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MARCH 2006



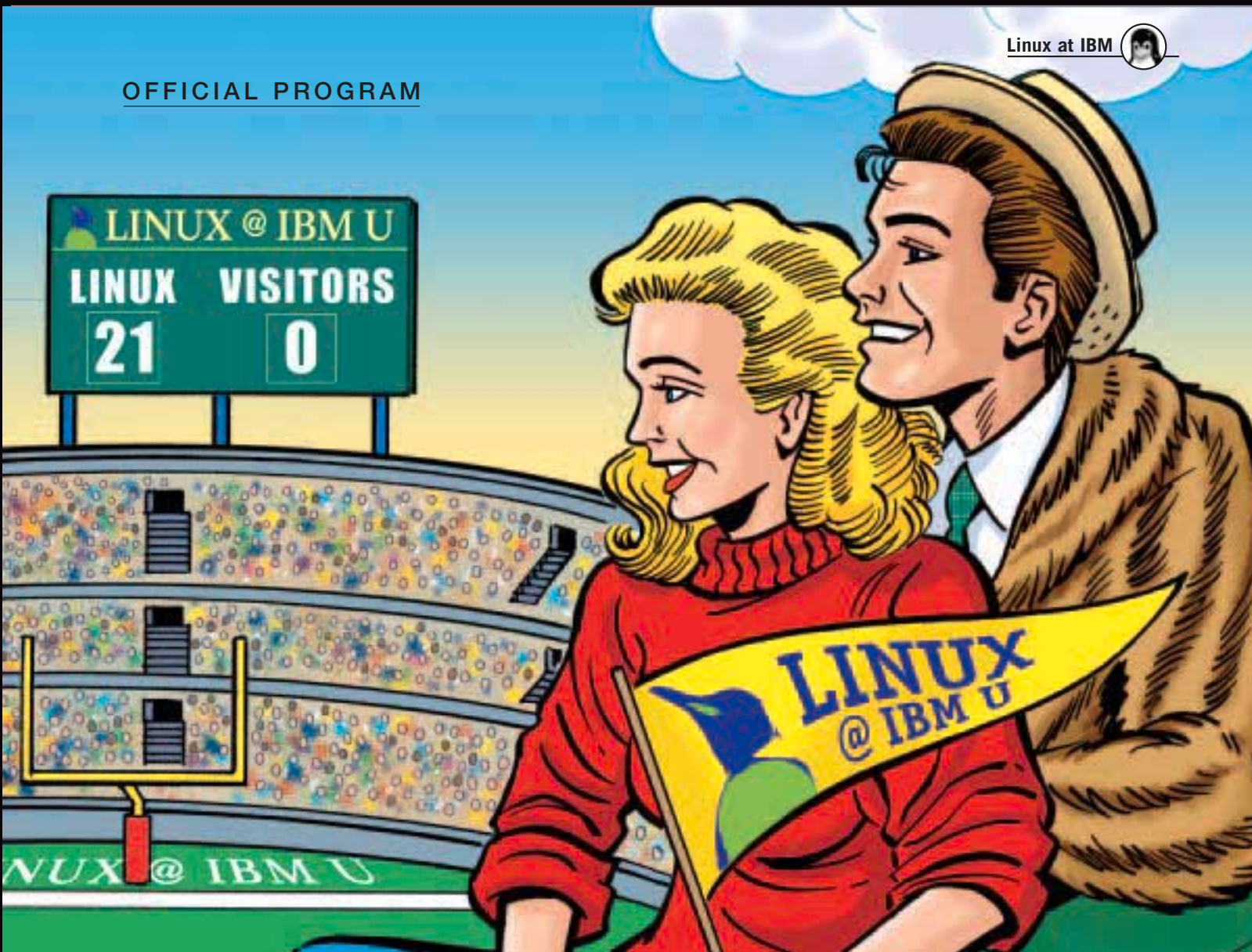
LINUX

Executive Report from IBM

Helping Customers Innovate with Linux and Open Source

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Linux at IBM 



A BIG SCORE

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Executive Report from IBM

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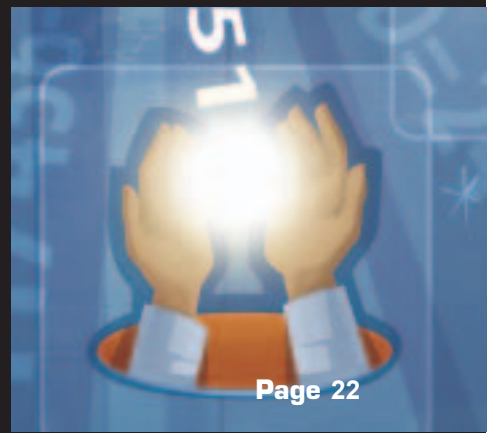
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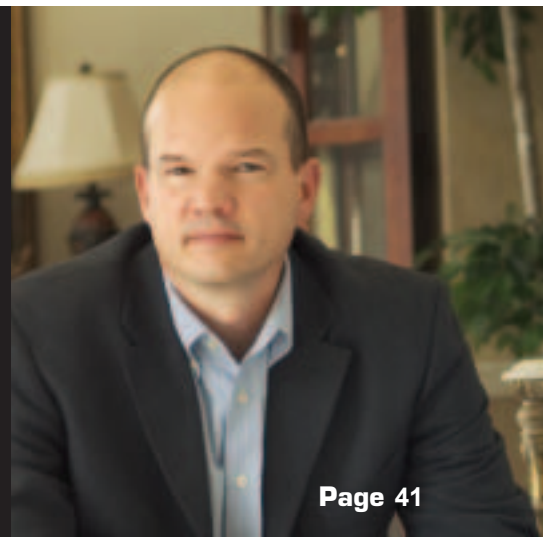
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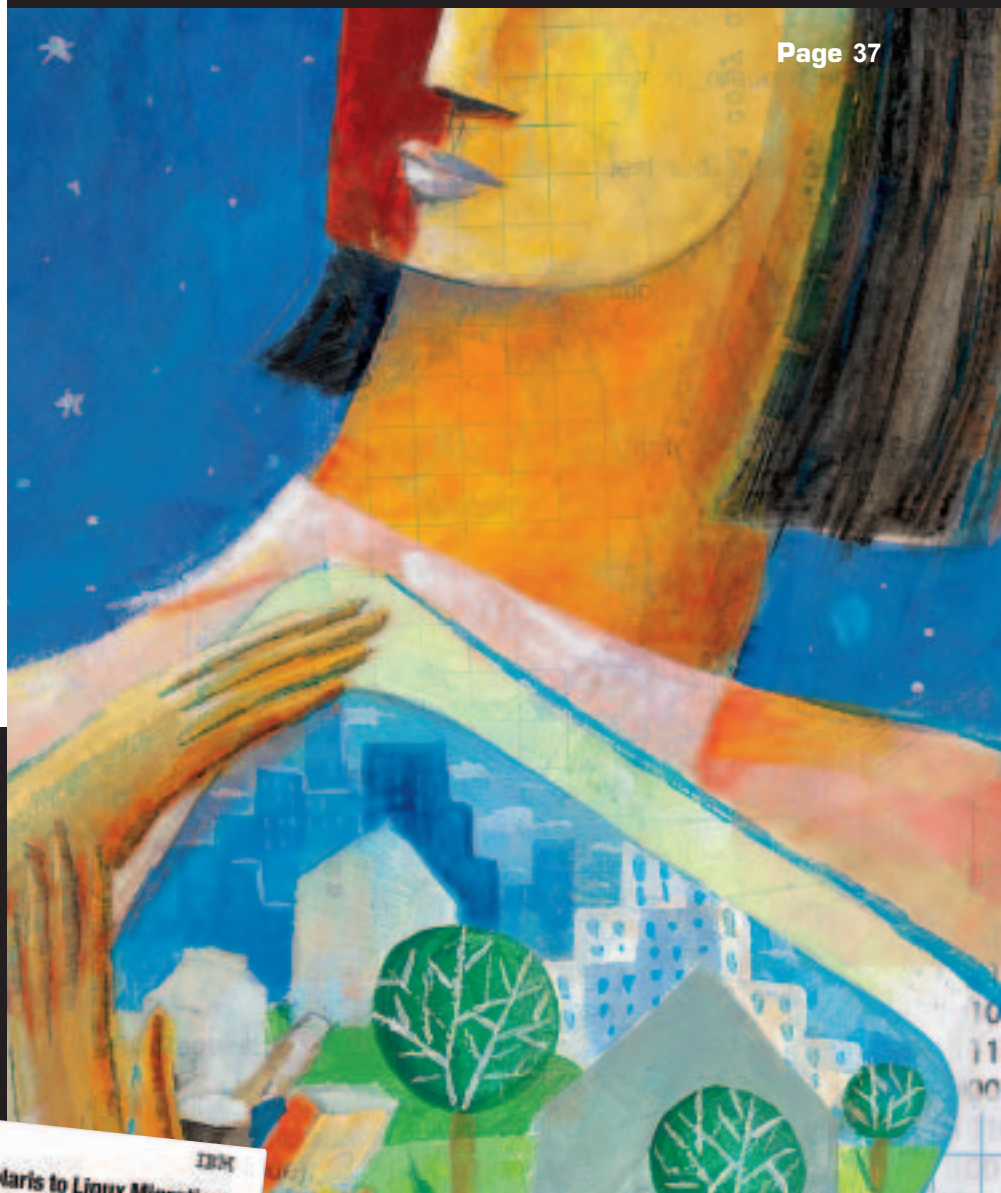
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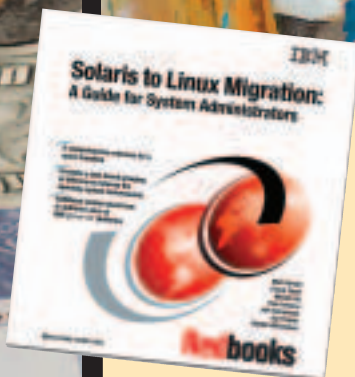
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There's a new guide for systems administrators. Download a free technical reference for migration from Solaris to Linux technology-based systems at www.ibm.com/linux.



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Executive Report from IBM

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It's an Open-Source World

THE ABILITY TO COMMUNICATE with anyone, anywhere and at anytime is enabling a torrent of collaboration opportunities that's blurring the lines between countries, organizations and industries. In the world of computer technology, one of the results of these collaborative experiences has been the explosion of open-source technology, such as the Linux* operating system, XML, Apache, Web services and Eclipse.

Historically, one of the reasons organizations have made the decision to adopt open-source offerings, such as Linux, is to attempt to avoid prohibitive software licensing fees. However, open-source users are discovering that implementing an open-source computing model has the ability to deliver additional financial benefits.

By moving to a common operating system, Linux customers are able to employ personnel with common skills to more effectively administer their server resources. Deploying open-source solutions can also help organizations consolidate servers, which can decrease management costs and improve CPU utilization.

Simply making the decision to deploy a Linux technology-based solution won't guarantee that an organization will save money. Deployment plans must be prudent and well planned. However, recent studies from two IT consultants show that deploying Linux technology-based applications, as opposed to Windows* and/or Solaris technology-based applications could potentially deliver savings of 40 to 100 percent.

Clearly the return on investment that open-source technology delivers is alluring, but there are other factors contributing to the growing adoption of open-source solutions. As Open Source Development Labs (OSDL) CEO Stuart Cohen says in this issue's Industry Watch column, "... as the world is moving toward open standards and open innovation, the

opportunity for Web-based and a Web-developed operating system like Linux fits with the times."

In this magazine, you'll read how schools like Bryant University, Boston University and the University of Virginia are deploying Linux to reduce costs, increase efficiencies and improve customer satisfaction. The First National Bank Omaha migrated its applications from both UNIX* and Windows environments to Linux on an IBM mainframe and an IBM BladeCenter* server to improve reliability and reduce costs. Havertys Furniture Companies, Inc. has cut costs by moving its applications from a high-maintenance Windows environment to Linux on iSeries* systems.

Companies in disparate industries are realizing the benefits of deploying open-source technology throughout their organizations. Moving to Linux makes good business sense. Linux is also becoming increasingly easier to deploy. Now, more than ever, the time is right for Linux and increasingly, open source beyond Linux.



A handwritten signature in black ink that reads "Scott Handy". The signature is fluid and cursive.

Scott Handy
Vice President Worldwide Linux and Open Source

Linux Gains Gravity

Cohen: Developers, vendors, users converge at OSDL to accelerate Linux usage

BY EVELYN HOOVER

IF YOU'VE FOLLOWED LINUX*, even peripherally, over the past few years, you've probably heard of the Open Source Development Labs (OSDL). It's now the home of Linux kernel creator Linus Torvalds.

CEO Stuart Cohen, who joined OSDL three years ago, explained that the organization's mission is to provide a vendor-neutral location where developers, vendors and users can come together to address technical, market, business and legal issues around the acceleration of Linux use in the enterprise space.

To learn how the organization benefits Linux users, the *Linux Executive Report* sat down with Cohen.

Q: OSDL's Web site (www.osdl.org) describes the organization as a "center of gravity." What exactly does that term mean?

A: It's a little bit of a tongue-in-cheek description. Right before I took the job as CEO three years ago, Steve Ballmer from Microsoft* wrote in a memo that Linux will never be successful because there's "no center of gravity"; that it comes from the open-source community. So, I took that as an opportunity to say that OSDL will become that center of gravity, where we will bring the community, vendors and users together. At that time, OSDL had about 20 member companies. We now have

about 80 member companies on five continents. We have three Linux user-advisory councils—one in the U.S., one in Europe and one in Japan. So we've got a pretty broad voice and a venue for different people to come together, but it really was kind of a tongue-in-cheek poke at Steve Ballmer's comments. Obviously, the development community is the center of Linux kernel development and Linus [Torvalds] is the leader of that.

Q: When I started working as an IT journalist seven years ago, Linux was viewed as something college students did in their spare time. Now, I've seen Linux evolve into an enterprise operating system. How do you explain that evolution?

A: It's a combination of things. If you go back to the days of UNIX*, UNIX came from AT&T, it came from Berkley. The users around the world had a new price point, new performance terms, new hardware, software and vendor flexibility that they'd never had before. Over time, customers lost a lot of that value proposition and a lot of that flexibility as vendors did things with their own flavor of UNIX. Then, Linux comes along from the Internet, from the open-source community, offering customers tremendous flexibility, and the vendors have the ability to sell a tremendous amount of hardware, software and services on top of and around Linux

that make for a strong value proposition for their customers. So it's a combination of a number of factors.

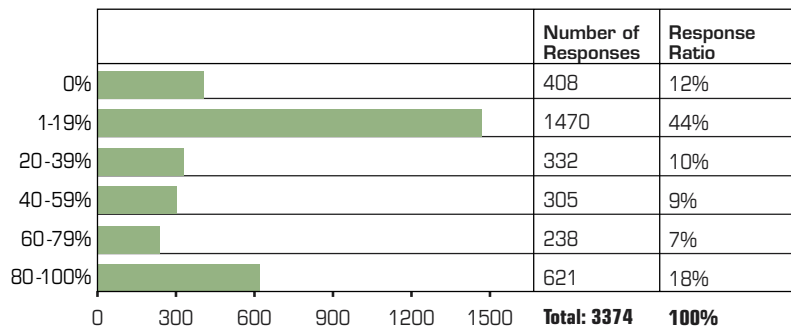
Q: Why is the evolution occurring now?

A: It's a number of things. Part of it's the more off-the-shelf technology that's available, like Power PC*, Intel* and AMD, so the price/performance of servers has dropped to a very low rate. At the same time, the price of Linux versus UNIX is substantially lower. And the reliability, availability and serviceability of Linux and its different distributions has been very well received. Also as the world is moving more toward open standards and open innovation, the opportunity for Web-based applications and a Web-based and Web-developed operating system like Linux fits in with the times.

Plus, IT professionals—whether in business, government or education—are under constant cost pressures, so there's been a financial opportunity to move to Linux without giving up the kind of hardware, software and services you're used to. Most of the software that was running on top of UNIX now is transitioned to run on top of Linux. So many times, the user is seeing the same applications, but the IT department is delivering them on much lower-cost hardware with a lower-cost operating system while at the same time, in most cases, providing better performance.

Figure 1

PERCENTAGE OF CLIENT COMPUTERS RUNNING ON LINUX TODAY (desktops, workstations, laptops, thin clients, fixed function)



Source: Open Source Development Labs



I think Linux, open source and open standards are just driving the market to a more services-based orientation, to go around hardware and software.” –Stuart Cohen, CEO, OSDL



Asia and Europe will spur Linux to have great success in the enterprise space.

Other areas also suggest a strong push for Linux: nine of the 10 largest supercomputers are running Linux; about 25 percent of the smart phones shipped in the second quarter of 2005 were running Linux; about 4 percent of the worldwide market for cell phones in 2005 were Linux equipped, which was up from 2004 and we think is on the rise. The same is true of consumer-electronics

devices. When you look across the board, embedded Linux and Linux operating systems across a wide variety of platforms are having good success. So,

Q: You’ve worked for IBM in the past. Did you ever expect IBM to be championing an open-source operating system?

A: There was seven years between the time I left IBM and the time I came to OSDL. I think if you look at IBM, the company has always been very customer-driven and has always had a very strong suite of hardware, software and services solutions. Ever since [former CEO] Lou Gerstner and [present Chairman/CEO] Sam Palmisano really made the push to services, I think Linux, open source and open standards are just driving the market to a more services-based orientation, to go around hardware and software. That plays right to IBM’s strengths. So from that standpoint, it doesn’t surprise me at all.

Q: What’s the short-term future of Linux?

A: From a short-term standpoint, Linux is having tremendous success. If you look at it from a server standpoint, big business is adopting it in a very strong fashion. When you look around the world at what’s going on in Asia around economic development, job creation and business creation, Linux, open source and open standards play a key role. When you look in Europe and you look at what the European Union and different countries are involved with, from an open-source, source-code availability and the sociocultural aspects of open source through open standards, I think there’s going to be tremendous growth and a tremendous push from the governments in Europe and in Asia.

So strong price/performance in the U.S. and price/performance and government involvement, both socioculturally and with regard to economic development, in

as the desktop applications become easier to use and there’s more flexibility for the users, I think Linux on the desktop will grow as well (see Figure 1, above).

Q: Speaking of Linux on the desktop, where is the market in terms of acceptance of Linux on the desktop in enterprises?

A: Open Office provides a very strong alternative to Microsoft Office, especially for the desktop worker. If you’re an office worker using e-mail and calendaring and a Web browser and a client-server application, Open Office is a good solution for you.

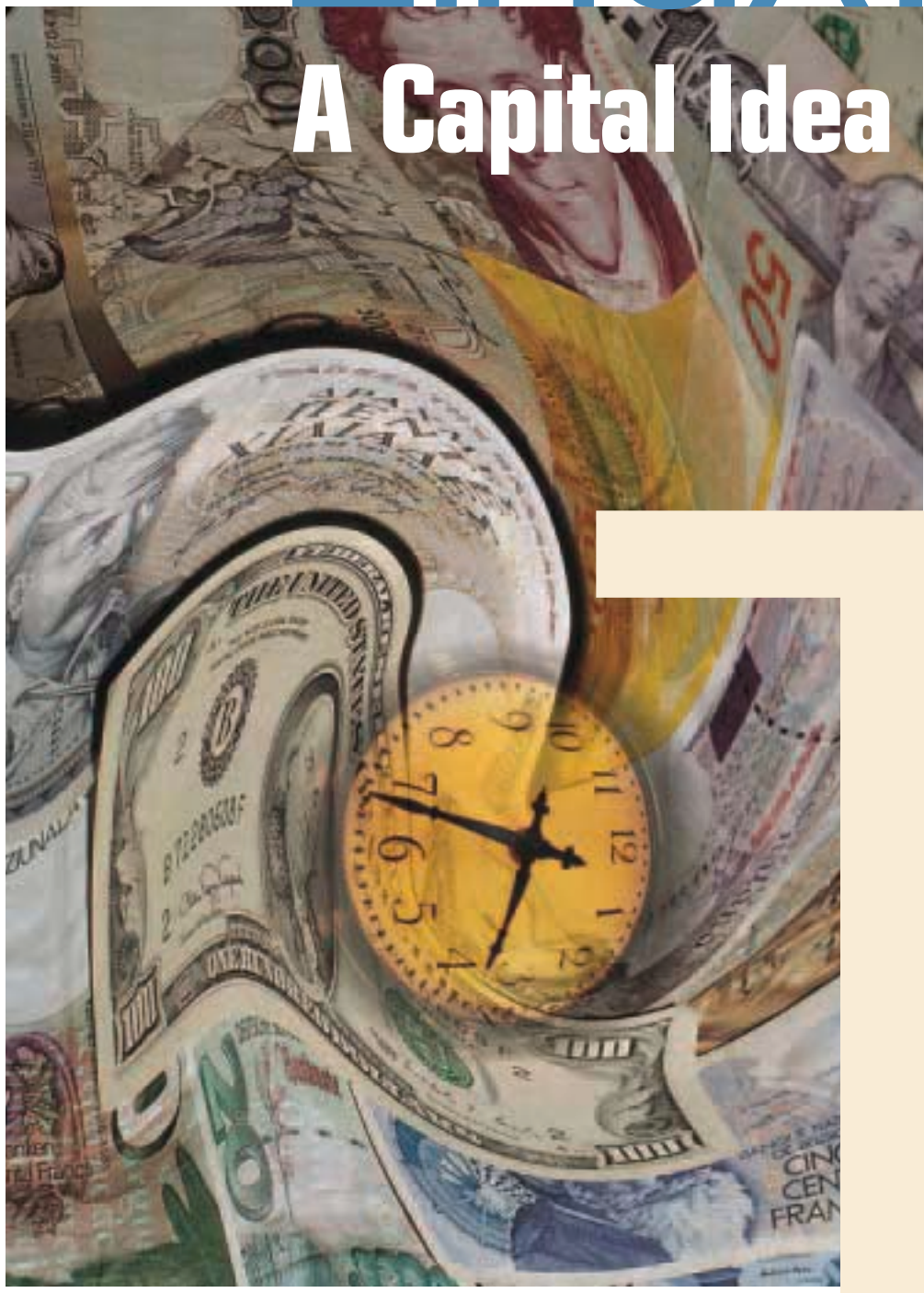
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ONLINE: Looking to integrate Linux into Windows environments? Check out: ibm.com/linux/integration.

Linux:

A Capital Idea



**Analysts discuss
the total cost
of Linux ownership**

BY JOE MCKENDRICK

There's no question that moving to Linux* has provided impressive cost savings for many organizations, resulting from low to no upfront licensing costs, as well as freedom from locking into expensive proprietary systems. Linux continues to mature as an enterprise operating system (OS), proving itself to be of value to enterprises beyond the basic cost savings seen in the early deployment stages.

Two leading IT consultancies—Robert Frances Group (RFG) and Pund-IT Inc.—have been studying the Linux value proposition for a while, and, in recent reports, have identified new emerging areas of value that the open-source OS brings to the enterprise.

First, let’s look at the hard numbers. RFG examined pricing models and surveyed 20 companies, and puts the cost of an application server running on Linux (on Intel* x86 hardware) at \$40,149 over a three-year period, a 41-percent savings com-

and in increased skill availability (see Figure 1, above). For example, a U.S. retailer interviewed as part of the study reported savings of more than \$2 million through simplifying its client-server infrastructure and avoiding future costs associated with the purchase of WinTel servers and software licenses and the hiring of IT support staff.

To discuss the implications of this new total cost of ownership (TCO) research, the *Linux Executive Report* spoke with the authors of these studies—Chad Robinson, senior research analyst with RFG; and Charles King, principal analyst with Pund-IT Research.

“We found that the main benefit that businesses saw in Linux was as a way to get out from underneath expensive operating-environment licenses.”

—Charles King, principal analyst, Pund-IT Research

Figure 1

Second stage Linux benefits	EMEA Pharmaceutical Distributor	U.S. Retailer	Mid-East Heavy Equipment Vendor
A. Better match applications and hardware	X		X
B. Better scaling of applications	X	X	X
C. Optimize cost performance across a value chain	X	X	X
D. Better meet dynamic workloads	X	X	X
E. Consolidate server workloads	X	X	X
F. Consolidate application workloads	X	X	X
G. Increase IT staff efficiencies while reducing the number of administrators	X	X	
H. Reduce IT management costs	X	X	
I. Reduce system maintenance cost, time and effort	X	X	X
J. Standardize on one set of tools	X		

Chart provided by Pund-IT Inc. All rights reserved.

pared to the \$67,559 cost of running the same software on Windows* (also running on x86). The cost of running the same application server on a Solaris technology-based system (running on SPARC) is more than double that of Linux, totaling \$86,478. Part of this is due to the fact that Linux systems support more applications and have higher utilization per server than Windows technology-based systems.

Pund-IT closely examined Linux deployments at three geographically dispersed companies in the retail, pharmaceutical and heavy-machinery sectors, and determined that in advanced implementations of Linux, cost benefits were being realized on an operational level, through server consolidation

hardware investments, as opposed to having to buy entirely new hardware and investing in entirely new operating system and application licenses. Those were the common “first-stage” benefits that companies experienced when they moved to Linux.

LER: Can you describe the benefits enterprises seek from Linux at this time?

Robinson: Administrator-skill portability, hardware-architecture portability and vendor diversity. These benefits increase the IT department’s ability to quickly and cost-effectively meet future workload demands and business challenges.

LER: Is moving to Linux still about the money?

Robinson: Yes, the money is still important. Anybody who can save money is a hero in a corporate environment today. Linux can help with that. But TCO is just one dimension of Linux. In our study, we found two big factors. First, that Linux is being used for more mission-critical workloads. And second, TCO has become just one factor of many benefits, which include Linux’s flexible licensing model, a wide range of supported hardware platforms, growing ISV support and fast administrator skill-set transfer from other UNIX* platforms. That is a big mental shift that we’ve seen over the last couple of years.

King: We found that the main benefit that businesses saw in Linux was as a way to get out from underneath expensive operating-environment licenses. They also were looking for ways to get additional leverage out of existing

King: In our study, the three companies talked about the benefits from consolidating IT processes and server workloads. One company, a U.S. retailer, moved significant numbers of server workloads onto virtual Linux servers on its mainframe environment, which provided a real cost benefit over time. Previously, the company's datacenter was expanding to the tune of 10 to 15 WinTel servers per year, and they needed to hire at least one administrator to handle those new servers. Adding these servers translated to \$100,000 in personnel and training costs, plus another \$5,000 to \$10,000 a server, plus operating systems and ongoing maintenance costs. There were also the structural costs of adding servers to the company's datacenter, in terms of heating and electrical and cooling costs. The company estimated that it has saved more than \$2 million in total so far.

LER: Any words of caution about achieving these goals?

Robinson: The TCO savings are not automatic. A lot of people go into Linux thinking that because everybody else has seen reductions—you've seen hundreds of reports about that—that if I put Linux out on my environment, I'm going to save money.

That may be true, and there are ways to do that. And certainly, we've got data that shows many people have done that successfully. But it won't happen just because you put Linux out there. You have to have a very good deployment plan, you have to take advantage of all the benefits it has to offer, and so on and so forth, before you actually see those TCO reductions.

LER: Skills and retraining issues and costs weigh heavily in the success of a Linux project, then. It is said that it's more difficult to bring staff over from Windows to Linux than from UNIX, which is more closely related to Linux.

Robinson: UNIX and Linux are not identical. They're very similar, but depending what you're going from and what you're going to do, you do have to be a little careful.

King: One of the companies I studied spent several months retraining existing Windows administrators and IT staff for Linux; it had heard that it was difficult for Windows administrators to move to Linux. There is some logic to that, since Linux is much more akin to UNIX than it is to Windows. The company, however, proved that smart system administrators and smart IT

staff members can be just as smart with Linux as with Windows. The company made the move over without displacing any staff.

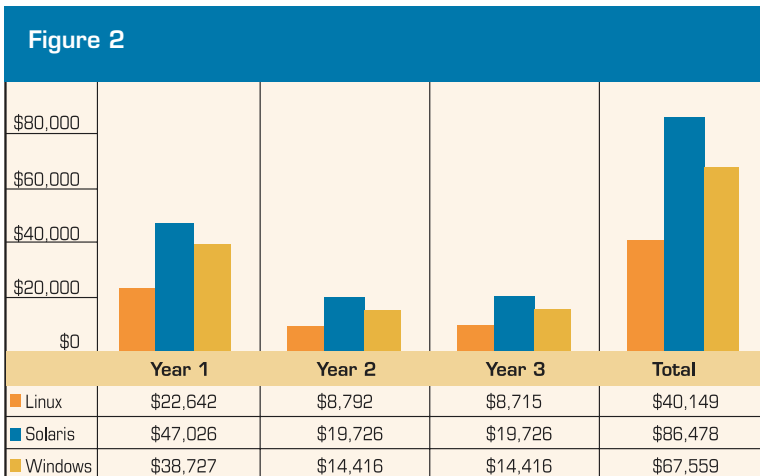
LER: What are the second-stage benefits of Linux we're seeing at this time?

Robinson: There are good Linux deployments and bad Linux deployments. TCO numbers are built from a whole series of factors (see Figure 2, below). Making gains in one of those factors is always a good thing, but you have to be very careful not to lose ground in another area. For example, administration costs and people costs are a huge portion of an IT budget—and that applies to Linux as well. If you buy Linux and save 20 percent off your software-licensing costs, that might save you \$10,000 for a given period of time. But your administrative

LER: Have any surprises come to light in your most recent research?

King: Some benefits can be a pleasant surprise. Linux appears to help enhance IT staff performance and lower system management and maintenance costs. Linux is extremely popular among young IT staff members, as well as with IT educators in universities and technical institutions. This has resulted in Linux playing a significant role in the recruitment and retention of new IT staff and managers. One company in my study reported the number of people applying for positions had increased significantly since it went to Linux. The company had a much deeper talent pool to choose from as it was expending its datacenter.

Robinson: There is a large gap between the Linux and Windows hardware-acquisition costs. Our study participants drove their Linux systems to higher utilization levels than those who used Windows, and ran more applications on each server. They were able to use less-expensive systems to support the same workloads.



Source: Robert Frances Group

LER: Is Linux being adopted for mission-critical workloads now?

Robinson: That depends on the industry. Certain industries, like financial services, have been on the leading edge of Linux adoption and have been using Linux for critical workloads for years now—for application servers, database servers and various other components in the enterprise architecture. In retail, we're starting to see Linux penetrate the critical elements of the stack there, not just being used out on the edge. But other industries, such as insurance, tend to naturally be more conservative.

costs might go up \$60,000 and wipe away the other savings.

The people that go into Linux with their eyes open tend to be the most successful, because they don't try to make Linux fit the old model. When you deploy Linux, it's not enough to just to put a new operating system out there, because you've added an operating system to your mix, and that increases complexity. If you just drop Linux in as a replacement and you expect it to behave exactly the same way that your old operating system did, then you're going to do a little worse than a little better.

King: Some are simply expansions of first-stage benefits while others arise from longer-term tactical and strategic issues, such as Linux's adoption for or adaptation to new business and IT processes. Linux technology-based server and workload consolidation relates to this, as does using the OS to better scale applications and server capacity to meet business needs. Linux can help to spark the success of strategic IT and datacenter consolidation efforts.

LER: How long before an enterprise starts seeing financial benefits from a Linux deployment?

King: The U.S. retailer I studied performed its first Linux implementation as a way to consolidate some IT infrastructure processes into a mainframe environment. The company saw financial benefits begin flowing back within 30 to 60 days of its first implementation.

LER: What do you see as the greatest TCO opportunities for Linux in the near future?

Robinson: Linux will play well in consolidation strategies. With the Xen project, which is still in the early stages, virtualization is built into the Linux kernel. It's very fast, very efficient and lets you get high levels of virtualization on a single server. Consolidation to reduce hardware count also improves reliability. With two separate servers, your reliability gets



“**C**ertain industries, like financial services, have been on the leading edge of Linux adoption and have been using Linux for critical workloads for years now. ...”

—Chad Robinson, senior research analyst, Robert Frances Group

divided, not multiplied. If you expect a failure once every 100,000 hours, now you're looking at every 60,000 hours. With four servers, it's once every 12,000 hours. With too many servers, there are real risk factors for one of those nodes failing. Service-level agreements and things like that become easier to write, and you don't have to worry about different failure rates.

King: There are going to be some interesting opportunities and choices around Linux this year, which are going to be driven in large part by Microsoft*. To get the full benefits of Windows Vista, which is supposed to be released this year, a lot of companies will have to consider hardware upgrades. At that point, the whole cost-benefit issue will come up for serious analysis.

There's now recognition that IT can provide significant

benefits to companies of almost any stripe. You would have to go a long way to find a business where IT doesn't have some sort of influence on business processes. But at the same time people are trying to get as many benefits as they can out of the money they've already spent—and spend as little new money as they can—to attain those benefits. Linux plays well in those circumstances.

Joe McKendrick is a research consultant specializing in IT and organizational development trends, authoring special reports for IDC and Gartner. He's contributing editor to *Database Trends & Applications*. Joe can be reached at joe@mckendrickresearch.com.

Linux is gaining momentum in both for-profit
and nonprofit environments

LINUX GOES TO SCHOOL

BY JIM UTSLER

DESPITE having students, early morning classes and late-night study sessions, educational institutions aren't unlike their for-profit cousins. All of them, whatever their motivations, want to increase efficiencies and reduce costs while also improving customer satisfaction, no matter the type of customer (students, clients or staff).

Fortunately, there are ways for them to achieve these goals, including introducing Linux* into their computing environments. This open-source operating system (OS) affords users alternatives to more proprietary and often more expensive computing staples, including other UNIX* technology-based offerings.

And universities and colleges have begun reaping the benefits from the move to Linux, using it in myriad ways, including advanced technical research or back-office operations. It also gives schools the opportunity to consolidate to fewer platforms and increase operational efficiencies. As Art Gloster, vice president for Information Services with Bryant University, points out, "The widespread adoption of Linux has a lot to do with flexibility, stability, performance and security."

Gloster isn't alone in uttering this mantra, as the cases of Bryant University, Boston University and the University of Virginia demonstrate. All have begun using Linux not just in supporting roles, but also as computing mainstays, with Linux replacing traditional OSs in ways that—even a few years ago—hadn't been imagined.



ILLUSTRATIONS BY PETE MCCONNELL



Students in the C.V. Starr Financial Markets Center simulate trading scenarios and real-world trading.

Up Close

- CUSTOMER:** Bryant University
- HEADQUARTERS:** Smithfield, R.I.
- BUSINESS:** Post-high school education
- HARDWARE:** IBM BladeCenter running Red Hat Linux on HS20 blades
- SOFTWARE:** SCT Banner and WebSphere
- CHALLENGE:** Consolidating multiple servers to a common OS
- SOLUTION:** Moving its 74 servers (all running multiple OSs) in three locations to 52 servers—all running Linux—in one location

PHOTOGRAPH BY DON HAMERMAN

A Little of Everything

Originally established in 1863 as Bryant and Stratton National Business College, Bryant University has since become a nationally respected university situated on 420 acres in Smithfield, R.I. *U.S. News & World Report* considers it one of the top 20 master's colleges/universities in the American Northeast, and *The Princeton Review* and *Forbes.com* have also called it the second "Most Connected Campus" in the country. According to Gloster, "We've logically decided that the foundation of our university, as far as technology is concerned, is going to be the network. So we decided to really push the connectivity foundation and have continued to grow from there."

Part of this success is due to the university's decision to consolidate many of its servers to a common OS platform, which in this case is Red Hat Linux. At the same time, it also consolidated its server platforms, moving

from 74 servers in three locations to 52 in one location. During this process, IT staff discovered an additional six so-called "stealth servers" they hadn't been aware of, which have also been consolidated as part of the 52 servers in the one location.

Prior to this consolidation effort, the university had been supporting multiple OSs on multiple platforms, including Windows*, Sun and AIX*. "We had a little of everything and not much of anything," Gloster jokes. When asked if that type of environment had been a chore to maintain, Gloster says, "You can say that many times over." Philip Lombardi, Bryant's director of academic computing and media services, agrees, saying, "Part of the problem was that we didn't know about some of these servers and therefore couldn't maintain them; they didn't have the latest security patches and so forth."

To address these and other issues, the university decided to migrate to a more Linux technology-centric environment, not just for low-level DNS and FTP purposes, but also for mission-critical applications such as SCT Banner, an ERP-type collegiate administrative solution from SunGard, and its WebSphere* technology-generated Web site. The server platform the university chose for this was an IBM* BladeCenter* running HS20 blades. This allowed the organization to focus more on delivering services rather than maintaining a host of disparate server platforms, including Intel* technology- and Sun technology-based servers. "We haven't had to increase staff even though the number of our applications has almost doubled over the past three years," says Janice Fagan, Bryant's director of administrative systems.

Also because of the move to a common platform, the university can now more easily share IT knowledge. In the past, this wasn't so easy, with IT staff members having expertise with one OS and server platform but not others. This created a disconnect between specialists. That speed bump has now been eliminated, with everyone working for the organization's IT department having the same skill sets. "Because we were supporting so many different environments, we couldn't effectively share resources," notes Rich Siedzik, Bryant's director of telecommunications and network technology. "Now, everyone has the same expertise."

Another crucial benefit was the university's ability to dramatically increase server-utilization rates. On average, according to Gloster, that rate had been about 10 percent. Since the consolidation took place, that rate has now climbed to 30 to 40 percent. And that work isn't yet completed. "We're still trying to identify areas where we can collapse workload and eliminate servers." This effort has been made much easier since the organization moved to Linux running on the HS20 blades.





Boston University students share notes in front of a dorm on Bay State Road.

Up Close

CUSTOMER: Boston University

HEADQUARTERS: Boston

BUSINESS: Post-high school education

HARDWARE: IBM @server zSeries 890 running SUSE Linux Enterprise Server

SOFTWARE: DB2 Universal Database for Linux V8, CICS

CHALLENGE: Successfully upgrading the software of its existing ID system

SOLUTION: Migrating to Linux from the previous Windows and Oracle configuration in an Intel technology-based environment

PHOTOGRAPH BY FRED SWAY



Reliable and Responsive

Boston University has had similar consolidation success, albeit by running SUSE Linux on an IBM @server zSeries* 890 rather than BladeCenter HS20s. The university itself has been in existence for 157 years and has become the fourth-largest independent university in the United States, with more than 29,000 students enrolled in its many undergraduate and graduate programs.

Because of its large student population, the university needs a way to effectively track and assist students as they take advantage of the organization's many services, such as class enrollment and student dining. One such way to do this is via photo IDs with magnetic-information stripes, or, as Gerard Shockley, assistant director of technical services for Boston University, explains, "image-based

credentials for validation purposes across campus. So it's what we call a single 'universal ID' that's used, for example, for access to secure locations such as dorms or purchases of convenience points for meal plans or for the visual identification of a student."

The previous photo-ID system was running in a Windows and Oracle configuration in an Intel technology-based environment. Although that technology was working well, the university was planning a software upgrade of its existing ID system. But rather than moving to a new build of the application, the university decided to take "the opportunity to consolidate those application and database servers on our zSeries system running Linux and DB2*," Shockley recalls. "These are in separate guests under z/VM*. So, using the virtualization strengths of the zSeries platform, we were able to eliminate two servers."

The result is the photo-ID application running in a virtualized SUSE Linux partition and DB2 Universal Database (DB2 UDB) for Linux V8 information-management software in another virtualized partition. The z890's current z/OS* configuration consists of four logical partitions (LPARs) that host a system, systems-programming, testing and two production environments and the Integrated Facility of Linux (IFL) environment for Linux on zSeries workloads. The system LPAR is used for software installations and OS programming; the testing LPAR is used by programmers for validation and quality-assurance purposes; and the two production LPARs are used for Web-services hosting and the university's IBM Customer Information Control System (CICS*) application. The IFL runs the SUSE Linux Enterprise Server (SLES) OS, hosting the DB2 UDB, its IBM WebSphere environment, its thin-client application and several other business-critical applications.

Of course, the consolidation wasn't the only benefit to the move to Linux. The university now has only a single interface to manage the environment, using the built-in management capabilities of z/OS. For example, it can now wrap database backups into its regular disaster-recovery routines rather than having to treat them as separate tasks. "There are many business benefits resulting from our configuration choices, such as improving our ability to manage the environment through a single interface, the power of z/VM, and improving the securability of the environment," Shockley says. "That, and the installation has proven to be highly reliable and very responsive, and the users are extremely pleased."



Members of University of Virginia's cardiovascular MRI research team gather in front of an MRI.

Up Close

CUSTOMER: University of Virginia
HEADQUARTERS: Charlottesville, VA.
BUSINESS: Post-high school education
HARDWARE: An eight-node cluster of IBM xSeries 335s running Red Hat
SOFTWARE: IBM Cluster Systems Management for Linux, IBM General Parallel File System for Linux and Tivoli Storage Manager
CHALLENGE: Improving the processing power necessary to create real-time MRI images
SOLUTION: Using the xSeries cluster and Linux to run an application to provide for the real-time MRI imaging

PHOTOGRAPH BY TOM COGILL

A Natural Progression

The University of Virginia's users—especially those who are patients at the university hospital—are also very pleased. The school is using Red Hat Linux in an xSeries* node to create real-time cardiac imaging using magnetic resonance imaging (MRI) so doctors can be more quickly informed of any issues related to patient cardiac problems. The university's School of Engineering and Applied Science, which is one of the nation's oldest engineering schools, created the node. Appropriately, its motto is, "Engineering That Makes a Difference."

Realizing that the onboard, embedded computing system in the MRI console wasn't up to this task, the university began looking at ways to improve the processing power necessary to create the real-time MRI images. With the assistance of a Shared University Research (SUR) Grant, the university's Biomedical

Engineering Department began work on the project, which, according to Mitch Rosen, CTO, School of Engineering and Applied Science, will allow physicians to "see the beating heart in real time with high frame rates, more slices and better image quality than ever before."

The primary computing power behind this is an eight-node cluster of IBM xSeries 335s. The application that allows for the real-time imaging is written for Linux and, as Rosen explains, "will pull the data from the MRI scanner to break down the stream and parse it out to the individual processors that make up the cluster. The cluster will then take those calculations, put them back together and render them as a real-time display." As part of the SUR, the university also has three additional research projects under way, all of which are running on a shared 26-node cluster. "Plans for an additional, more powerful cluster node are in works to connect to a new 32-channel MRI unit that we've placed in service," Rosen adds.

Because the MRI nodes won't always be in use, the university plans to make it part of a larger, university-wide grid. This will allow the organization to make better use of the resource. "When a patient is in the MRI scanner and there is no real-time cardiac imaging going on, we would like to be able to make more efficient use of the available cycles. So a grid model is something that is absolutely part of our project moving forward," says Rosen. "In fact, we just installed the grid software on the larger cluster."

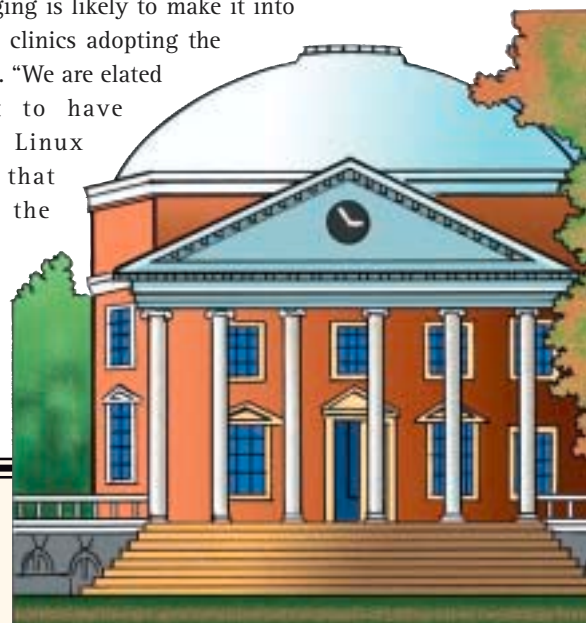
This example of Linux in use for real-time MRIs is only part of the Linux story at the school. Across the grounds, other departments are adopting the OS, seeing it as a way to move away from other proprietary OS to one that's more open, flexible, secure and stable. "There's been an erosion over the last several years of the deployment of UNIX desktop equipment in favor of equipment running Linux," Rosen says. "It's been a natural progression, and nothing's been mandated; much of the software we use, especially the scientific software, is being ported to Linux."

Rock Solid

As with organizations of nearly any type—for profit or not—Linux is becoming a mission-critical part of the computing environment. Once the domain of tech heads, it's now the norm, both in scientific and back-office settings. "Linux is rock-solid stable," says Boston University's Shockley, "and if there are any defects, they're typically resolved before they reach production exposure. So, yes, Linux is gaining momentum, and that momentum seems to be unstoppable—and beyond the university environment."

This is perhaps clearest in the case of the University of Virginia. The work it's doing with Linux and medical imaging is likely to make it into the mainstream, with hospitals and clinics adopting the technology for use in the real world. "We are elated about our cooperative effort to have constructed this world-class, Linux technology-centric facility that actualizes new decisions from the clinician to the patient," says Rosen.

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Ken Kucera, senior vice president and division head, FNBO enterprise technology services, helped direct the move to Linux on zSeries and BladeCenter.



First National Bank Omaha's IT choices mean money in the bank

BY JIM UTSLER

Compound Interest

Although working out of the house is a wonderful thing, it means I have to provide my own technical support, troubleshooting the four computers I use. This effort is sustainable for now, but the inclusion of even two more PCs to my IT environment might push me over the edge.

And my experience is nothing compared to that of larger enterprises. Maintaining an appropriate system-administration staff can take away from the bottom line, requiring organizations to hire new staff and pay ever-increasing software-licensing fees as their server farms continue to grow. Consolidation is a good way for them to address this issue.

Some might say that's easier said than done. However, the reality is that the task doesn't have to be difficult to execute, as long as there's a sound migration plan in place. One organization that recently underwent a consolidation effort is First National Bank Omaha (FNBO). FNBO is using the onboard Linux* capabilities of an IBM* @server zSeries* server and the dense

UP CLOSE



CUSTOMER: First National Bank Omaha

HEADQUARTERS: Omaha, Neb.

BUSINESS: Banking and other financial services

HARDWARE: An IBM *@server* zSeries 990 and an IBM BladeCenter

SOFTWARE: DB2 and WebSphere

CHALLENGE: Reducing costs and improving reliability in a distributed-computing environment

SOLUTION: Migrating UNIX applications to Linux on zSeries and Intel applications to the BladeCenter

computing capabilities of the IBM BladeCenter* to replace approximately 600 stand-alone Intel* and UNIX* technology-based servers. As a result, FNBO is now poised to save \$1.8 million in operating expenses this year alone.

Twenty Servers, Another Body

Based in Omaha, Neb., FNBO is the lead bank within First National Nebraska Inc., one of the largest bank-holding companies west of the Mississippi, with more than \$16 billion in managed assets and more than 7,000 employees. FNBO has been in existence—under the same name—for more than 150 years, which is no small feat given the mergers and acquisitions that have occurred throughout the banking industry's history.

Founded on a philosophy of personalized customer service

and the creation of innovative, quality financial-services products, FNBO is always looking for additional ways to provide more to its patrons, whether by offering attractive credit-card solutions or creating simpler ways to conduct online banking. To help ensure that it offers dependable services to its customers, FNBO developed its new IT environment, comprising a zSeries 990 (z990) and a BladeCenter holding approximately 65 blade servers.

Of course, this beefy IT environment didn't exist before the company began its consolidation effort. Although core banking and credit-card operations were running on a z900, other processes and applications, such as Web-based banking and back-office software, were assigned various stand-alone boxes, including more than 30 Sun Microsystems machines and more than 560 Intel-technology-based servers. "Our Web applications, such as online banking, bill-pay systems and others such as customer service, were running on the UNIX technology-based servers," says Ken Kucera, senior vice president and division head of FNBO Enterprise Technology Services. "Other applications, such as our contact-management and recruiting software systems, ran on the Intel servers."

Notably, each of these servers had dedicated processing and storage resources that couldn't be shared. Equally disturbing were the wasted resources, with processor utilization at only 12 percent and storage utilization at 14 percent.

This disparate computing environment was becoming extremely expensive, requiring FNBO to hire more people as more boxes were brought online. Kucera, who's also on the bank's board, explains, "I looked at our infrastructure in 2002 and

saw we were growing servers at a rate of 30 percent per year. For every application I had, I needed another one to five servers behind that, for things like development and application and Web serving. And every 20 servers translates to another body to administer them."

Having these separate boxes also meant higher licensing costs. For example, if FNBO had 150 copies of Microsoft* SQL*, it would have to pay for all 150 instances. "The entire environment was getting out of control," Kucera adds. However, if the organization reduced the number of physical servers, it could also dramatically reduce licensing costs.

Off and On

In early 2003, FNBO decided to re-evaluate its IT environment, realizing that a move back to enterprise computing might help



“I was very interested in the Capacity on Demand capability. We could ‘rent’ extra processors as needed instead of paying for the extra processor capacity up front.”

—Ken Kucera, senior vice president and division head, First National Bank Omaha Enterprise Technology Services

it rein in upward-spiraling costs, as well as allow the organization to support all users over IP from a single datacenter. This move toward a consolidated environment could also help FNBO become more flexible, deploying applications within physical or virtual partitions more quickly than it could with one-off boxes.

After exploring options from IBM, HP and Sun, FNBO approached IBM and MSI Systems Integrators (an IBM business partner) about the possibility of migrating its UNIX technology-based applications from Sun boxes to the Integrated Facilities for Linux (IFL) on the zSeries platform. This would eliminate the need for its 30-plus stand-alone Sun boxes and allow the organization to tap into additional IFLs as peak workloads demanded them. FNBO could also take advantage of the On/Off Capacity on Demand (CoD) features of the zSeries platform, allowing it to turn processors on and off as needed.

“During the holiday seasons, we have a lot of credit-card transactions to process,” Kucera says, “so I was very interested in the Capacity on Demand capability. We could ‘rent’ extra processors as needed instead of paying for the extra processor capacity up front. It doesn’t make sense to carry that overhead for 12 months just to use it for a month or two.”

This was only part of the solution. FNBO also had to deal with the more than 560 Intel servers it was supporting. At this point, IBM and MSI suggested moving these systems to IBM’s BladeCenter, which would allow the organization to shift its back-office applications to a single resource center. Rather than using a 1-to-1, box-to-box ratio migration model, both IBM and MSI suggested that FNBO use the virtualization capabilities of the blades to create a 1-to-18 consolidation ratio.

At the same time, IBM and MSI also suggested that FNBO move to a virtualized storage environment, in the form of the IBM Storage Area Network (SAN) Volume Controller. This would allow data to be stored in a single location instead of on each individual server. The organization could then eliminate 12 TB of excess storage as well as the large number of routers and firewalls it had deployed for its Intel environment.

As part of this consolidation effort, MSI arranged an IBM Zodiac study, which would help ensure that the migration—upgrading FNBO’s z900 to a 32-processor z990—would meet FNBO’s proposed productivity and total cost of ownership (TCO) expectations. With the Zodiac testing and proof-of-concept work done, FNBO decided to proceed with the migration. After running a pilot program beginning in late 2003, the organization began the migration, now having moved more than half of its Web-based applications to the BladeCenter. “We have 60 Web servers running within five IFLs on the mainframe,” Kucera notes.

So far, so good. There have been no zSeries server outages in the six months FNBO has been running both native mainframe applications and the Linux applications on the z990, and the BladeCenter has increased PC-based application performance with few issues.

With the migration moving smoothly forward and the hard work out of the way, FNBO has been able to cut its server support staff from 21 to six. Kucera hastens to add, though, that this cutback wasn’t the result of layoffs, but rather attrition and intracompany movement. “Some found other opportunities within the bank, some went elsewhere entirely, but nobody was laid off,” he says.

Savings, No Loan

FNBO’s very deliberate consolidation efforts, including bringing in both IBM and MSI, proved highly successful. Besides the expected \$1.8 million savings in operating expenses over the next year, the bank also foresees about \$10 million in savings over a five-year period. Other savings include newly available floor space, which Kucera expects will be whittled down 50 percent by early 2007.

Although I don’t face the same challenges as FNBO, there’s a lesson to be learned. I might benefit by upgrading to a more powerful and flexible system, moving from four systems to one. By doing so, I may save myself headaches, time and money. It seems that planning ahead could be the key.

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Open ing Up

IBM sees open-source alternatives as key to IT innovation

BY RYAN RHODES

IBM'S commitment to open-source software and open standards isn't new—the company has been promoting offerings such as Linux* for years. However, with the new IBM* Systems Agenda unveiled in 2005 comes a renewed commitment to openness, making significant investments in development communities and creating a broad portfolio of systems incorporating open-source applications and open standards into their design.

The goal of openness is to build an application portfolio that promotes increased flexibility, interoperability, scalability and choice when it comes to building an IT infrastructure, rather than the “one-size-fits-all” vendor models, which are often inflexible when it comes to future growth and general IT direction changes.

As a component of openness, a commitment to open source, standards-based solutions and initiatives allows customers to more easily and seamlessly integrate technology and systems into their existing environments. Because

customers often need to leverage their existing investments and often lack the manpower and personnel to deal with introducing new technologies, disruptions may occur. Openness can help customers deal more effectively with disruptions.

Open Source and Linux

As its name implies, open source means opening up software source code—either completely or specific segments of it—so that it can be accessed and altered by others.

The most obvious example of this sort of application development is the evolution of Linux, an operating system (OS) created by Linus Torvalds, who put his creation out for general consumption as an open-source development project on the Internet in 1991. Since then, thousands of Linux enthusiasts have built on that original creation, and the Linux versions available today are a result of a worldwide collaborative effort to improve and customize the OS.

Linux development was for many years considered an

ILLUSTRATION BY GEOFFREY PAUL SMITH

“WE’ve learned a lot about the benefits of open-source software and how those benefits tie in when used in conjunction with proprietary software.”

—Adam Jollans, IBM software worldwide Linux marketing strategy manager

interesting—but mostly fringe—phenomenon that wasn’t yet “ready for prime time,” particularly when matched up against the Microsoft* Windows* OS offerings. It wasn’t until companies such as IBM started looking at Linux as a viable OS for powering business servers and storage arrays that it really started to come into its own.

What Linux brought to the table for IBM was a common OS platform that could work across the different hardware types IBM offers, including mainframes, mid-sized servers, Intel* technology-based servers and storage devices, not to mention mobile devices, etc.

“IBM was very interested in Linux because of its interoperability across its different platforms and devices” says Bob Sutor, IBM vice president of standards and open source. “You can see why Linux makes a tremendous amount of sense to us, allowing us to transfer software-development expertise from one hardware platform to another. It provides a platform that is so similar across these different hardware environments that we can build many products such as DB2* and WebSphere* to run on top of them.”

More generally, Linux development showed IBM an emerging and powerful method of application development that offered a complementing model to the more established proprietary-application-development model.

“I would say that really over the last eight years or so, IBM has really learned a lot about open source, thanks in no small part to watching how Linux development occurred,” says Adam Jollans, IBM software worldwide Linux marketing strategy manager. “We’ve learned how to adapt to open-source business models and licensing, which are still evolving. We’ve learned a lot about the benefits of open-source software and how those benefits tie in when used in conjunction with proprietary software.”

Proprietary Software and Open-Source Development Models

People often compare open-source development with traditional, or proprietary, software development that typically takes place inside a single company. Proprietary development is the model in which someone basically says, “I created this, I paid for the people who developed it, so it’s mine and I’ll do with it what I choose.”

Proprietary development is arguably the most widely used model across the software industry, used both for popular offerings such as Windows and also in more specialized markets.

Alternatively, there’s open-source development which, as stated, means some or all of a product’s source code is available, as well as the executable code, so everyone can access, alter and distribute it. What that means is there’s more live peer review—people can see the source code, comment on it, and suggest a better way of doing something. They can even spot bugs and suggest fixes. This model isn’t limited to OSs like Linux; it can apply to almost any area of software, including database and e-mail systems and virtually any application.

“What’s remarkable about open-source collaboration is how it happens so spontaneously,” says Jollans. “If you want a sort of a model of how this has happened before, you can look at academic research, where an intellectual has an idea and publishes it, and that, in turn, is built upon by another academic and takes the idea to the next level and so on.”

Obviously, the question that arises regarding open-source development is how it makes money. To answer this, it’s important to remember that in the traditional proprietary model, licensing the product isn’t necessarily the only way to make money off that product.

For example, support services can drive considerable revenue, and subscription fees and maintenance fees can be charged instead of flat licensing. SUSE and Red Hat variants of Linux are examples where commercial companies have found ways to profit from a core product that’s essentially free of charge. Through customization, bundling and service agreements, SUSE and Red Hat make money largely without the traditional licensing model.

“However you want to develop software, the main thing is to realize that there are many ways to generate some sort of revenue from it,” says Sutor. “The licensing, such as it is, that takes place in the open-source model is different in that users are allowed to modify the software if they want, redistribute if they want, and even be able to sell those modifications further down the line. It’s potentially a much more flexible model. Of course, there are responsibilities that go along with the new model, and that depends on the software. Linux, for example, uses the GPL license and so allows a developer to

modify it, compile his or her own version and use the result—but if you're going to try and distribute it, you're required to make all your modifications publicly available. Other licenses will vary a bit according to the software, the company and the development community."

This doesn't mean that a company has to opt entirely for one model over another, and it doesn't mean that people who work for traditional proprietary software companies can't work on open-source projects. In fact, if there's one message about open source that IBM wants people to understand, it's that it isn't a binary choice—it's not a matter of using only proprietary software or open-source software. According to Sutor, the world's a hybrid, and at any given moment a company may be using a combination of open-source and proprietary software.

IBM was very interested in Linux because of its interoperability across our different platforms and devices."

—Bob Sutor, vice president of standards and open source, IBM

With that in mind, the question that remains is: "What's the best mix?" "Let's say a company is just this little dentist office down the street; a proprietary solution might be the way to go, or they might decide they want to run Linux and run commercial applications on top of that," says Sutor. "What we're in the midst of learning about and understanding is the essence of this hybrid environment."

"Open-source adoption doesn't mean that commercial application development is going to go away," adds Jollans. "It's going to go to a mixed model and it's going to vary from area to area as to how mixed the model is. Just as Linux didn't mean Windows or UNIX* was going away, open source doesn't mean traditional development is going away. It just adds another option, and choice is obviously a good thing."

Open-Source Pros and Cons

Open source is all about tapping into the minds and experiences of people around the world. In particular, that means people who don't necessarily happen to work in niche environments, so they can bring to bear all of their collective knowledge and everything they've learned about different IT situations. Because of that, code put up for open-source development can often produce a high-quality piece of soft-

ware for a low overall cost. Additionally, a piece of code put out for open-source development might be plugged into a much larger offering that's still considered a proprietary offering because of the way different things are mixed in.

The type of code best developed through open source varies, but one area in which open-source developed code shines is in the realm of industry and government standards. If a product is going to provide functionality that must adhere to standards, the code behind that functionality may be best served by open-source development.

"A good example of this is the Apache Web server, which IBM uses as a component module of WebSphere," says Sutor. "It's a straight-up HTTP server we opted to use within WebSphere in the late 1990s, because there was no point in reinventing the wheel. It was a perfectly fine, high-quality, community-maintained piece of software that tracked the standards extremely accurately. Today, nearly 70 percent of the Web servers in the world run Apache. It was a very smart decision on the part of IBM, in retrospect, to do that."

Perhaps one of the most compelling benefits open source brings to the market is its capability to develop software with only a relatively modest but shared investment, rather than one person footing the entire bill.

For example, IBM has invested an estimated \$100 million in Linux development, which underscores IBM's commitment to Linux. However, when you consider that \$100 million is only about 20 percent of the total estimated cost of developing Linux so far, you may understand that IBM is realizing a considerable cost benefit through the open-source development of Linux. Through that 20 percent investment, IBM has so far leveraged a high-quality, enterprise-class and highly secure OS out of the bargain.

"You look at this equation, and you see you only have to invest 20 percent into something to get this wonderful thing," says Sutor. "You start looking at how to leverage that kind of development model in other situations and say, 'Well, where can we do this again?'"

Among the biggest potential shortfalls when it comes to open-source offerings is in the realm of product support. When there's not one obvious company you can call for support, it can be an inconvenience. Some companies offer support, but in some cases it's not as easily available, so you may have to provide your own support, which of course requires some level of technical savvy and expertise. This is an area that's evolving, though, and the industry is responding to provide new support options. In this way, open source is stimulating innovation around business models.

“Another drawback is figuring out how to integrate open-source offerings with each other,” says Jollans. “There’s no ‘open source guru in the sky’ designing all of the open-source programs to work seamlessly with all other open-source and non-open-source programs. If you want to use Linux in conjunction with Apache in conjunction with MySQL and so on, for example, either you have to put them all together and integrate them yourself, or you pay someone else to do so.” Of course, proprietary offerings have sometimes had the same type of criticism leveled at them.

Open Source Going Forward

In the past, open-source development was usually performed by people in their spare time. Today, open-source development has evolved to a point where entire companies come together to create open-source offerings.

For its part, IBM is investing in several collaborative and online communities that promote open-source initiatives. IBM was the initial contributor to several important XML and Web services open-source projects, as well as the industry-transforming Eclipse software development environment. On the storage end, in late October 2005, Aperi (which means “open” in Latin), a nonprofit, collaborative open-source storage platform initiative was announced, consisting of founding

members such as IBM, Cisco, Computer Associates (CA), Brocade, NetApp, McDATA, Sun Microsystems, etc. In addition to its investment in this initiative, IBM is also donating a part of the source code for its TotalStorage* Productivity Center to establish an available base storage-management platform.

According to Jollans, open source is an industry trend that’s speeding up at varying levels from area to area. In terms of development tools, it’s fairly widespread, whereas systems management isn’t catching on as quickly.

“What we saw happen in 2005 was an acceleration in both interest and adoption in terms of open-source software,” says Jollans. “I think that’s a clear dynamic that’s taking place, and the industry is seeking a new equilibrium.”

“Remember that companies should think in terms of hybrid open/proprietary environments,” adds Sutor. “Whenever a company is thinking about software solutions and is thinking about proprietary options, and they say, ‘It’s definitely only just this way,’ they probably have more research to do. Rather, it’s about exploring combinations of open source and proprietary software that makes for interesting and successful business opportunities.”

Ryan Rhodes is a managing editor with MSP TechMedia. Ryan can be reached at rrhodes@msptechmedia.com.



The Cutting Edge

**TSYS Prepaid reduces
costs and grows
quickly with Linux**

BY JAMES MATHEWSON

TIM KUCHLEIN doesn't get a lot of sleep these days. When you run a four-person IT department for a financial company with a large amount of growth each month on a limited budget, there's a lot of work to do. But you won't catch Kuchlein complaining; he delights in building leading-edge systems efficiently with the least possible cost.

Kuchlein is the senior vice president of technology for TSYS Prepaid, a leading provider of prepaid-card solutions. His company manages card programs that utilize the Visa, MasterCard, EFT and ATM networks. In exchange, TSYS Prepaid gets small transaction, processing and hosting fees.

When a prepaid card is swiped at checkout and the transaction doesn't occur in fewer than 10 seconds, the association will deny the card—even though the funds may have actually been available. This can lead to some very angry customers, displeased merchants and possible lost business for TSYS Prepaid. Because of all the steps involved to get an authorization request from the merchant to TSYS Prepaid and back again, the brunt of the stress is on TSYS Prepaid's technology.

The system manages thousands of transactions per day with sophisticated database tools. And, as more merchants offer prepaid cards, Kuchlein's team must add capacity quickly, seamlessly and without interruption. Unlike large credit-card companies, which can afford mainframes or rack upon rack of high-end servers to handle the tasks, TSYS Prepaid had to build its systems resourcefully, with a careful eye on expenses.

To get the price/performance ratio he needed, Kuchlein turned to Linux* on POWER*. He runs the front-end systems on IBM* BladeCenter* JS20 blades running an embedded Linux distribution. The back-end, database-transaction-processing engine features IBM OpenPower* 720 servers running Novel SUSE Linux and IBM DB2* Universal Database* (DB2 UDB) for Linux.

Blades on the Edge

Kuchlein says though the BladeCenter machines offer the best bang for the buck, using them presents challenges to the operating environment. "Because the blades are diskless, the biggest image you can deploy at boot time is 12 MB. Any standard distribution is more than that," he says. "We used Gentoo Linux as a custom-build setting, in a netboot environment with the embedded Linux distribution at the core."

BladeCenter JS20 machines are based on the Power PC* 970 chip, which gives the machines advantages of the Power Architecture*, including symmetric multiprocessing and 64-bit addressing, at price points that rival 32-bit Intel* machines running in the same BladeCenter chassis, about \$2,200 per blade, Kuchlein says.

TSYS Prepaid customizes the blades to some extent, packing on 2 GB of memory, and increasing that figure as necessary. The larger memory footprint improves performance and allows the blades to run the applications in a diskless environment.

In addition to the low cost for the BladeCenter machines, Kuchlein says he chose blades because they represent minimal system maintenance and system disruption in case of





The principal reason we chose OpenPower machines running SUSE Linux is their low cost. —Tim Kuchlein, senior vice president of technology, TSYS Prepaid

failure. “Even if we lose a blade, we have a new blade up and running in two or three minutes with minimal impact to the system,” he says. “The only moving parts on the blades are the fans in the BladeCenter chassis, giving us potentially two moving parts for 14 servers—so we have a really low incidence of failure.”

Kuchlein says the BladeCenter machines are deployed on the edge for Java* Web applications running on the open-source JBoss Application Server. These applications include authorization processing, messaging, consumer Web sites, internal and external administration and Web services application program interfaces (APIs).

“The embedded Linux deployment code pulls all Java and JBoss packages on startup,” Kuchlein says. “This really simplifies application maintenance because when we change an application, all we need to do is change the config file and reboot the blade with no persistence. If something does go horribly wrong, we just reboot the blade and it works.”

Kuchlein says BladeCenter management is still a work in progress. “We’re working on automating as much of the blade management as we can with an internally developed management tool,” he says. “But they’re so streamlined that management is kept to a minimum, which is one reason we can get by with relatively few support staff.”

The Power of Open Source

By comparison to the leading-edge BladeCenter environment, Kuchlein calls the back-end transaction processing system “vanilla.” “The principal reason we chose OpenPower machines running SUSE Linux is their low cost,” he says.

“But we also chose SUSE Linux because it gives us the added features of the 2.6 Linux kernel; and we chose DB2 for Linux because it runs on everything, from embedded systems all the way up to IBM System z9* mainframes,” He adds. “This gives us the flexibility to scale out in any direction in the future.”

Indeed, cost and scalability are the key requirements for Kuchlein, which is why he favors the OpenPower systems and DB2. He says that when TSYS Prepaid gets a new account his team can initially create additional databases on an existing server and migrate the database to a dedicated server if the client grows beyond the size of the server. “For really big clients, we can give them a dedicated server,” he says. “And we can add database and server instances at will with minimal coding to make it work.”

As for storage, Kuchlein says he can manage the huge data load with 146 or 300 GB local SCSI disks, though he’s in the process of adding additional storage drawers. “We can plug one or two of the SCSI cards into the machine and get up to 14 additional disks that appear as internal disks to the system,” he



TSYS Prepaid uses BladeCenter and Linux on POWER to help manage credit-card programs.

UP CLOSE

CUSTOMER: TSYS Prepaid

HEADQUARTERS: New York

BUSINESS: Provider of prepaid-card solutions

HARDWARE: IBM BladeCenter JS20 and HS20 blades, OpenPower 720 servers running SUSE Linux

SOFTWARE: DB2 Universal Database for Linux, Java Web applications

CHALLENGE: Maintaining the IT environment’s high performance at low cost

SOLUTION: Running front-end systems on BladeCenter running Linux and using OpenPower 720 servers running Linux on the back-end systems

says. "It offers exceptional scalability and value."

The OpenPower 720 servers feature 64-bit POWER5* processors, which give TSYS Prepaid industry-leading performance among four-way servers. Though the servers offer optional Virtualization Engine* technologies, Kuchlein says he prefers to manage the system "the old-fashioned way," which helps him keep costs to a minimum.

Open-Source Futures

Kuchlein sees no end in sight for the growth of prepaid-card services. But he's not worried. "We've got the architecture to handle growth with the least possible investment."

"A lot of our stuff is built from other stuff; we reuse code and machines as needed," he says. "For example, most office users don't use a lot of power, which is why we use BladeCenter machines in our office environment as well. We can get several people per blade, which, with Windows* terminal services running on [IBM BladeCenter HS20] blades, we can reduce the desktop burden to next to nothing."

As the company grows beyond the small-business category and into the medium-business category, the cost savings in using blades instead of desktop machines isn't insignificant, he says. "Plus, it reduces

maintenance to a minimum."

The fundamental disruptive technology that allows TSYS Prepaid to cut costs to the bone without sacrificing performance is Linux. Linux can run on everything from embedded to Intel to POWER to mainframe processors; it supports everything from embedded systems to high-end enterprises; and its applications ecosystem continues to flourish and grow.

TSYS Prepaid uses the embedded Linux to run its BladeCenter Web applications servers. It uses SUSE Linux to run sophisticated back-end data-replication and partitioning applications under DB2—applications typically associated with high-end enterprise work. And it can scale all of this up indefinitely without increasing costs per client.

Kuchlein wholeheartedly endorses the advances in Linux. "We get a lot of bang for our buck with Linux on POWER," he says.

James Mathewson is lead editor for IBM's *ISV Strategy and Enablement* organization and editor-at-large for *ComputerUser* magazine.



ONLINE: For the *Linux Executive Report* in its entirety, with updated topic information, newsletters, additional customer references and end-to-end solutions, please visit www.ibm.com/linux.

IBM Linux Technology Center's Daniel Frye discusses the past, present and future of Linux

Mission: BY MICHELLE CARLSON Linux

LINUX* is marching into IT departments at a rapid pace, penguin after penguin. Thanks to recommendations and enhanced capabilities from its passionate development community, many industries are adapting Linux to meet their specific needs. Whether it's a Wall Street company, branch of government or restaurant chain, the operating system (OS) is playing to a receptive audience.

Linux Executive Report recently sat down with Daniel Frye, vice president, IBM* Linux Technology Center (LTC). He explains the OS's popularity, why open-source flexibility is good and where the LTC fits in the ever-expanding Linux family tree.

Q: How was the IBM LTC born?

A: The LTC was first called for in a corporate Linux strategy—the first IBM Linux strategy document, which I co-authored, was written in the fall of 1998. We started the LTC in August 1999, and it has morphed in its mission and organization a number of times since then. Two of us started it—myself and Sheila Harnett. We've been with it ever since. We established it with two people in 1999 and never looked back.

Q: Explain the role of the LTC.

A: We are IBM's Linux technology-development team. In some sense, we look very much like the AIX* technology-development team—the difference is that it's open-source and community-based as opposed to something IBM owns.

The LTC has three fundamental missions. One, we help make Linux better; we work with the community to put enterprise features into Linux that our customers care about, whether it's scalability, security or availability.

PHOTOGRAPH BY JOHN MEYERS



Daniel Frye, vice president, Linux Technology Center, IBM, explains the role the LTC plays in Linux development.

We're deeply integrated into the community as we do that. We don't consider the community "them" and IBM "us," it's that we are part of the community.

The second mission is to make sure IBM wins with Linux, so we're responsible for making sure Linux exploits our IBM Systems hardware; whether it's our Intel* technology-based servers, xSeries* servers, POWER* servers (System i5* and System p5* servers), mainframes in System z9*, storage—we work with all the software-group brands to make sure Linux has what they need. If DB2* needs a feature that it can exploit for better performance, we work with the community to get that done.

Our third mission is to expand the scope of Linux—to help move Linux into new workloads, new areas of the business. We do that work with the Open Source Development Labs (OSDL) and within the industry. One of most successful examples is how we helped enable the entire carrier-grade telecommunications market into Linux by working on a set of features that would make Linux carrier-grade ready. Similarly, we're now working with OSDL around mobile Linux, making it an excellent operating system for small, mobile devices.

The mission we started with in 1999 was simply: "Make Linux Better." The corporation decided that it was in our best interest if Linux grew up into a mature enterprise operating system as quickly as possible and our job was to accelerate that. Over time, IBM's business got larger around Linux—and now it's billions of dollars a year.

Q: How does the LTC expand the reach of Linux?

A: When we started Linux in 1999, Linux was ready for infrastructure workloads, but it wasn't ready for enterprise workloads. We'll identify a workload (a Web-serving workload, application-serving workload or data-server workload), and ask ourselves, "What does Linux need to be able to service this workload?" And we'll find that maybe it needs symmetric multiprocessing (SMP) scalability, a security architecture feature or additional serviceability and we'll work with the community to get that function into Linux. We extend the scope of Linux by making it good enough now for workload after workload. Today, Linux is clearly ready for a majority of enterprise workloads.

We also extend the scope by moving Linux into new industries. IBM is currently helping the community to fully enable Linux on the desktop. We've been pretty maniacally focused on the server space for the last six years, but we're beginning to work with the community more broadly on the desktop as well.

Q: What are some of the key business benefits of Linux versus Solaris or Windows*?

A: Linux is just a reliable-performance operating system.

“Linux is the only operating system that runs everywhere. It runs on the Intel platform, POWER platform, mainframe.”

—Daniel Frye, vice president,
Linux Technology Center

Linux has entered most IT shops through the bottom; development teams and technical teams have deployed Linux—sometimes secretly—and they find it works.

Additionally, it brings a maximum amount of flexibility. Linux is the only operating system that runs everywhere. It runs on the Intel* platform, POWER platform, mainframe. If you think of a traditional solution stack, Linux is a neutral layer inserted in the middle. It

used to be if a customer chose an operating system, they were implicitly choosing a hardware architecture, hardware vendor, OS vendor, service and support vendor and limiting the choice of ISVs and middleware that would run on that platform. Linux breaks all of that. It gives the customers the choices they want, and it introduces market forces into each of those sets of discussions. You don't have to have a single provider of all of those things; you have choice in those providers and it is much easier to change those things if you don't like a provider. If you decide you have the wrong hardware architecture or provider, you can swap that out when that hardware is up for renewal; you don't have to change the rest of the stack. Those changes aren't free, but they're cheaper and easier for Linux than they've ever been before for any operating system.

Q: Is Linux branching into different industry segments? Are the customers becoming more varied?

A: Every day. If you charted Linux work in various segments and with various workloads starting in 1999 to today, you could identify new workloads, new market segments virtually every quarter.

The finance sector is a good example of an early adopter. We've been working with Wall Street firms on Linux deployments ever since 2000, because they're pretty aggressive in terms of technology. But we're now seeing Linux deployment in the banking industry, which is at the opposite end of the finance industry—very conservative, slow-moving, they want to see other people using it first. Three years ago, we were seeing no interest from banking, and now we have major deployments and major customer engagements as they're getting comfortable with the idea of Linux. In the national laboratories—high-performing areas—Linux is a majority of the market these days. It is difficult now to find a market segment that has no interest at all in Linux.

Government is all over Linux for a couple of different reasons. We've had a very close partnership with the U.S. national government over the last couple years as we've been improving Linux security. The government sees Linux as open and flexible, outside of vendor control. We have Linux reference customers at the national-government level, state,

county and city. And worldwide, Linux is very hot—it's a worldwide public-sector phenomenon.

Q: In terms of migration, are you seeing a growing number of companies migrating to Linux from other open-source environments?

A: We see migrations to Linux from virtually every operating system. In fact, in the last 18 months, we've seen a lot of migrations from Solaris, and it has been one of our primary targets. We've seen migrations from Windows, HP-UX and smaller proprietary operating systems. Linux has really taken share from a variety of different sources.

Q: How does the LTC assist companies who are considering migration?

A: We ensure that those companies have the technology they need in Linux. So if companies are thinking of deploying Linux, if they find inadequacies or difficulties in Linux, those problems turn into requirements from my team. The LTC is the deep development support behind our IBM service and support teams. Service and support is run through IBM Global Services (IGS), but we help them when they have a problem. We have an extensive advocate program—we work with a number of different customers as they begin to move to Linux

or if they have Linux performance problems. Most of the application-porting work is done through other Linux-enabled teams at IBM that have those skill levels—a variety of the Linux integration center, software group, IGS and systems group teams who help customers with early deployment. The LTC is an operating-system team, so for deep application skills, they go to the application teams.

Q: Talk about the community Linux has built up over the last five years.

A: One of the first things we undertook, starting in 1998, was understanding how the community worked. In fact, we asked ourselves a question: How can an undisciplined, chaotic development community produce high-quality code? And we came back with the answer: It can't. So what we learned was not that the code wasn't good quality—because it is—we learned that the community isn't undisciplined and chaotic. It is a highly disciplined, predictable process; it just looks a lot different and it took awhile to understand that.

One of the things we figured out very early on—we got this advice from the community—is that you can only really understand it from the inside. As we began to staff the LTC, we took our developers and inserted them into communities to figure out how they work from the inside. Over the last five or six

GRID

Benefits Companies of All Sizes

WHAT IF A BUSINESS could increase employee productivity; analyze an investment portfolio in minutes, rather than hours; decrease design time while also reducing instances of defects; unite a research team with others around the world? What if I told you your organization could do this today—with grid computing?

Organizations of all sizes—from small businesses to large Fortune 500 corporations—can benefit from grid technology, as grids can be used in a relatively simple environment or across heterogeneous systems and business functions.

Grid implementations are as varied as the organizations that use them. Some are large and complex, and others are small and simple. Many choose to start small, launching their grid within a single department. Later, they expand the function and sophistication as the value of the grid is realized.

The benefits of grid include faster results that support better decision-making, improved productivity, and enhanced customer service and faster time to market—all of which can lead to competitive advantage. These benefits fall into three key categories of business value: accelerating business processes and time to market, improving collaboration, and increasing business agility and productivity.

Accelerating business processes—Applications in a typical IT environment run on a specific server, which limits available compute resources. Grid computing can remove the boundaries between applications and servers, virtualizing the infrastructure.

Improving collaboration—Locating, accessing and integrating data becomes more challenging as businesses grow and evolve. An information grid can provide a unified view of the data, enabling increased levels of collaboration and business insight.

Increasing business agility and productivity—Remaining competitive requires an infra-

structure that can dynamically adapt to fluctuating business environments, efficiently and cost-effectively utilizing resources and minimizing risk. Grids can offer a more intelligent way to manage IT assets. A manufacturer wouldn't allow 40 percent of its assembly plants to stand idle, nor would a hotel chain let 75 percent of its rooms sit empty. Yet many companies are only using about 15 percent of their computing resources. Taking advantage of grid technology can improve resource utilization and reduce costs.

Reaping the Benefits

The benefits of grid computing can be realized because of open standards and strong industry adoption. Grid middleware is available from vendors, open-source projects and even customers. Because grids are frequently built from heterogeneous collections of resources, it's valuable to be able to "mix and match" middleware from various sources to build specific solutions. Open standards like Linux, GGF OGSA, OASIS Web services and management standards help define interoperable interfaces and protocols that make this type of solution integration possible.

Beyond simply adding power "under the hood," grid computing helps you create a secure, stable network that can be grown as necessary. By combining virtualization and grid computing, companies can reduce operational and system-management complexities while maintaining necessary capacity. This is because a virtualized grid environment allows all system resources to be viewed and treated as a single system. This fact also helps reduce the complexity of adding to an existing IT infrastructure. Elements can be added as necessary and these then become part of the grid themselves. This, in fact, leads to the ability to create a seemingly homogenous system, even if it is made of heterogeneous elements.

Grid and Grow

To quote an old adage, just because it's the perfect solution doesn't mean it's complicated. The decision to move to a grid environment may be a big one, and it certainly involves change, but that doesn't mean it's a Herculean task—quite the contrary. The IBM Grid and Grow program offers a quick and easy way to get started with grid computing. It packages hardware, industry-leading IBM and business partner scheduling middleware along with a "get started" services package to help first-time grid customers maximize the benefits of grid computing at a low-cost entry point.

Grid and Grow includes BladeCenter* grid hardware (either an Intel* technology-based HS20, POWER* technology-based JS20 or the AMD based Opteron LS20 blade), grid scheduler software (choice of Altair PBS Professional, DataSynapse GridServer, Platform LSF or IBM LoadLeveler) to manage compute resources as a shared pool, operating system (Red Hat or Novell SUSE Linux as well as Windows* or AIX 5L*) and services designed to help get customers started with the new solution.

Realizing Efficiencies

Grid computing isn't a new technology—it's mature, robust technology that can help companies realize huge efficiencies. Many customers are using it today to solve problems previously unsolvable, to gain new levels of collaboration and innovation and to achieve new levels of efficiency. IBM and its business partners can provide you the experts, the tools, and the equipment to help you realize the true power of your network. To learn more about IBM solutions and other customers gaining benefits from grid, see www.ibm.com/grid.

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years, the Linux development community has continued to mature rapidly. The community has been joined by top-flight engineers, not only from IBM, but also from HP, Intel, Fujitsu, Red Hat, Novell and others—the community is extremely progressive in the sense that it is self-analytical; it looks at its own processes on a regular basis and figures out how to make those better, stronger and faster.

Q: How important is the relationship between the LTC and IBM hardware?

A: We sell hardware underneath it, we sell software on top of it and services all around it. So the software and hardware relationships, in particular, depend on technology in Linux. The relationship with the hardware team is very important as we make sure we know what the most important things are for their customers, what do they need out of Linux to deploy. We work with all of them very closely. At the LTC, we make sure Linux exploits the hardware. For example, Linux on the xSeries platform or System p5 platform, the customers get the value out of the hardware that's there because it is enabled by Linux—that's our primary job in that space.

Q: What factors account for the close relationship between grid computing and Linux?

A: The basic grid functionality wants to run on everyone's hardware, and there's only one OS that does that. It's just naturally easy for everyone in grid to have one of the platforms they support be Linux. If you're going to make a choice of deploying just one platform, you would pick Linux because it immediately gives you access to all of IBM's hardware, all of HP's hardware, all of Dell's hardware, et cetera. It provides the maximum amount of flexibility. (For more on grid, see the sidebar "Grid Benefits Companies of All Sizes" on page 42.)

Q: What can customers expect from Linux in the future?

A: The horizon is a continued march for Linux to the heart of enterprise. Day by day, week by week, month by month, Linux becomes increasingly ready for every enterprise workload. And our deployments continue to become more complex. Customers bet more and more of their businesses on Linux successfully. We'll see Linux continue to grow in terms of not only base revenue but also market share. It has already become one of the fundamental elements of most IT shops, and you'll see over time it will be the volume leader in terms of overall UNIX* deployments in the industry. And that trend will continue.

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Linux

BY CAROLINE JOYCE

**Stargazer Foundation
uses Linux and xSeries
technology to meet
the needs of its clients**

Beyond


IT'S NO SECRET that Linux* is widely known as an affordable, open-source operating system (OS). Large enterprises and small and medium businesses (SMBs) are realizing its benefits. The reasons companies choose Linux vary; it could be its ease-of-use or its flexibility. Or they may choose Linux because of its affordability. All three of those reasons came into play when the Fairfax, Va.-based nonprofit organization Stargazer Foundation chose Linux.

For the Public Good

Stargazer Foundation provides a portal of online tools to other companies and government agencies via www.stargazer.org. According to Mike Lasky, managing director at Stargazer Foundation, the organization's mission is to "leverage technology for the social good." He says Stargazer.org was created to provide technical capabilities to nonprofits and communities around the world. Stargazer.org is home to a disaster center where people can check out the latest news about health risks and breaking news about emergencies. Additionally, Stargazer.org provides a preparedness network where communities and first responders can create emergency-response centers called Joint Information Centers (JICs). With JICs, communities and emergency responders can share information, communicate with neighboring departments and see—at a glance—the conditions in their communities. The services Stargazer Foundation provides help other nonprofit organizations deliver their missions better and to effectively deliver all-important services.

"Our philosophy has really been that for a lot of small nonprofits and communities, a lot of technologies that they really want have—by and large—been unaffordable," says Lasky. "Nonprofits shouldn't be spending money on technology, what they should be spending money on is delivery of all-important services. You know, they should be doing what they do best—feeding kids, providing housing, protecting environments, providing social services."





he Red Hat Linux solution has required little or no support, no major monitoring and has not had any major security concerns.”

—Mike Lasky, managing director, Stargazer Foundation

That’s where Stargazer.org comes in. The organization is running WebSphere® Portal Express Plus, DB2® Universal Database® Express v8.2 and Red Hat Linux on two IBM® @server xSeries® 345s. With all of the work that needs to be done to meet its clients’ needs, the organization’s four-person IT department can’t be cavalier about how they use their time. Lasky says because of Red Hat Linux’s ease-of-use and lack of “necessary monitoring,” his team can focus on delivering services to the organization’s clients.

“We’re a very small organization, and, as a nonprofit, we need to utilize our people very effectively. The Red Hat Linux solution has required little or no support, no major monitoring and has not had any major security concerns,” says Lasky. “Our technology director, John Reece, assures me that we’re not spending a lot of time on the solutions—upgrading patches or anything—and not utilizing valuable resource time to maintain our operating system. It really has been self-maintaining, and that means we can put our limited resources directly into offering services to our constituents—and that has been the major, major, major benefit to a stable, well-supported platform.”

Installation

One of the most impressive parts of this story is how quickly Stargazer Foundation migrated from its Sun ATG solution to its current IBM and Linux team. Lasky says in June 2004, the organization was migrating to its new platform at the same time it was trying to add new capabilities for one of its clients, the Metropolitan Washington Council of Governments, which provides tools to the Emergency Managers of the National Capital Region. It could’ve been a sticky situation performing two very important tasks at once, but Lasky said the support they got from IBM and the fact that Linux was so easy to use made the transition and migration quick and painless.

“I credit IBM’s support of Linux platform; the fact that DB2, Websphere, the x345s and Linux clearly worked seamlessly and any issue that we came up with had been thought through beforehand,” says Lasky. “I think we needed a little bit of hand-holding, but the process was incredibly smooth and easy, and that made a difference. As a nonprofit, we don’t think so much in terms of a business process, but in terms of a nonprofit-mission process; the speed by which we could get an enhanced offering up was a significant issue to us. Our users were incredibly pleased, both by the quality of the offer-

ing and the stability of the offering and also the fact that we went from really initial specs with some of our folks to an offering in three or four months is really phenomenal.”

Reece was there for the installation and says, thanks to Linux and IBM, the team was able to complete weeks’ worth of work in just days.

“We especially enjoy the ease of loading and unloading applications without having to reboot. The security setup with IBM’s firewall and our platform is simple and effective,” says Reece. “We were able to communicate with local servers data and remote data [to validate users] seamlessly. Linux also allows us to run multiple applications without worry of them taking each others’ resources. Memory and processor management is fantastic.”

Making Change

Stargazer Foundation staff realized they had to expand the platform last year, when Lasky says they needed to have a true focus on portal capabilities. After all, the information Stargazer Foundation provides via its Web site could be a matter of life or death for some people. It’s essential that the organization can provide news and updates for their clients quickly.

Stargazer Foundation was using Global Chat—which allowed clients to create conference rooms and have moderated discussions—with its Sun ATG solution. That solution wasn’t providing the portal capabilities the organization needed, so the IT department looked into the IBM, Linux and WebSphere solution.

“The Global Chat and ATG platform could ‘live together,’ but weren’t part of one system,” says Reece. “The ATG/Sun solution also had a memory leak that never got resolved. The ‘fix’ was to reboot once a week. IBM provided portals and applications that worked with the collaborative suite very easily.”

Although Lasky says comparing the old platform to the new one is like comparing apples to oranges, he says clients have noticed the improved capabilities in the new solution. “The move to the WebSphere, x345 and IBM-hosting Linux solution was a huge increase in offering new capabilities,” says Lasky. “All of our clients noticed a significant improvement in the service.”

“I am often talking to emergency managers in communities across the country, and one of their concerns has always been the quality and stability of our platform, from the point of view of availability and security,” says Lasky. “When I described to them our previous platform, the managers’ eyes glazed over and I had to spend a fair amount of time assuring



UP CLOSE

CUSTOMER: Stargazer Foundation

HEADQUARTERS: Fairfax, Va.

BUSINESS: Nonprofit organization providing a portal of online tools to other companies and government agencies

HARDWARE: Two IBM @server xSeries 345s running Red Hat Linux

SOFTWARE: WebSphere Portal Express Plus, DB2 Universal Database Express V8.2

CHALLENGE: Providing services and portal capabilities at low cost with little necessary monitoring

SOLUTION: Migrating from Sun ATG to IBM hardware, running Red Hat Linux

the technologist in the organization about the stability of our platform. Now that I can say we're an IBM solution end-to-end—including IBM software, IBM hardware and we are hosted at the IBM facility in Ashburn, Virginia—that conversation with our clients has gone from potentially hours to a 30-second conversation. Everybody is very comfortable with the fact that we are IBM end-to-end, and that makes all those conversations very easy and quick."

The move to IBM and Linux was an obvious choice, but Lasky gives credit to Stargazer Foundation's IBM business partners, One Point Solutions and Chainlink Networking Solutions, for helping the organization find the right solution.

"We looked at a number of different platforms and a number of different operating-system options, and we felt that the @server xSeries 345 and the Linux solution was really one of the best paths for us for a couple of reasons," says Lasky. "One was we like the security of that combination. One of our options at one

time was a Microsoft* operating system, and some of our partners were uncomfortable with that from a security point of view. The Linux/x345 solutions assured us with an excellent response time, which has proven to be true. Our speed of service has been great. Also, we worked with one of our other business partners, Insight, to supply our hardware and software solutions, and they were able to spin up our boxes and get them to us in 48 hours, so it [the solution] was very attractive."

By working closely with the business partners, the organization was able to come up with a fully integrated solution. Lasky says working with them to come up with a hardware, software and OS solution that was well-thought out and well-vetted made the migration and adjustment that much easier.

"I credit the integration strategy of the software and the hardware, the support of the partners and IBM, and the fact that we really encountered few, if any, issues that were not resolved really quickly," says Lasky. "Not only did we get our boxes, get them settled, seated and spun up our cage, an awful lot of moving parts had to happen quickly when we moved to an entirely new platform and a new hosting solution. So we had hosting, software and hardware all coming together in a short time frame, and we were able to deliver. We've been running on this platform now for a little more than a year."

"We work with a wide range of organizations, and all of them were very pleased with the increased capabilities and improved performance," says Reece. "Portal services provided a target solution to the needs of emergency managers and nonprofits. No one offers a solution like ours, and we wanted to get it right with the new platform. Luckily, we hit the nail on the head."

Gazing Onward

With the easy migration and the quick realization of benefits of the move to IBM and Linux, the future only looks bright for Stargazer Foundation. The platform's scalability provides Stargazer Foundation with an upgrade and expansion path as the organization increases its services and provides additional capabilities for new customers and communities. "I always worry about server loading and constantly monitor the usage levels for Stargazer," says Reece. "With our IBM and Linux solutions, I rest easy that we can increase our capabilities quickly and seamlessly, resulting in no loss of performance or capabilities."

Caroline Joyce is a managing editor with MSP TechMedia. Caroline can be reached at cjoyce@msptechmedia.com.



There's a new guide for systems administrators. Download a free technical reference for migration from Solaris to Linux technology-based systems at www.ibm.com/linux.

from

OLD
S C H O O L

to

new
s c h o o l


BY JIM UTSLER

Although somewhat reticent at first, Havertys Furniture Companies has now embraced Linux on iSeries

“I was from the old school,” remarks Ed Clary, CIO with the Atlanta-based Havertys Furniture Companies Inc. “I thought that if software was free, it was meant for those who couldn’t afford the ‘real’ version.”

This isn’t an unusual perspective. Many companies—albeit fewer than even a couple of years ago—question the whole notion of free, open-source applications. After all, how robust, secure and full-featured can software not supported by large, branded application-development companies be?

Increasingly, the answer to that question is becoming a nonissue, with open-source software—especially that built for Linux*—finding its place in more and more company IT environments. This is especially true now that organizations are beginning to better understand the open-source community and the power it wields, with developers from across the globe coming together to craft applications that can be robust, secure and full-featured. As Clary notes, “I heard someone talk about the database product he had developed in the open-source space, and he said he had more developers working on it than Oracle had working on theirs.”



Ed Clary, CIO, furnishes
Havertys' IT environment
with Linux running on
iSeries systems.

Because of this shift in mood, Linux and the applications that run on it are becoming common—and expected—parts of the everyday IT infrastructure. The only question remaining is which hardware platform to run them on. In the iSeries* and @server i5 world, the answer is becoming self-evident, especially now that Linux can be run in iSeries and @server i5 partitions. Companies wishing to deploy Linux no longer need to purchase commodity PC servers to do so; they can run it on their existing iSeries and @server i5 systems directly, next to their production applications.

The results can be huge savings, with PC servers being nixed in favor of consolidated partitions and expensive commercial software being replaced by less expensive—if not free—open-source alternatives. This can drive down IT costs in profound ways, allowing organizations to more effectively respond to market pressures in more creative ways instead of consuming valuable IT resources to, as Clary puts it, “fight fires.”

Understanding the Downside

Havertys, which celebrated its 120th anniversary last year, sells what Clary characterizes as “mid- to upper-end” furniture, with offerings ranging from accent pieces and curios to master-bedroom and dining-room sets. Its retail reach spans 16 mostly Southeastern U.S. states, from Florida to Texas to southern Ohio. And the company, which employs about 5,000, only continues to grow, opening about six retail locations annually to add to its existing 118.

Acting as its fulfillment backbone are three distribution centers and several home-delivery sites. Clary indicates that this is what gives the company “a competitive advantage.” He adds, “We’ve developed a distribution system that we believe is as good as any out there. And given our industry, this is a necessity. People want their furniture within three to five days, and if you can do that, you’re creating excellent customer satisfaction.”

To that end, Havertys has developed distribution and customer-service systems that link the entire company together, helping reduce inventories while still meeting and—more often—exceeding customer expectations. These applications are run primarily on iSeries and @server i5 systems, including an @server i5 570 and an iSeries 870, one acting as a production box and the other as an off-site mirror.

As with many other companies, Havertys introduced several PC servers into its IT environment, even though most of its production computing took place on the iSeries system and its precursors. In fact, most of its applications were developed in-house, based on green-screen coding. About 12 years ago, however, the company decided to move some mission-critical

processing to what at the time was thought to be a more open platform, Windows*. Clary remembers, “We jumped on the Microsoft* bandwagon pretty hard without really understanding the downside to that.”

That downside became especially apparent when Havertys introduced Intel* technology-based servers into each of its retail locations. As Clary notes, “That’s when the wheels started to get pretty wobbly.”

Not only did the company have to pay for the hardware and maintenance costs, but also the licensing of the software—including office-type applications—that ran on the servers. This was true even after the company began adopting a thin-client approach to desktop computing. (It has about 3,000 thin clients in use.) “Most of the product licenses are per user, and as we continued to grow, we would pay more, but the quality of the products didn’t really increase,” Clary says. “And when

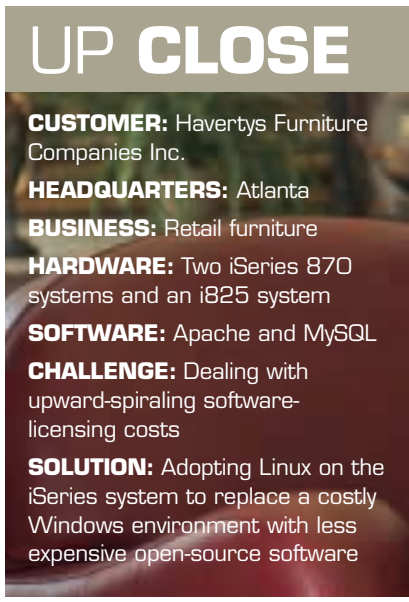
we, say, created a spreadsheet, we would have to have a file license to save it to a network drive. We could never outpace the incremental cost for adding each additional thin client.”

The Citrix-server-based thin clients were heavily tilted toward Windows, running embedded versions of NT and XP. This, according to Clary, “was better than having a thick client” at each workstation, but the software costs were again becoming prohibitive. After attending a CIO briefing in Rochester, Minn., in September 2003, Clary took notice of the iSeries system’s partitioning capabilities, especially as they pertained to server consolidation, which held the promise of helping Havertys counter the upward-spiraling software costs.

Notably, Clary had little interest or knowledge about Linux at that time. “The only thing that really sparked my interest was talk about reducing licensing fees for file and print,” he remembers. But soon, talk about Linux began filtering up to him, and despite his “old school” notions about free software, he and his IT team began considering it as an alternative to the company’s reliance on Windows. He explains, “In March 2004, we moved our file and print services to Samba running on the iSeries system and eliminated the need for paying those out-of-control Microsoft licensing fees.”

A Shift in Attitude

As Havertys introduced additional Linux applications into its IT environment, Clary’s attitude about open-source applications swung 180 degrees. He explains, “Some of these applications were more robust than the products we were paying a considerable amount of money for. I started taking them a lot more seriously.”



UP CLOSE

- CUSTOMER:** Havertys Furniture Companies Inc.
- HEADQUARTERS:** Atlanta
- BUSINESS:** Retail furniture
- HARDWARE:** Two iSeries 870 systems and an i825 system
- SOFTWARE:** Apache and MySQL
- CHALLENGE:** Dealing with upward-spiraling software-licensing costs
- SOLUTION:** Adopting Linux on the iSeries system to replace a costly Windows environment with less expensive open-source software

With the help of a few Havertys IT employees with some off-the-job experience with Linux, the company began more widely deploying the operating system and open-source applications. "They really understood some of the open-source tools, and we've since begun using several of them in our production systems," Clary says. Now, Clary and team actively seek out Linux-based applications, preferring them to more expensive Windows alternatives. Havertys may even adopt the open-source Open Office in favor of Microsoft Office.

Of course, running some of these applications on Linux partitions on the iSeries and @server i5 systems doesn't hurt. Clary notes that the power and flexibility of the platforms make them a perfect choice for running Linux. "In the past, they uniformly only ran native apps, but now we have eight Linux servers running on the two production boxes. IBM pricing also makes it desirable to run Linux on the iSeries and @server i5 systems, as does the platforms' speed. You can go to our Web site at havertys.com and be the judge of that."

Havertys has also begun converting its legacy applications to Java*, wanting to reduce its reliance on the thin clients running embedded Windows NT and XP. By doing this, the company can deliver applications to users via Linux servers on the iSeries and @server i5 systems through Linux-compatible browsers, ridding itself of the stand-alone PC

servers it has installed at each retail location. The results of this move will be HVTnet, a Linux Apache WebSphere* intranet (named after its stock ticker symbol) that ties into the company's back-end systems.

The company also recently migrated its Domino*/Notes* environment, which previously ran on Intel servers, to the iSeries system. This further allows the company to consolidate. Similarly, it has moved its Citrix servers to Integrated xSeries* Adapters (IXA) on the iSeries system. "We had four very large Citrix farms that we've consolidated to the xSeries attached to the iSeries system," Clary says. "And these boxes are just processors, with the storage coming off the iSeries system. We can take an xSeries server, boot it up to be a Citrix server or a budgeting server, and we can do that in literally 10 or 15 minutes because it's just pulling the image off the iSeries system."

Gaining Momentum

Although Clary says the move to Linux wasn't originally "part of the master plan," it has already begun to pay off. For example, Havertys has already replaced about 40 PC-based servers between its Linux on iSeries and xSeries migration, and it expects to displace another 118 (or one per retail location) when its HVTnet intranet rolls out.

“Unlike when we started bringing Windows servers into our environment, we won’t be locked into a proprietary platform. Linux on the iSeries system allows us to add and remove resources quickly in response to changing conditions.”

—Ed Clary, CIO, Havertys Furniture Companies Inc.

And that’s not the end of it. As new application purchases are being considered, Havertys will first look for Linux solutions, realizing it can run them on the iSeries and @server i5 systems without deploying additional PC servers. (And, as Clary points out, “It only takes hours to do this on the iSeries system as opposed to weeks for a stand-alone server.”) In addition, his IT staff can now more easily manage the company IT infrastructure, with much of the administrative work taking place on the iSeries system instead of individual PC servers. Similarly, his IXA servers have been effectively virtualized, with storage being allotted to them via iSeries management capabilities.

Although Clary wasn’t an immediate convert to Linux, he’s now fully on board,

especially now that he can run and manage it from the iSeries system. As he puts it, “This whole effort has gained momentum, and I don’t think it’s going to stop anytime soon. But unlike when we started bringing Windows servers into our environment, we won’t be locked into a proprietary platform. Linux on the iSeries system allows us to add and remove resources quickly in response to changing conditions.”

Jim Utsler is a senior editor with MSP TechMedia. Jim can be reached at jutsler@msptechmedia.com.



ONLINE: Looking to integrate Linux into Windows environments? Check out: ibm.com/linux/integration.



Quotable Quotes

Customers explain the business benefits of deploying Linux

Baldor Electric

“We made the move to Linux* on zSeries* with a large server consolidation of three z800s, 13 pSeries* (servers) and 20 Intel* machines onto one single z990. This has helped Baldor reduce its infrastructure cost from 1.7 percent of sales to less than 1.2 percent. By using z/VM*, we have been able to virtualize the entire environment and drive utilization much higher, which gives us a better return on our assets purchased. Linux on zSeries has performed flawlessly, and we have experienced the zero downtime that the zSeries platform promises. We are extremely happy to run our entire SAP workload on Linux on zSeries and could not be happier.”

**Mark Shackelford, director of information services,
Fort Smith, Ark.**

Whitfield School

“We originally chose Novell (SUSE) Linux* Desktop as a way to lower acquisition costs for student laptops and provide an affordable pass-through to Windows* through Citrix. What we found is that 60 percent of the computer use was being done directly within the Linux environment. We ended up saving 27 percent versus last year's costs and have improved user satisfaction.”

Alex Inman, director of technology, St. Louis, Mo.

RealPlus, L.L.C.

“The migration to Linux on IBM* Informix Dynamic Server solved our performance problem overnight. We were stunned at the difference. Queries that took five minutes to complete took seconds with Informix Dynamic Server Version 10.”

**Eric Gordon, managing director,
New York**

J.A. Becker & Söhne

“We are presuming that we won't need a new system in the next five years. The OpenPower* 720 offers us sufficient room for scaling and high performance when processing data with Linux*. It's powerful enough to support our business processes using ABAS Software's ERP for the long term.”

Tobias Kellermann, IT manager, Germany

Touchdown!

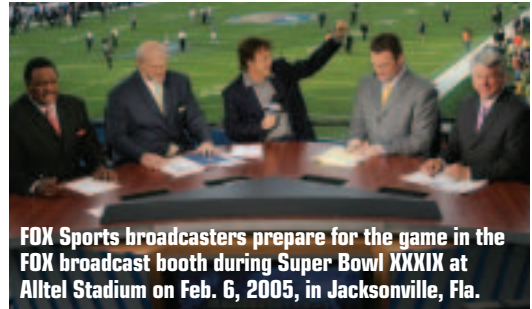


NFL, IBM reach the end zone with digital-media implementation

ALMOST three years ago, IBM and the National Football League (NFL) kicked off a content-management deal. In October 2005, the drive down-field was completed when IBM announced that it had designed and implemented a digital-media solution for the league and its NFL Films division, which produces more than 1,000 hours per year of NFL programming for NFL Network, NFL.com, wireless, home video and many of the NFL's television partners. The goal is to bring game content to sports show hosts and producers faster, easier and at a lower cost.

Called the Digital Foundation, the solution features several IBM hardware and software components including IBM* TotalStorage* storage area network (SAN) file system (SFS) running on Linux* technology and IBM @server xSeries* systems. This combination of hardware and software allows a show producer or host to do a PC search through a statistically based catalog of game plays, review the search results footage in real time, select and send footage to an editor, and create content collections that can be accessed and viewed by different producers and hosts simultaneously.

IBM middleware also figures prominently into the overall solution. Middleware components being used include DB2* Universal Database*, DB2 Content Manager and Ancept Media Server, which provide the digital-asset-management system for the 30-second play clips. Tivoli* Storage Manager is



FOX Sports broadcasters prepare for the game in the FOX broadcast booth during Super Bowl XXXIX at Alltel Stadium on Feb. 6, 2005, in Jacksonville, Fla.

PHOTOGRAPH BY FRANK MICELOTTA/GETTY IMAGES

used to back up the SFS solution.

Before the Digital Foundation was developed, with the help of IBM business consultants, an NFL producer or host needing to access broadcast game footage would manually search through printed NFL game books, view reels of video tapes, note plays on paper logs and then assemble plays to review later on tape.

"By working with IBM, the NFL will be able to provide our viewing audience even more of the high-quality content that they have come to expect from NFL Films each season," explains Steve Sabol, president, NFL Films. "IBM's innovative digital solution enables the NFL to remain competitive as it gives producers and hosts quick and easy access to any particular broadcast game element and will help us capitalize on new business opportunities around digital content."

Along with on demand access to the footage needed for a broadcast, the Digital Foundation has also helped reduce the programming production cycle for several of the NFL Films' most important programs. "Digital content is bringing a new dimension to broadcasting and customers like the NFL," says Dick Anderson, general manager, IBM Media and Entertainment. "The Digital Foundation solution for the NFL illustrates how innovative technology can both streamline operations and enable new business models."

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Wide receiver Hines Ward #86 of the Pittsburgh Steelers scores a touchdown in the fourth quarter of Super Bowl XL at Ford Field on Feb. 5 in Detroit.

PHOTOGRAPH BY HARRY HOW/GETTY IMAGES