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B2C Technology Story

Web Summary:

The Linux Adventures

by Leon A. Enriquez

Reading Time:
10 minutes

Reader Benefit:
♦ Understanding the value proposition of the Linux operating system software;
♦ Insights into the Linux revolution;
♦ Would a Linux deployment in your environment make sense to you?

What started out as a hobbyist's software project in Linus Torvalds's bedroom has now grown into a major challenge to the proprietary world of server computing. Besides Windows, MacOS, and the various flavours of Unix, there is the familiar open source software operating system (OS) known simply as Linux. Against all odds, Linux is now a major powerhouse in the OS market, despite Linux being freeware and open source.

Many people are instantly turned off by the fact that Linux is a text-based OS. What home-users don't know is that many companies have put together distributions of Linux – that have many graphical equivalents of the text-based utilities, making Linux a real option for the new user – that have all the nice graphical interfaces that one would expect to see on say a MacOS or Windows OS.

Despite the mass apathy, Linux has become popular for many different uses. When sustained and robust use is desired, Linux has somehow made the cut. Linux is especially useful for such uses like Web, FTP, DNS, and other Internet-related servers. Linux is good for software development, database uses, and is also popular with the scientific research community.

The Linux Adventures

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Besides Windows, MacOS, and the various flavours of Unix, there is the familiar open source software operating system (OS) known simply as Linux. And Linux is a complete OS. Although Linux is similar to – Linux is not identical to Unix.

Some people are recommending replacement of Windows with Linux on their servers. This is apparently to reduce the total cost of ownership (TCO) in tough economic times. Obviously, this is assuming that because Linux is "free" it will reduce TCO. The question is simple. Is this a good case for Linux or is this an emotionally-driven reaction against Microsoft?

Linux's true value is derived – more from the price/performance of the commodity Intel hardware it enables rather than its open source characteristics – as any astute IT administrator will realise.

Who Uses Linux?

Linux users come in a variety of different kinds of people. Most Linux users are fairly knowledgeable about computers and how they work. Someone has aptly observed that: "Linux is user-friendly. It just chooses its friends wisely."

Many people are instantly turned off by the fact that Linux is a text-based OS. It doesn't have all the nice graphical interfaces that one would expect to see on say a MacOS or Windows OS. In fact, most of the home-users turn away from Linux when they realise this.

What home-users don't know is that many companies have put together distributions of Linux that have many graphical equivalents of the text-based utilities, making Linux a real option for the new user.

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Linux is especially useful for such uses like Web, FTP, DNS, and other Internet-related servers. Linux is good for software development, database uses, and is also popular with the scientific research community.

What makes Linux strong in most of these areas is the reliability of the OS. Just consider that very few operating systems can stay running stable for months at a time without requiring a reboot of the machine.

The speed of the OS also makes Linux a good choice for database and scientific research-related software. Market highlights about Linux abound. For instance, a reputable source claims that Maple runs three times faster under Linux than it does in the Windows environment.

The free compilers for just about every programming language make Linux an excellent platform for software development. And instead of having to pay thousands of dollars for site licenses, Linux users get everything for free.

Humble Origins

What started out as a hobbyist's software project in Linus Torvalds's bedroom has now grown into a major challenge to the proprietary world of server computing. Linux is now a major powerhouse in the OS market, despite Linux being freeware and open source.

And Linux continues to take on the likes of Windows NT, Unix variants and MacOS in niche environments.

Add to that the low running costs and modest hardware requirements, and it not difficult to see why Linux is now established as a firm favourite among cost-conscious ISPs (Internet service providers), hosting companies, and indeed anyone looking to run a back-office server cheaply.

Yet, how has Linux come so far so quickly? – and without the support and nurturing of a massive corporate development and marketing regime such as those of Microsoft, Sun Microsystems, Oracle, Hewlett-Packard or IBM.

According to analyst GartnerGroup, it's down to the setup of a user base – which in turn, has helped to champion the Linux case in the workplace, and effect a gradual programme of adoption.

GartnerGroup's Linux research director, George Weiss explains it this way: "A technology must take root deeply in the IT infrastructure or get blown away by the next technology storm. The roots put down by Linux, and open source software, have generally spread horizontally throughout network infrastructures as a consequence of the Internet. Most Linux deployments revolve around the edge of the network and in clusters."

According to Weiss, while it is now commonplace for a large organisation to have Linux tucked away somewhere in the business, the bias remains on network functions and services, rather than on the desktop.

"Eighty per cent of GartnerGroup clients – which are typically companies with 1,000 employees or more – have Linux deployed somewhere in the business." Weiss said. "But at least 80 per cent of these deployments are in appliance and network functions, file-and-print services, Web front-end applications, or computational server farms. A select number of open source products that run on Linux are enjoying success among businesses that are adopters of leading-edge technology, and among mainstream adopters."

Weiss elaborated: "In particular, the Apache Web server and Tomcat servlet engine are widely used by independent software vendors, as well as directly in IT departments."

Applied Uses for Linux

Obviously, Linux has been saddled with significant baggage with the sharp focus on networking and back-end applications. Linux is still seen as a server OS despite its popularity, and subsequently, Linux development has continued to focus on that side. This has somewhat delayed the push of Linux to the desktop.

"Among the first uses of Linux in commercial settings was server-side file-and-print sharing," noted IDC analyst Dan Kusnetzky. "Freely available open source software tools, such as the Samba file-and-print service software, support for many network protocols, and Web server software such as Apache, were of great interest to organisations looking for ways to lower hardware and software costs, while still working with reliable, robust, and customisable tools."

Apache has been one of the biggest success stories for the Linux platform, providing it with an established application at a time when demand for Web servers was exploding.

Coupled with the free nature of the product and the accessibility of source code, Linux Apache Web servers are now the cornerstone of ISPs, Web hosts and companies looking for low-cost internal Web and intranet server systems.

While the desktop implementation of Linux has yet to take off, there is some growth, particularly in the Web browser market. Dominated by Netscape, through its Mozilla open source project, this market now faces competition from Norwegian outfit Opera. Its fast and small footprint browser has enjoyed some success in the Windows environment, but the dominance of Microsoft's Internet Explorer continues to stifle its progress.

"Opera marked the beginning of a significant and healthy browser war on Linux, particularly in areas such as Asia. The result has been that a great deal of attention has been focused on the Linux community," explained Dean Kakridas, vice president of desktop products at Opera.

There has also been significant interest among manufacturers of embedded computing appliances and network hardware.

Jude O'Reilley, director of product marketing at security vendor Aventail said: "We see enormous benefits in security using Linux. We can strip down the OS to its essentials, harden the file system, and layer-on the most necessary components. Reduction in complexity equals improvement in security for us. Moreover, Linux is under far more public scrutiny than other commercial OSes we've supported before."

Aventail has launched a security product for operating virtual private networks (VPNs) using a dedicated appliance, which runs an embedded Linux operating system. Because Linux is a modular operating system, Aventail can use just the bare minimum components needed to perform the VPN functions and nothing else. The end-result is a fast system that runs on very basic and low-power hardware.

O'Reilley explained: "We're still in the early stages of testing, but we've seen enormous performance benefits of Linux-on-Intel hardware compared to previous commercial Unix platforms that we've used. Essentially, we have a lot more ability to optimise the OS for the needs of our application."

More big names are also looking to Linux as a new avenue for their products. Oracle has been working extensively with Red Hat and Hewlett-Packard to develop a complete Linux solution for its Oracle 9i database products.

Doug Kennedy, vice president of Oracle's platform technologies division puts it this way: "With Linux demonstrating that it's an attractive enterprise computing option, companies are looking to deploy proven applications. Oracle can now deliver our flagship database solutions on industry-standard Hewlett-Packard ProLiant servers running Red Hat Linux Advanced Server, with the same levels of reliability, scalability and performance that businesses have come to expect from other operating systems."

Support and Migration Issues

Obviously, commercial open source vendors have emerged to provide support for Linux – although most of such open source vendors are still struggling to establish viable long-term commercial strategies for Linux distribution and support.

Often, businesses that adopt Linux and open source must provide systems integration and product support for themselves. To help them, companies such as Red Hat and SuSE have significant support and training arms to provide the educational and technical support needed to get a company established with Linux. However, the external support often ends there, and more needs to be addressed to bridge the gap caused by significant lack of Linux skills in the workplace.

Intel's director Richard Curran explained: "Intel Solution Services is one of the companies that founded the Open Source Development Lab to test the high-end applications under Linux. More and more companies are looking for consultancy for the most seamless migration onto the new operating system. Companies are keen to maximise return-on-investment and the cost benefits attached to moving to Linux, coupled with scalability, improved throughput, and flexibility. All this makes Linux a compelling enticement for many organisations."

Curran added: "Already proven in the academic and scientific arenas, technology-leading sectors, such as the financial services market, see Linux as a verified and truly viable solution to accommodate new ways of working and new business methods."

But despite the cost benefits that Linux offers, analysts still warn that charging down the Linux or free software route is far from sensible in the longer term, particularly when it comes to future software development and the supply of skilled workers to run the systems.

"Open source application servers should be avoided when more comprehensive and extended e-business platform functionality is needed, such as business-to-business application integration or a portal," said GartnerGroup's Weiss. "In such cases, integrated suites from IBM, BEA Systems, Sun and Oracle should be entertained, even though the products will have standard commercial licence and support costs."

Undoubtedly, Linux will continue to play a big role in the longer term. The steady but gradual take-up of Linux in the business world has ensured that Linux is here to stay. Still, compared with Windows NT and Solaris, Linux remains an immature platform, and is in need of far more serious development and support before it can aspire to be a player on the bigger IT stage.

Continuing cost pressures force the issue of cost-effectiveness and ROI. Today, there is the need for IT departments to increase provision for online and internal Web-based services.

There is also increasing interest in the platform among commercial software developers to look to Linux as a viable solution. That means that more innovative development work is likely to come out of the Linux platform in the next few years.

Box Story 1:
Linux Pros and Cons

Each Linux distribution has its own quirks and problems. While each is built around a single Linux core that is ratified by a single committee, yet there are still inconsistencies that need to be tackled. These include archive builds and installation paths.

Although each core OS remains compatible at a code level, some fiddling is often required to make sure an application installs and works correctly. But then again, there are plus points that cover all Linux distributions.

Pros		Cons
1. Linux is fundamentally a free product, without the licensing overheads of Windows, Unix versions and other operating environments. 2. The source code for Linux is freely available to developers, allowing for easier development of applications and expansion of the OS. 3. Unix skills are often easily transferred to Linux. 4. Linux distributions generally produce excellent performance on meagre hardware. 5. Apache Web server on Linux is one of the cheapest, best performing and most widely used web platforms. 6. Generic driver support has improved significantly, including support for USB, FireWire, audio and wireless local area networks.		1. Linux is still perceived as too complex for use as a workstation or desktop operating system. 2. Certified Linux user or technical qualifications are still new and relatively unproven. 3. There remain multiple distributions of the OS, each with their own design, layout and installation processes. 4. Open access to source code is viewed as bad by some because it makes it easier to identify and exploit security problems. 5. Most major software developers are still not backing the platform. 6. Manufacturer driver development for Linux is still limited, hampering the use of more specialist hardware.

Box Story 2:

What's Linux?

Open source means that Linux is freely distributable, i.e., the source code for the kernel and most software cannot be withheld. But, it does not mean that companies cannot charge for it.

Linux OS runs on a wide variety of hardware, e.g., ranging from Intel and AMD CPUs to more sophisticated hardware such as Digital Alpha computers, PowerPCs, and Silicon Graphics workstations.

Originally the term Linux referred strictly to the kernel, i.e., the core of the operating system. Today, Linux means a collection of configured software that runs on top of the Linux kernel. Such collections of software are known as distributions. Although these distributions often have their own unique flavour – together with some proprietary software – they are essentially the same.

Nowadays there is a wide choice of Linux distributions from such companies as Red Hat, Caldera, SuSE, Mandrake, Debian to name just a handful. These vendors do not just compile and configure the software. For instance, Red Hat, SuSE, Mandrake and others have added their own proprietary software to their distribution – which help to make such tasks as installation easy for the user like Windows XP.

Every desktop computer uses an operating system. The most popular operating systems in use today are: Windows, MacOS, and Unix. Because of free licences, Linux is a version of the Unix OS that has become very popular over the last several years.

OSes are computer programs, and the first piece of software that the computer executes when you turn the machine on is the OS. The OS loads itself into memory and begins managing the resources available on the computer. It then provides those resources to other applications that the user wants to execute.

Typical services that an operating system provides include: a task scheduler, a memory manager, a disk manager, a network manager, other I/O services manager, and a security manager. An operating system normally also provides the default user interface for the system.

The Linux kernel, created by Linus Torvalds, was made available to the world for free. Torvalds then invited others to add to the kernel provided that they keep their contributions free. Thousands of programmers began working to enhance Linux, and the operating system grew rapidly. Because it is free and runs on PC platforms, it gained a sizeable audience among hard-core developers very quickly.

Linux has a dedicated following and appeals to several different kinds of people:

1. People who already know Unix and want to run it on PC-type hardware;
2. People who want to experiment with operating system principles;
3. People who need or want a great deal of control over their operating system;
4. People who have personal problems with Microsoft.

In general, Linux is harder to manage than something like Windows, but offers more flexibility and configuration options.

All this stuff about embedded Linux taking off like a rocket sounds great, but are any companies really shipping embedded Linux in real products? And, if so, when are some of these embedded Linux-based products going to start hitting the market?

People are designing embedded Linux into real products. Some products are already being delivered to customers in large quantities. Many more are in varying stages of development. The gestation cycle of most new product development projects is about nine to twelve months, whereas the interest in embedded Linux itself has only begun to gain widespread mindshare in the past twenty-odd months.

Thus, if you do a quick calculation, based on those two assumptions, you'll quickly realise that the rollout of embedded Linux-based products should be starting right about now, and can be expected to really pick up momentum in 2003.

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