projected out several years, based on what it would take to migrate and what it would cost not to migrate--not only financial costs, but other costs, such as the amount of overall control you want over your organization's software requirements. With a Windows-to-Linux migration, "nobody can force you to upgrade or deny you a security fix. You always call the shots, so you are guaranteed to save money and retain more control in the long run," says Nicholas Petreley, a Linux analyst at IT market intelligence firm Evans Data Corp. of Santa Cruz, Calif.

Of course, reducing costs can be another driving factor in the decision-making process. According to Forrester Research, 68% of companies in North America consider lowering overall operating costs a top priority, and Linux is one means to that end.

To achieve success in a Windows to Linux desktop migration, experts advise planning, planning, and more planning. Before starting, take these steps:

- **Get executive buy-in.** This step is crucial. Without executive support, your project may be doomed to failure. By gathering this support before launching your project, you can be sure it will be supported, both financially and otherwise.
- **Make sure your organization is a good candidate for a Windows-to-Linux desktop migration.** According to Werden, those that are good candidates generally are looking for ways to reduce the cost of IT and more control of employee desktops. In addition, these organizations use standard applications and software or need only basic data entry functions and often need remote application on mainframe, Unix and Windows on the same desktop.
- **Examine the existing environment and understand it thoroughly.** Also, consider whether it makes sense to invest in new hardware, or whether you will be migrating with existing hardware.
- **Choose your flavor of Linux carefully.** It doesn't matter much whether you settle on Red Hat, SUSE, Mandrake, Gentoo, Debian, or another flavor altogether. It's more important that your migration team is comfortable with the Linux distribution chosen.
- **Identify which employees within the organization are the best candidates for a Linux-based alternative desktop.** Often, these include transactional workers and developers -- employees who rely on basic applications like Web browsers, productivity suites, and email -- and not workers who routinely use powerful programs like Photoshop or Macintosh-based applications. "It's about identifying needs or pockets where you can save the greatest amount of money with minimal disruption," notes Susan Jeffries, marketing manager for the Java Desktop System at Sun Microsystems Inc.
- **Prepare employees.** There is nothing worse than coming into work on Monday morning and being

treated to an entirely new desktop, with entirely new expectations. In addition, set up a program to train employees on the new system before unveiling it.

- **Consider using outside consultants.** Unless you or members of your team have attempted such a migration before, it can be well worth the money to hire an outside consultant. Doing so can save countless hours of frustration. "When you run into a problem like not being able to get something to print, someone familiar with Linux will be able to fix it in 10 minutes. If you don't have such a person, it could take a week to fix the problem," Petreley says. Consultants charge in various ways--by the hour, or by the project. A reasonable hourly price range for general consulting with an experienced systems engineer costs $125 to $225 per hour. Total cost depends on geographic location, the cost of consultants in the area, and the number of employees, environment and number of applications to migrate. Typically, a migration consulting service may begin with a workshop, proof of concept and architecture and implementation review.

Once you have finished planning and preparing for the migration, it's time to choose a single migration target -- generally a department instead of an individual -- to ensure that your strategy will work. By migrating applications used by specific groups in turn, you'll encounter less resistance. "A department is a good, manageable unit that generally has a core defined business function and a mix of user types," says Jordan Rosen, CEO of systems integrator Lille Corp. of Albany, N.Y.

And by starting small, you'll have a chance to make mistakes without impacting the entire organization. You'll also prove your business case to executives and show employees that migration can work.

But migrating individuals within a group is a poor idea, as it can lead to different members of the same group using different tools and being unable to share knowledge about the new environment, notes Mike Sheffey, CEO of Santa Barbara, Calif.-based Versora, a software developer offering Windows to Linux migration solutions. "And if you move one person at a time, you'll need to be certain that the new processes are 100% compatible with the old, or else time will be lost," he says.

Here are some tips you can use to enhance your Windows to Linux migration experience, along with solutions to some daunting challenges.

Choosing a Linux distribution
When it comes to choosing a Linux distribution, there are a dizzying array of choices, including de facto standard Red Hat, Mandrake, SUSE, Mandrake, a Debian variant, or Fedora, a Red Hat- and community-supported open source project to build a complete, general purpose operating system exclusively from free software.

Businesses usually can't lose by going with a de facto standard, which today is SUSE, Red Hat, or Fedora. SUSE is backed by Novell, while the Java Desktop System is supported by Sun. Both are solid companies, and both distributions also are solid choices. SUSE can make a great deal of sense for companies used to managing their desktop environment with systems management tools like ZenWorks and SMS. But for businesses that have deployed Red Hat servers and have experience with the Red Hat network, extending their IT infrastructure with Red Hat desktops also can make good sense, Sheffey says.

Debian has one advantage over these tools -- once it is installed, it can be upgraded automatically over the Internet. "The process is so easy it's downright unbelievable," Petreley says. "You don't upgrade Debian with another CD, you simply keep it up to date with a few simple commands." The downside, he notes, is it is run by developers who don't keep it as cutting-edge as Red Hat or SUSE.

Hardware migration
Most hardware manufacturers today support most Linux distributions. In addition, most Linux distributions today automatically detect most hardware, but in some cases, you might need specific drivers for new or unusual hardware. If your hardware falls into that category, you might encounter a hardware compatibility issue. Somebody eventually may write a driver for your problem hardware, but you might have to put your project on hold until you can locate an appropriate

Chaos brought to order with Windows to Linux migration
With 25 physicians and more than 80 support staff working at seven office and hospital locations to provide a full range of services to its patients, Capital Cardiology Associates is a constant hive of activity.

driver. The alternative is to buy new hardware.

In the case of laptops, you shouldn't have much problem getting your graphics card to work, but just in case, consider downloading the Linux drivers from the manufacturer. Virtually all video cards are supported in 2D mode, which is all most users need for desktop productivity. However, depending on the card, you might not be able to gain support for 3D games, DVD playback or the TV-out capabilities of the card -- features that aren't generally required for the average work environment. Other home use issues are usually USB-related. For example, some digital cameras can't be hooked up to Linux desktops, as well as some printers and scanners -- at least without the services of an experienced Linux systems engineer. It's also worth noting that Centrino notebooks don't work with Linux.

Choosing a Window manager
Unlike Windows, Linux supports both GNOME and KDE, as well as a wide variety of window managers. Red Hat makes GNOME and KDE look and work alike. While GNOME has the fewest features and is least likely to confuse users with options, KDE is more feature-rich and powerful, but is so configurable that it could some to spend too much time working with it. Other, less commonly used window managers include XFCE, ICEWM, Enlightenment, Blackbox, Fluxbox and WindowMaker. Generally, these tools are for more advanced Linux users with specific needs or desire for greater customization. Given the choices, Petreley recommends KDE, while Rosen considers either KDE or GNOME reasonable. Rosen prefers ICEWM for thin client implementations. "It's clean, fast and allows for maximum user productivity," he says.

Application migration
Migrating from Microsoft Office to an open source office productivity suite isn't too difficult, although some believe there is more work to do. In general, suites such as OpenOffice.org or Sun's StarOffice work fairly well.

There are still some compatibility issues, however. "Let's say you've got a graphic in a Microsoft Word document. If you open it in OpenOffice.org, there is a pretty good chance that you won't be able to view that chart or graph," Sheffey explains. He also sees some compatibility issues with presentation software within the suite, but says spreadsheet functionality works well. Note that Office macros won't work in OpenOffice or StarOffice.

One option for migrating applications is Evermore Integrated Office (EIOffice) from [Evermore Software LLC](#) of Monterey Park, Calif. Written in Java and running on Windows, Linux, and other operating systems, this software functions as a single integrated office environment instead of a suite. Petreley says that

To manage this full-service cardiology practice and provide the type of comprehensive cardiac care that its patients have come to expect, employees must rely on a series of complex applications that are reliable, stable, and easy to maintain.

For many years, that environment was a combination of Windows and Unix systems. But as time passed and the organization experienced significant growth, its systems were no longer reliable enough or stable enough to suit CEO Dr. Martin Echt. Over time, what started as a simple, centralized Unix system focusing on billing and appointment scheduling has become an unwieldy mix of character-based dumb terminals running various versions of Windows operating systems and Microsoft-based software, with a variety of virtual private network connections and remote terminal server access thrown in for good measure.

"Our system was getting so complex that every few months we were adding new servers, and at the same time, our IT budget kept going up and downtime was increasing," he says.

That was enough to prompt Echt to commission an independent study on how Capital Cardiology could fix its escalating IT problems. The recommendation soon came back: Try Linux. As Echt began thinking back to a time in the early 1980s when, as an amateur, he worked with Unix-based systems, he remembered the operating system's reliability and thought the idea had merit. And because the organization's billing and appointment system already was running a variant of Unix, he didn't believe the switch would be too painful.

Echt hired Albany-based systems integrator Lille Corp. to spearhead the project. Lille, in concert with a core team from Capital Cardiology, established migration priorities, such as determining which functions were mission-critical and the order in which the system would be rolled out. Eventually, the team settled on Red Hat Linux in a thin client environment. The team also chose to replace the organization's aging mix of hardware with IBM xSeries servers, which support Linux.

"We decided that everything would be done on the server side, so there would be no more hard drives for users," explains Lille president Jordan Rosen. "The desktop each user would see would be pre-designed, pre-approved, and pre-tested."

Other decisions included temporarily moving to email client Pine at the request of Echt's team. Pine, created in the 1990s by students at the University of Washington. "The intention was to refocus email on text content, not fancy GUI displays," Rosen notes. The organization later moved to Evolution. Capital Cardiology also switched to office productivity suite OpenOffice.org.

Before introducing the new system to company employees, Lille's staff engaged in extensive testing -- something Rosen says was critical to the project's success.

EIOffice links data better than any other office suite he's ever experienced.

Another option is CodeWeavers' CrossOver Office, a Linux desktop productivity tool that allows users to run many office applications, such as Microsoft Office, Lotus Notes, and Adobe Photoshop. A more comprehensive solution is Win4Lin from NeTraverse Inc. of Austin, Texas, which allows users to run Windows 98 on top of Linux such that the application comes up on Linux. By installing Microsoft Office on top of this, you can actually run Microsoft Office on Windows on Linux.

Migrating proprietary and homegrown applications to Linux opens another can of worms. If a company is truly dependent on many of these applications, the migration process probably will be more difficult and lengthy. One solution is to use a remote desktop to allow employees to

"During our testing, we came up with various configuration options, and in some cases, if we had not done testing in our restricted environment, it would have led to significant production issues. Testing is how we were able to produce an environment that didn't give us any surprises," he says.

After the testing was complete, the team decided to make the entire switch over a single weekend -- something Echt says he would do differently if given another chance. "We would have had a training room and had every employee come through prior to rolling out the system," he says. "That type of planning and advanced training would have greatly diminished the worries and concerns of our employees."

-- Karen D. Schwartz

view those applications running on a Windows host while the clients run a Linux-based desktop. Another option is to use a product like Secure Global Desktop from Tarantella Inc. of Santa Cruz, Calif. or Citrix MetaFrame Access Suite from Citrix Systems Inc. of Ft. Lauderdale, Fla. to run Windows remotely. Yet another option is to rewrite those applications in Java or something equally operating system-agnostic.

Yet another option is to use VMware and run a full-blown client on top of Linux. "At first glance this doesn't make sense, but once you get into a customer's environment and see the need for them to unify their desktop environment to a common standard, it starts to make more sense," Werden says.

Migrating Mail, Calendar, and Personal Information Manager
The de facto standard for moving email, calendar, and PIM information from Microsoft Outlook to a Linux environment is Novell's Evolution, included with most Linux distributions. For all intents and purposes, it's a faithful clone of the Outlook interface, ensuring that anybody who uses Outlook will feel immediately comfortable with Evolution. Evolution provides everything Outlook provides -- email, calendaring, meeting scheduling, contact management, and task lists. Evolution also can work well with existing Microsoft Exchange services using POP3 and IMAP4.

Another alternative is Kmail. With the KDE windowing environment, migration of settings and data between popular Windows clients and the Kmail or Opera Mail clients will be important to anyone who plans to support one of them as the corporate standard for email. Currently, these tools are not as widely used as other mail clients like Novell (formerly Ximian) Evolution and as such, have fewer import features. They also lack other interconnect features such as the Evolution connector for Exchange, Sheffey notes.

Internet browsing/Web services
While Windows provides two common browser options -- Internet Explorer and Netscape Navigator -- Linux users have more choices. Those choices include Mozilla, Opera, and Konqueror. None of these browsers have major compatibility issues.

HTML editing also can pose some challenges. As tools like Quanta, Bluefish, Eclipse and others continue to grow and mature, the functionality will quickly reach a point comparable to what can be found today on Windows. "We don't see this as being a big deal because when a company decides to move from Windows to Linux, the Web developers are happy that they get to learn some new languages," Sheffey says. "Those who have been developing under Microsoft ASP are happy to take some time to learn the power and ease of PHP."

Instant Messaging
No major problems should arise with instant messaging as it works today, since both GAIM and Kopete are full-featured, fully compatible instant messaging clients. The instant messaging field on all platforms face the same challenges -- how to enable clients on different

Linux migrations growing in popularity

proprietary networks to connect and share with each other.

It's worth noting that AOL, Yahoo and Microsoft all hold control of their instant messaging protocols. While the open source clients have figured out how to use these protocols, they could be changed by the protocol owners. If, for example, AOL decides it needs to receive more revenue from ads via AIM, they could be locked out since open source clients don't show ads. To circumvent this issue, Sheffey recommends an open source instant messaging protocol called Jabber, which suits all of the same needs as the proprietary protocols. Groupwise for Linux by Novell is another solution. This critical business productivity tool now includes an instant messaging client that addresses many of the security and audit concerns of instant messaging.

Linux has pulled ahead of Windows 2000 as a migration destination in large enterprises, according to a report from Evans Data Corp., an IT market intelligence firm based in Santa Cruz, Calif. According to the report, one out of five enterprises reported migrating to Linux in 2003, up from 15 percent a year earlier.

The study reports that enterprise development managers see greater potential for Linux to replace Windows as an operating system than replacing Unix, especially since Linux can be deployed easily on Intel-based commodity servers.

In addition, 36% of developers expect to migrate to the 2.6 Linux kernel within a year of its release. The 2.6 kernel is expected to improve scalability across more processors and provide the foundation for improvements in multi-threading, the report notes.

Database migration
Carefully examine the database and the data. Determine what you are trying to accomplish with the database. Only then can you plan what the new database environment should look like. Microsoft Access databases can be ported fairly easily to MySQL Database Server and PostgreSQL. In situations where migration problems occur, some enterprising vendors are creating solutions, such as Versora's ProgressionDB, which deals with some of the most common conversion issues. Another option is SharePlex from Quest Software Inc. of Irvine, Calif. This data replication software, mostly used to migrate Oracle to Linux, provides support for thousands of rows per second for load distribution, disaster recovery, and migrations.

File sharing
Linux desktops should deploy Samba, an open source implementation of the SMB (Server Message Block) file sharing protocol. Samba can be installed on any Linux distribution and can replace, for example, a Windows NT domain controller -- at no cost. Yet another option is WebDAV (World Wide Web Distributed Authoring and Versioning), a set of extensions to HTTP that facilitates collaborative editing and file management between remote users.

A challenge for mixed Windows/Linux environments, Rosen notes, is permissions. "Unix-style permissions are not user-friendly," he says. To combat this issue, Rosen recommends options such as OpenAFS (an open source implementation of a file system first developed at Carnegie Mellon University that provides a client-server architecture for file sharing) and Netware NSS (Novell Storage Services), which soon will run native to Linux.

Multimedia applications
When it comes to video codecs, Linux is the place to be. There are several multimedia applications available to replace Windows Media Player, such as XMMS, Xine and mplayer. A video that would take all of the computing power of a P4 2.0 Ghz under Windows Media Player would barely touch the resources of a P3 500 Mhz running mplayer, Sheffey notes.

However, Linux does lack one major feature -- digital rights management (DRM). Under a closed-source system, copy protection is far easier, as the communication channels from the protected media playing application to the operating system aren't as well-known. But because Linux is far more flexible, redirecting the speakers to record a DRM'd MP3 or redirecting the video to record a DRM's movie is much easier. But because the DRM companies don't see Linux as a viable market and because DRM is much harder to truly lock down in Linux, Linux may be lagging in digitally distributed forms of media, Sheffey says.

Petreley suggests one solution -- a plug-in from CodeWeavers that allows users to run things like Windows Media Player from Linux browsers using Wine (the Windows support libraries for Linux).

Backup
Major vendors, including Computer Associates and Veritas Software, offer client/server backup for Linux. Other backup solutions include Arkeia products from Arkeia Solutions, Backup Edge from Microlite Corp.,

and System Backup Administrator from [Storix Inc.](#) among others.

What's left to accomplish

Although migrating from Windows to Linux is easier than ever before, there are still some issues and functions that could benefit from improvement.

Many believe that Linux needs a standard way of setting up Linux users and managing them from one administrative location, as can be done with Windows clients. Although it is possible to do so today, the lack of standards in this area can be discouraging, and lead to time-consuming, inefficient methods.

While Jeffries notes that the recent release of Java Desktop System includes tools such as provisioning and performance monitoring tools, remote desktop take-over and desktop policy management that integrates with a company's directory service, Werden

Sheffey notes that most of the major systems management software vendors appear to be addressing the issue as well. Novell's ZenWorks and Red Carpet products are working together as a way to solve this problem, while other companies, such as [Novadigm Inc.](#), [ManageSoft](#) and [Altiris](#) also seem to be pursuing the issue. He believes that eventually, all systems management vendors will support Linux clients, with the exception of Microsoft. Rosen recommends Webmin, a Web-based interface for systems administration.

Werden says:

> Central software management is one of the major points when using Linux desktops. Commercial tools like ZENworks, and others are supporting Linux today with a very advanced interface. Customers can use Nsure Identity Manager to provision users using an NIS (Network Information Services) or NIS+ driver. Then, they can use LDAP authentication (or OpenLDAP) to Novell eDirectory and manage the Linux devices using ZENworks Linux Management (formerly Ximian Red Carpet Enterprise).

> Some of our customers chose these products before deciding on Linux. They merely enhanced their existing environment, making the migration much easier.

But by far, consensus seems to be that what's needed to truly make Windows to Linux migration easier and more productive is more tools -- and lots of them. In general, desktop tools are adequate, with the primary applications for migration in place and working well (groupware, office productivity, Internet). But just about every other application area needs tools for Linux -- something independent software vendors (ISVs) generally must develop.

One example is in the financial management arena, where Intuit, for example, would be doing its user base a great service by supporting Linux for its QuickBooks applications, which millions of small companies use to manage their finances. Other products in this space that could support Linux include Moneydance and Gnucash. Linux also could benefit from the porting of tax preparation software. Dozens -- even hundreds -- of applications like these in a variety of niches will make all the difference.

Evans Data Corporation	Enterprise Management Issues Development Survey
800-831-3080	Fall 2003

Migrating Business Critical Application FROM Server Platform

While the last of the flow of applications away from Microsoft Windows NT abates, the "legacy" operating system has been surpassed by a new "legacy" platform: Windows 2000. About a third of respondents, 32%, are moving mission-critical applications off of the three-year-old operating system. When this question was first asked six months ago, 19% were in the midst of moving off 2000. The greatest beneficiary, as shown on the next page, is the next generation of Windows server products, Server 2003. Windows 2000 has consistently been the most prevalent operating system in previous Evans surveys, and still represents a large installed base of companies.

Windows NT now drops into second place as the outbound migration platform, from 29% a year ago to 23% of companies today moving off the OS. The mainframe represents the third highest platform in terms of outbound migrations. In the current survey, 12% are moving from the mainframe, a level unchanged since the last survey, but down from 21% a year ago.

Migrating Business Critical Application TO Server Platform

The greatest recipients of these OS migrations are the current Windows and Linux platforms. Windows Server 2003 has replaced Windows 2000 as the most popular migration destination, cited as a destination by 28% of respondents in this survey. In last survey, 15% cited Windows Server 2003 as their destination.

Linux has also raced ahead of Windows 2000 as the second most popular destinations in larger enterprises. One out of five enterprises report migrating to the open-source OS at this time, up from 15% a year ago.

With the introduction of Windows Server 2003, migrations to Windows 2000 have been cut in half, from 26% a year ago to 13%. Most likely, these migrations are coming from Windows NT, as shown on the previous page.

Will Linux Replace Windows-Based Operating Systems?

Enterprise development managers see far greater potential for Linux replacing Windows as an operating system than replacing UNIX. Since Linux can readily deploy on Intel-based commodity servers, the open-source operating system is competitive in terms of hardware requirements. Forty-two percent of the respondents to this survey agree with this notion, and believe Linux is likely to replace Windows. Close to one out of five respondents, 18%, say this is a virtual certainty. The results are unchanged from the previous Evans survey.

Evans Data Corporation   Enterprise Management Issues Development Survey
800-831-3080   Fall 2003

Links

1. "Evermore Software LLC" - http://www.evermoresw.com/
2. "CodeWeavers'" - http://www.codeweavers.com/
3. "NeTraverse Inc." - http://www.netraverse.com/
4. "Tarantella Inc." - http://www.tarantella.com/
5. "Citrix" - http://www.citrix.com/
6. "SharePlex" - http://www.shareplex.com/
7. "CodeWeavers" - http://www.codeweavers.com/
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9. "Veritas Software" - http://www.veritas.com/
10. "Arkeia Solutions" - http://www.arkeia.com/
11. "Microlite Corp." - http://www.backupedge.com/
12. "Storix Inc." - http://www.storix.com/
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