

Migrating Linux to the Enterprise Desktop

A growing number of industry organizations and Linux vendors are driving the consideration of Linux as the preferred desktop operating system for personal and business computers. Companies like Novell, Red Hat, Wyse and Sun are expending a great deal of resources to make the Linux desktop a success. Whether in search of a lower-cost alternative to licensing fees charged by popular desktop application providers, or to leverage the inherent security, reliability and manageability of Linux, more companies are starting to consider desktop Linux strategies and implementation.



The move to Linux on the desktop is being led in part by the growing acceptance of thin client computing. Indeed, thin Linux combines Linux's strengths in security, manageability, reliability and affordability with similar strengths of thin client computing. Flexible and powerful, thin Linux merits consideration by every organization looking to lower costs, reduce complexity and fulfill open-source mandates.

This Executive Brief will explain why Linux is more likely to arrive on the desktop in the form of a thin client than a PC, and the advantages that it brings to Linux-based business computing over traditional desktop PCs. It will further identify how thin Linux can help to lower IT costs, as well as factors to consider when choosing a Linux-based thin client platform.

THE ROAD TO THIN LINUX ON THE DESKTOP

Linux made its initial inroads into the enterprise in the back-end server arena, where popular applications such as databases and Web servers offer excellent Linux support. Today, Linux has clearly entered the mainstream of enterprise operating environments. In fact, Linux servers are enjoying double-digit growth every year and, according to market research firm International Data Corp., should reach a market share of 29 percent worldwide by 2008.¹ And growth in western Europe is predicted to be particularly profound. IDC expects a volume increase in this region of 203 percent between 2003 and 2007.

Desktop Linux, however, is still in the early stages of growth. This is due to the diversity of hardware found on the desktop today (with the requirement of Linux drivers) as well as a lack of desktop Linux applications. In addition, users are comfortable with the Windows interface and trained in pervasive Windows-based applications.

As a result of these challenges, the adoption of desktop Linux on PCs has been low to date. According to IDC, Linux's 2004 market share of business desktops is under 3 percent worldwide.² But as this growth continues, it's far more likely that Linux will arrive on the desktop in the form of a thin client than a PC. That's because a thin client makes a more suitable desktop client for a number of reasons.

First, Thin Linux enables Linux to be locked away in flash memory where it can't be tampered with by end users. It is also much easier for IT staff to handle, since thin client Linux firmware can be tracked remotely using professional management tools on a relatively simple and homogeneous hardware platform.

But the biggest benefit is the thin client's ability to overcome the current lack of desktop Linux applications as well as users' familiarity with Windows. Because thin clients act as terminals for server-based applications, a Linux thin client is capable of displaying a wide variety of applications, including server-based Windows applications and Web-based applications such as SAP, as well as Java, X-Windows and legacy green-screen applications.

Hence, Linux thin clients are perfect for organizations that

want to migrate to open-source applications, but still need to access Windows and other applications during the migration period. "Thin clients present a cost-effective alternative to traditional desktop machines," says Bill Weinberg, open-source architecture specialist for Open Source Development Labs (OSDL). "Linux-based thin clients provide a valuable tool for smooth migration to Linux in the enterprise, from the data center to the desktop and beyond."

These advantages have resulted in Linux making serious inroads in the booming thin client market, which is outpacing PC shipment growth. According to IDC, Linux accounts for more than 20 percent of the current thin client market worldwide³ and 30 percent in Europe, making it the second most popular operating system choice.

UNDERSTANDING LINUX THIN CLIENTS

Thin clients are broadly defined as diskless devices that are connected to a server-centric computing environment, where applications and data are hosted centrally on a server rather than on a desktop device. This time-tested architecture is more secure, manageable, affordable and reliable than a typical client-server architecture, where data and applications reside on PCs distributed throughout the organization.

Applied to the open-source environment, Linux thin clients are designed to work in a heterogeneous operating environment. By virtue of built-in access software, Linux thin clients provide flexible application access in a manageable client with greater appeal than other desktop configurations. An essential element of the increasing adoption of thin clients is the fact that they function as network devices rather than "fat" clients, and as such are easier to manage, configure, upgrade and protect than desktop PCs in a client-server environment.

How does thin Linux compare with Linux-based desktop PCs? In terms of manageability and affordability, Linux desktop PCs fail to demonstrate significant benefits over Windows-based PCs. Though Linux is often viewed as more reliable than alternative operating systems, the differences are not great, since the requirements for Linux PC hardware and Windows are similar.

In addition, due to the proliferation of Linux servers, IT departments today understand Linux servers and how to manage them. The addition of network devices in the form of Linux thin clients is a simple integration that does not greatly tax the IT staff or budget. Thus thin Linux may indeed be the preferred architecture for Linux on the desktop for many organizations.

READY FOR NETWORK COMPUTING

Linux thin clients support a growing trend at a much lower cost than traditional PCs: Increasing use of centralized, Web-based applications and Web services that require only a browser and Internet connection.

The popularity of the Web browser as an application interface is reflected in thin clients. Linux thin clients can be equipped with full Mozilla or Netscape browsers and Java Virtual

¹ "Worldwide Server Quarterly Forecast," IDC, June 2004

² IDC News Service

³ "Enterprise Thin Client Q-View," IDC, June 2004

Machines (JVMs). This makes them useful access devices for the growing number of browser-based applications, including e-mail, CRM, ERP, collaboration tools, sales force automation, training and more. Many of these are provided by application service providers (ASPs), who deliver hosted software as a service across the Internet.

In addition, thin client computing supports adoption of Web services-type applications. Web services refer to a standardized way of integrating Web-based applications using open standards over an IP backbone without changing the underlying code. Since Linux is inherently Internet friendly, it is easier to integrate thin Linux than PCs into Web-centric environments.

Users benefit in ease of use and productivity gains from the location flexibility and anytime, anywhere access of Web-based, thin client computing. Linux thin clients are inherently suited for flexible, remote access to Web applications because their server centricity mimics the operation of Web applications. Because of the bandwidth efficiency of thin client computing, users can access data and applications from any location with a secure connection to the Internet, such as a branch or home office.

THIN LINUX CAN LOWER IT COSTS

Because Linux thin clients, like Windows thin clients, lack onboard disk memory and are less complex than PCs, acquisition costs are lower and hardware lifecycles can be extended to three to five years. Open-source software licenses are also less expensive. But these represent only a fraction of the savings possible. Because of the reduced complexity and easier manageability of thin Linux, it can lower ownership costs throughout the computer lifecycle.

These stages and potential savings include:

- **Easier deployment:** With thin clients, installing a new desktop can be as easy as opening the box, taking out the device and plugging it into the wall. Plug n Play capabilities by some vendors allow auto-configuration options such as setting up the keyboard language, screen resolution, terminal connections, installation of drivers, and desktop configuration to access local applications from the central server. Desktops do not have to be staged or set up before being shipped to their ultimate destination, and expensive technicians don't have to be sent to install a new desktop. Hot-spares can be kept locally or shipped rapidly to end users in the event of failure. And terminals can be automatically entered into their correct logical groups, making identification and subsequent management easier.
- **Simpler support:** Once thin clients are installed, they can be supported and managed remotely, greatly lessening desk-side visits by IT staff. Remote management includes mixed environments with difficult scenarios, such as devices behind firewalls, dial-up users, wireless users with intermittent connections, users on limited-bandwidth subnets, security-critical environments, and environments that use the Internet as part or all of their backbone.

Because they have few moving parts, thin clients are highly reliable, greatly lessening "break-fix" scenarios. In addition, thin Linux client software is far simpler than the typical PC environment—no "blue screen of death" for users to contend with. Therefore users require less training and desktop support.

- **Centralized administration:** Centralized applications and data means less complicated IT assets to manage, which simplifies software administration while reducing the number of IT support staff. Software updates and patches are done centrally, as easy as downloading the updates on a central server and upgrading thousands of thin clients in minutes. TCO is further reduced by better utilization of software licenses—"concurrent users" are far easier to track in server-based computing. It also leads to higher utilization of hardware assets. In addition, centralized systems help organizations recover more quickly from natural disasters and viral attacks. During disasters that prevent employees from getting to work, server-based computing lets them access data and applications from home or any remote location.
- **More robust security:** Thin client computing in an open-source environment makes it far easier to secure information assets and recover from disasters. Since Linux thin clients do not house vulnerable applications at the desktop, only the data center needs to be secured, not each individual desktop PC. Linux thin clients are in "locked down" configuration, with no floppy drives, extraneous peripherals or software downloads to produce security threats. IT staff is freed from updating virus definitions and otherwise managing complicated operating software, and users become more productive.

WHERE THIN LINUX MAKES SENSE

Traditionally, thin clients have been used in task-oriented applications such as call centers. But now they are accepted as direct PC replacements for almost all desktop applications. Thin clients are also moving outside the typical industries where they have been used, such as transportation, retail and healthcare. These industries are characterized by many small remote locations that are difficult to support with PCs. New sectors such as government, manufacturing and financial services are adopting thin clients strongly for general desktop use.

Despite this broad appeal, thin Linux is not for every user. Technical workstation users are particularly concerned about the processing power required by applications such as CAD, CAM and development software. Desktop PCs remain the best solution for technical workers.

Thin Linux finds its greatest appeal among the following user types:

- **Transaction workers:** For the transaction worker who uses one or more fixed transaction applications for work such

as help desk, customer service, order entry or inventory, thin clients provide ideal access and are more manageable and affordable.

- **Knowledge workers:** For knowledge workers, especially “basic knowledge workers” that use basic transactional applications and basic office packages, thin clients provide secure, reliable access for job functions such as accounts payable clerk, line manager, remote support and field sales.
- **Kiosk users:** Thin clients are especially well suited for kiosk users, or for the workstation that is used for occasional access by either internal or external users. Here thin clients provide reliable access to a fixed set of information and applications in the form of a sustainable, secure device that can be accessed by many different users.

CHOOSING A LINUX THIN CLIENT

Linux-based thin clients are available from a number of manufacturers. As with any strategic information technology purchase, it pays to perform due diligence on both the equipment and the vendor. Vendor due diligence includes examining issues such as the installed base, the technology vision, and the track record of successful deployments, along with financial strength, customer references and technical support.

Because of their simplicity, thin clients are inherently reliable, but product form factors, features and options do vary. A careful evaluation will ensure that the specific models chosen will meet the needs of your organization.

Key technological issues to consider include the following:

- **Application access:** The appeal of the Linux thin client lies in its flexibility to offer access to Linux, Windows, Java, Web and legacy applications from the same device. Look for the latest versions of ICA and RDP protocols for access to Windows applications from Microsoft terminal server and Citrix MetaFrame XP. Also important is a Java runtime environment and a Linux browser for the Web, either Netscape or Mozilla. Access to legacy IBM and other text-based applications will require built-in terminal emulation.
- **Remote management:** Since many of the benefits of server-centric computing arise as a result of centralized management, it’s critical to evaluate the management software available from the manufacturer. The best products allow thousands of thin clients to be administered from a single, easy-to-use console, with flexible options for device grouping, change management and reporting. Also consider

hardware and software asset management, efficient use of bandwidth and scalability for enterprise deployment.

- **Security:** Though server-centric computing is easier to secure than other architectures, thin client security is still a concern. Look for thin clients that run the latest versions of Embedded Linux and other software, preferably on solid-state flash memory that is write-protected to guard against code modification. Support for Point-To-Point Tunneling Protocol is also important for secure use over virtual private networks (VPNs). In addition, the most secure thin clients support a range of security features, such as secure ICA, smart cards, multiple user accounts and access levels, multi-level security, auto-connect, and auto-failover to back-up devices in case of network or server failure.

A VIABLE DESKTOP ALTERNATIVE

The acceptance of thin clients on the Linux platform is growing as more companies, organizations, vertical markets and global regions embrace the advantages of open-source computing. Now and in the future, thin client computing will drive Linux desktops further into the mainstream.

As an example of this dynamic, in late 2003, Dr. Martin Echt, CEO of Capital Cardiology Associates in Albany, N.Y., supervised the conversion of a 200-user network from a Windows-based environment to a network of Linux-based thin clients. According to DesktopLinux.com, the successful conversion has improved application performance, reduced costs and increased stability.

Says Echt, “Why did we select the Linux thin client? If we had selected a Linux and Citrix desktop [PC] solution, the project would not have been economically viable at this time. While going to Linux was driven by many factors, it still needed to be economically within bounds. Thin clients accomplished that.”

How do the costs compare versus a Windows-based desktop PC solution? “We had estimated the yearly operating costs to be 37 percent less with Linux thin clients,” Echt says. “These savings appear to materialize nicely and we will likely exceed them in the future.”⁴

Thin Linux combines Linux’s strengths in security, manageability, reliability and affordability with similar strengths of thin client computing. Flexible and powerful, thin Linux merits consideration by every organization looking to lower costs, reduce complexity and fulfill open-source mandates.

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⁴ “Doctor Prescribes Linux for More Reliable Networks, Lower Costs,” DesktopLinux.com, November 2003