

Essay

Far from simply producing freeware clones of existing technologies, Linux and the open-source world now turn out some of the best software at any price. Here is the view of someone who's made a profession of making Linux work for business.

The Business Case for Linux

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In a world where no business can afford lengthy computer downtimes, selecting the appropriate operating system is critical. Most companies choose either Microsoft Windows or one of several commercial Unix offerings. Into this arena comes a third option, the Linux operating system, until recently considered of interest mainly to the academic community and hobbyists. Linux offers some of the best features of both MS Windows and Unix and introduces several benefits of its own. As a result, Linux is increasingly regarded as a viable contender in commercial installations. More than any other OS, Linux offers businesses both exceptional technology and a model that encourages the best possible mix of community and commercial involvement.

My company, Starnix, was formed as a direct consequence of an extensive analysis of the new Linux marketplace, its commercial opportunities, and the obstacles it faces. Starnix's choice of Linux as its strategic operating environment was not the result of the zealous enthusiasm that has occasionally characterized parts of the Linux community. Rather, it grew out of the partners' combined experience in Linux, Unix, and MS Windows environments—about 35 years' worth. The Linux models of community development and freely available source code seem incompatible with conventional assumptions about the way software is created and distributed, but these obstacles are minor compared to the phenomenal potential that Linux—and open-source software in general—offers the computing world.

A REBIRTH OF UNIX

During the Unix wars, which peaked in the early 1990s, vendors danced a fine line between supporting Unix standards and trying to snare users into single-vendor dependence by adding proprietary “enhancements.” Interoperability often took a back seat to politics and salesmanship. It took the threat of Microsoft Windows NT to get Unix vendors to agree on a common graphical interface, and even that was accomplished with great reluctance.

At a September 1995 Unix trade show in New York, Novell announced it was about to dump the rich Unix legacy—previously dumped on Novell by AT&T—on the Santa Cruz Operation. SCO obtained the System V code in return for some stock and a small amount of cash. That’s all it came to be worth; a casualty of wars fought in its own name. Unix was beginning to look like an unwanted orphan.

Moments after that announcement, I visited the modest Red Hat and Caldera booths at the show; other attendees followed. Even given its many rough edges in 1995, Linux showed promise as a badly needed overhaul of Unix.

Indeed, Linux was a rebirth of Unix, both technically and socially. Unix concepts that worked and had proven their value were kept, while much of its excess baggage was left behind—or so we hope.

CURRENT BUSINESS USES OF LINUX

In our experience, the existing business use of Linux mainly takes two forms:

- ◆ Linux can be found in development shops, Internet service providers, and other businesses where computing services and products are the main source of revenue. Here, developers and others who are Linux-friendly may already be in decision-making positions.

- ◆ Linux can also be found in businesses where Linux-friendly staff bring it in for its perceived technical merits, often without the explicit direction of IT management. Either experimental systems are set up that simply evolve into production systems, or management doesn’t specify an operating system for particular projects—perhaps assuming that a more mainstream choice would be made.

Demonstrating that Linux is technologically on a par with other mainstream OSs, such as Unix or NT, has never been difficult. First used by ISPs because of their razor-thin margins, Linux’s low cost made it

a popular choice. As Linux started proving its reliability and flexibility, it crept into installations where local technology staff deployed it, often in secret, as an alternative to mainstream systems.

However, in general Linux has not found its way into corporate IT and small business systems. Selling managers of companies not mainly technically oriented on the benefits of Linux—“through the front door,” so to speak—is much different than convincing development shops, ISPs, and other technology-based businesses.

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TECHNICAL STRENGTHS OF LINUX

Some of Linux’s technological advantages, once they are spelled out, make it an easy sell.

Scalability

Linux can run (albeit at a limited level) on older 386 and 486 systems, making it attractive to organizations that have spare computing power or otherwise unused systems. For similar reasons, Linux will find an eager home in the third world and other situations (such as some schools) where lack of funds demands the use of slower or cast-off systems that cannot run Unix or NT well.

At the other extreme lie systems based on the Beowulf clustering technology, which closely ties together multiple Linux systems of any size. Using this ability, Linux practitioners have taken their systems to supercomputer levels of performance. The Avalon implementation, for instance, turns 140 Linux systems into the 113th fastest computer in the world.¹

Flexibility

There are few computing tasks a Linux system cannot be made to do. The key to this is free availability of the operating system’s source code: anyone with the right expertise, or willingness to hire that expertise, can make any desired modification or enhancement. When Caldera tried to port the Novell NetWare server to Linux, it had to modify the kernel to enable the traditional Unix streams facility. Now it merely ships the patch with every copy of NetWare for Linux.

However, Linux flexibility is about more than

source code. It maintains the Unix ideal of using chains of small, nimble tools rather than huge, monolithic programs. By keeping the graphic subsystem out of the kernel, for example, it allows dedicated servers to operate without any fancy resource-stealing video. In addition,

it maintains powerful Unix remote-administration, batch, and scripting facilities.

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Reliability

By putting the video subsystem in the kernel, Windows NT leaves its system performance and stability dependent on the speed and quality of third-party video drivers. By using a modular kernel, which encourages the loading of modules only as needed, Linux minimizes potential problems. While most of the comparisons of crash resistance between Linux and other OSs are anecdotal, Linux users consistently report uptimes measured in months and years rather than days or weeks. Even by Microsoft's own research, "Linux has been deployed in mission critical, commercial environments and boasts an excellent pool of public testimonials."²

SOCIAL BARRIERS TO ACCEPTANCE

Without claims of scalability, flexibility, and reliability, Linux could not get a foot in the front door. But technical attributes are far from enough. Linux faces its most significant hurdles in the nontechnical aspects of software deployment: marketing, support, and general providing of "comfort" to IT managers.

Marketing Challenges

Until recently, Linux had a visibility problem. With few large software vendors behind it, Linux publicity pales next to that of Microsoft and traditional Unix vendors. Despite that gap, however, Linux has achieved a high level of public awareness. Linus Torvalds made the cover of *Forbes* magazine in August 1998, and almost every major news outlet has devoted space or time to the task of introducing Linux and the more general concept of free software.

One fortunate circumstance that has benefited Linux is the aggressive efforts of conventional vendors to tackle each other. The media—and the ven-

dors—have painted an active battle between RISC-based Unix systems (such as Sun's Sparc systems running Solaris) and Pentium-family systems running Windows NT. Linux, most commonly running on Intel systems, has been able to use this to its advantage by coming up the middle, demonstrating the best of both worlds. It combines the reliability and adaptability of Unix with the commodity pricing and large variety of suppliers offered by the Intel world.

Also helping Linux is the number and caliber of software companies porting their applications to Linux—among them Netscape, Corel, Novell, and IBM. Oracle, Sybase, Informix, CA-Ingres, and Software AG have either ported their database products to Linux or committed to do so. Only Progress Software has yet to commit, and even they say they're looking hard at Linux.

To be sure, the novelty of Linux—a community development project capable of holding its own with the products of billion-dollar companies—also appeals to the media, which seems eager to paint a David-versus-Goliath scenario. In the wake of the US government actions against Microsoft, many people and companies seeking an alternative to MS Windows are finding it in Linux.

The Importance of Support

At the top of the list of obstacles to mainstream IT use of Linux is its community's insufficient provision of support that is not purely technical in nature. While the Linux world has shown it can track down bugs, this is not as broad as the umbrella handholding offered by Unix vendors and Microsoft. Established companies have armies of salespersons and analysts skilled at translating corporate needs into computer solutions. In contrast, those driving innovation in Linux have generally been software programmers, who concentrate on the tools and facilities that they and other programmers need.

Some corners of the Linux world are directly addressing this. Companies such as Caldera have packaged a commercial version of Linux and have positioned themselves to market it through a channel of value-added resellers and integrators (such as Starnix). Such networks and resellers offering personal service will be critical to Linux's success.

Commercial OS vendors offer one thing that Linux does not yet provide: a comprehensive and respected scheme of training and certification. In the formative years of Linux, certification was not an issue because programmers' contributions could easily be judged by peer review—you were as good

as your last piece of code.

This model does not work well in corporate IS. To that end, groups such as the Canadian Linux Users' Exchange are working with Linux vendors and professional trainers to develop an effective testing and certification scheme. Training firms, eager to capitalize on the growing popularity of Linux, are joining the dozens of book titles on the subject to offer the education necessary for serious corporate work using Linux. If and when a certification effort happens, it will offer a standard level of expertise that employers and contractors can expect, much as programs such as those for the Microsoft Certified Engineer and the Certified Netware Engineer provide for other OSs.

The Ease-of-Use Issue

The one social barrier to Linux's success that *can* be addressed through technical solutions is in ease of use compared to other OSs. Its programmer-oriented initial development has assumed a certain level of familiarity, and this attitude has deterred many potential corporate users. Current attempts to simplify administration tasks, such as *linuxconf*³ and *COAS*,⁴ show promise but are still immature. More general ease-of-use issues have been resolved as the Linux community has settled on two GUI systems, KDE⁵ and Gnome.⁶

Open-Source Culture

The open-development model that drives Linux is in some ways both its greatest benefit and its primary weakness. This distributed model started by Torvalds has proved to be flexible, even though it maintains a single direction in a diverse community. The model has been effective from day one, and Linux has avoided much of the fragmentation that has beset the BSD freeware effort (and, in fact, the Unix field in general).

Yet some of the same elements that make the Linux model attractive to technology fans are downright scary in some corners of IT management. Because there is no "Linux Inc.," there is no central authority to blame—that is, nobody to be held liable, legally or otherwise. According to a paper that describes commercial levels of Linux acceptance,⁷ one of the most revealing indications of the influence of fear, uncertainty, and doubt (FUD) is the common belief that Linux has no vendor support.

Such allegations are false. The Linux model combines community-driven support with the availability of commercial-grade (and commercial-cost)

backup, and has routinely been found superior to the conventional help-desk model employed by most commercial vendors. The effectiveness of the Linux model was recognized when it was awarded *InfoWorld*'s 1997 Product of the Year award for best technical support.⁸ (Ironically, the editors at *InfoWorld* half-complained about not knowing to whom they could present the award!)

However, there is certainly potential for problems, and some fear fragmentation in the community. As a volunteer effort, Linux developers trade in respect and ego rather than dollars. The possibility of ego clashes in a world that depends so heavily on volunteer work always exists, and threatens the kind of splintering that has plagued the Unix community. Another perception of dissension comes from within other areas of the non-Linux freeware community. As Linux gains popularity, many are stepping out of the woodwork to either claim a piece of its honor or complain at being left out.^{9,10}

Much of the Linux crowd has also refused to march lockstep to the drum of the Free Software Foundation. Contrary to FSF doctrine, many Linux distributors have encouraged the addition of commercial and almost-free software solutions (such as the BRU backup system and the xv shareware graphics viewer) when these solutions are seen to be superior to freeware offerings.

Still, Linux has a long way to go to provide all the amenities offered by commercial vendors. The Linux community is addressing many of these issues; they must succeed if Linux is to become a true alternative to conventional systems.

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THE NEED FOR OPEN DISSENT

While some within the Linux community have sought to muzzle dissent, others have suggested that the Linux community needs a Gates- or McNealy-like parent figure.¹¹ But changing the rules by closing opinions, hiding discussions behind closed mailing lists, or imposing solutions without consensus would be nothing but destructive. To submit to those who complain about the public airing of differences is to change the principles that

have allowed Linux to challenge the commercial systems, so well and so fast. Just as dangerous would be to insist upon the path dictated by the FSF that collaboration with conventional software vendors is to be avoided at all costs. Listening to the needs of the end user and corporate community is vital.

Every organization has its internal squabbles about direction. Most companies have the luxury of keeping internal dissent internal, and letting the public know only the sweetness and light that result. The Linux community's openness—the same openness that allowed it to achieve the technical success it has to date—eschews nondisclosure agreements or other forms of limiting freedom. It also means that the dirty laundry hangs outside, in day-glo colors, for all to see.

On the positive side, the open process has led to the formation of groups such as Linux International¹² and initiatives such as the Linux Standard Base project,¹³ to settle differences between various proponents' approaches in a (usually) nonconfrontational style. In a manner intended to emulate Torvalds' style in leading the kernel development process, these cooperative projects seek to encourage innovation while recognizing the fine line between diversity and confusion.

Those disturbed by open discussion, dissent, and even open disagreement can just tune it out. Just as one can belong to a church without needing to endure rancorous board meetings, one can simply purchase one of the commercial Linux distributions, let the developers argue all they want, and listen in only as desired (if at all). The product's quality will not have changed one bit. All the qualities that make Linux a superior choice for so many computing solutions still exist, and they are progressing faster than conventional systems.

Microsoft, in its now-famous "Halloween document,"² stated that Linux suffered from "tail-light-following." That is, according to Microsoft, the most important features and facilities of Linux are simply open-source reactions to what others have already done.

Such an assessment is simply wrong. Linux did not merely reinvent Unix; it reinvented the way operating systems are made. Netscape, IBM, Sun, and others have already started open-sourcing some of their technologies; others are considering similar moves. And far from simply producing freeware clones of existing technologies, Linux and the open-source world now produce some of the best soft-

ware at any price. In stark contrast to much of the concern expressed about it, Linux also offers some of the best support; in fact, sometimes the best support is software that simply works reliably.

Still, in many ways, Linux is immature—especially in its ability to cope with the nontechnical needs of the business community. As it matures, it will find itself accepted into an increasing number of corporate environments, running databases and kiosks and just about any business computing task possible. This evolution of Linux—and of the entire computing world—is well underway. ❖

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