Linux and Solaris: A Marriage in the Datacenter?

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Adapted from Worldwide Unix Operating Environments Forecast and Analysis, 2002-2006: Linux and the Economic Downturn Take a Toll *by Al Gillen and Dan Kusnetzky, IDC #27753*

Linux is on the rise in the datacenter and throughout the enterprise. This has led to a fundamental shift in the IT industry, as Linux has become both a low-end, "Unix-like" platform as well as a force to be reckoned with in higher-end applications.

Enterprises will reap the benefits in the form of lower costs and increased enterprise capabilities. Major vendors are addressing Linux, which promises to make integration and mixed environments easier to deal with. However, enterprises will also be forced to look at issues such as:

- Compatibility of Linux with other flavors of Unix, especially Solaris, in mixed environments
- Total cost of ownership (TCO)
- Future of Linux capabilities and applications

Unix has been the cornerstone of IT infrastructure over the last decade, and the most prevalent flavor of Unix is Solaris. Linux and Solaris now differ on positioning, as Solaris retreats up-market by adding features while ceding the lower end of market to Linux. Companies can gain benefits via a mixed Linux and Solaris/Unix environment, maintaining and increasing functionality while keeping down costs, but they must pay attention to issues related to security, applications, and overall compatibility.

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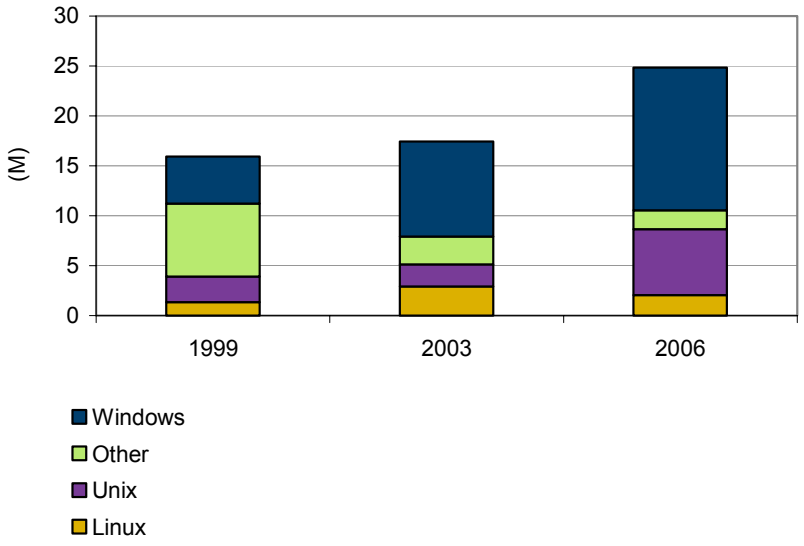
Definitions and Market

Linux is growing quickly, displacing Unix to a large degree. Windows is also grabbing more market share. While Windows and Linux are seen as natural — and bitter — competitors, the simultaneous gains made by each have placed Unix in a vise. Major Unix vendors must constantly add features to defend and expand their market positions. Other platforms are rapidly diminishing. These developments are illustrated in Figure 1.

Figure 1

Worldwide Server Operating Environments Installed Base, 1999–2006
(M)



Source: IDC, 2002

Linux and other open source operating environments include all systems (e.g., servers, workstations, minicomputers, and clients) running Linux, NetBSD, FreeBSD, OpenBSD, or other Unix-like open source operating environments. Typically, this software is licensed under the Free Software Foundation's General Purpose License (GPL).

While Linux has often been described as an open source version of Unix, this is not entirely accurate. Linux began as a project to build a Unix-like operating system with a very high level of compatibility. Linux cannot be called Unix because no one has submitted Linux to the Open Group for Unix certification testing.

As the most prevalent version of Unix, Solaris is the most affected by the rise of Linux. Solaris commanded over 41.3% of Unix server operating environment shipments in 2001. No other flavor of Unix commanded more than 15.3%. IDC believes that the number of relevant flavors of Unix will soon diminish to three or four.

Windows represents the main alternative to Unix/Linux. It combines a dominant position on user desktops with a growing array of enterprise configurations and applications. In the meantime, other operating environments, such as NetWare and OS/400, are on the decline.

One particularly important arena where these battles will play out is the datacenter. The datacenter stores a company's main IT and network equipment and where the heavy lifting of advanced applications is done. Linux continues to increase share in the datacenter, with 18.4% of companies IDC surveyed reporting Linux installed in their datacenter. Over the next several years, IDC believes most Internet datacenters will have Linux/Apache Web servers running somewhere or will have Linux workstations and servers running as a development platform, and it is increasingly being looked at as an alternative for database and application workloads.

Key Factors Driving Linux

There are five main factors pushing Linux forward in the enterprise:

- **Price and total cost of ownership** allow Linux to take over servers and other enterprise functions traditionally handled by Unix or other platforms. Linux can be optioned free or in low-priced builds, often bundled with various applications.
- **Increasing support of Linux** by vendors, including the major Unix vendors that view Linux as the "entry-level" Unix. Linux now has the stamp of approval from some of the most trusted names in software.
- **Increased affinity between Linux and Unix** is the natural response to this support, as vendors create tools to migrate users from Linux to their own flavors of Unix as their IT needs increase. Linux has even become a focal point for Unix development and helped slow the divergence of different flavors of Unix.
- **Proliferation of application software** for Linux, including enterprise applications, highly specialized technical applications, and even a growing number of end-user, office-type applications.

- **Linux in mobile/embedded markets** has opened up a new level of infrastructure. Success here could help open other opportunities for both Unix and Linux at higher levels of the food chain, with important implications for competition with Windows.

Solaris

In order to compete with Linux, major Unix vendors have undertaken a strategy known as "retreating upmarket." This entails adding advanced features not available in Linux. Enterprises have benefited by getting new capabilities at lower prices.

Important new features of Solaris include:

- **Integrated data management** features, including journaling capabilities, as well as direct input/output designed to improve database performance.
- **Provisioning and change management** features allow improved replication and archive management. A flash feature allows users to take a snapshot of an existing stack — operating system and application — and drop the information into another system, allowing provisioning to take place in a matter of minutes.
- **Server virtualization** allows users to create partitions within the system, leading to improved security, management, and resource allocation. Improved control allows bandwidth allocation on an application-by-application basis.
- **Solaris containers** allow the creation of reconfigurable domains with the ability to share memory and other resources. These also allow the allocation of specific resources to particular users, groups, or application sets.
- **Improved security** features are designed to automatically plug holes that can open in patched systems.
- **Configuration management** features allow users to install the best architectures and configurations for different installations, as well as managing and tracking patches.
- **Clustering** features allow faster and easier customization of Solaris configurations.
- **Performance** improvements come from better memory, file system performance, and thread modeling.
- **Application compatibility** derives from a toolkit designed to let users check and adjust application programming

interfaces (APIs). There is also much stronger compatibility with Linux.

The Promise of Linux/Solaris Environments

Many enterprises want to take advantage of Linux but face uncertainty. IDC believes that, for the foreseeable future, Unix will remain superior to Linux in scalability, availability, and reliability.

In response, enterprises are increasingly looking to combined Solaris/Linux environments, with the former occupying high-end tasks. Such configurations could allow companies to take the best advantage of their existing hardware and Solaris configurations, while still showing the best performance for spending. This strategy also allows users to take advantage of the Solaris advancements listed above, which are now available at more flexible prices.

This marriage of Linux and Solaris has been made possible by a number of developments. Some of these are the same forces that are aiding Linux as a whole. For instance, the major Unix vendors are providing greater support for Linux to take advantage of this growing market opportunity and to provide a way to migrate users from Linux to their own versions of Unix. A growing number of Linux applications and the increasing affinity between Linux and Unix are making the transition to such a strategy easier for vendors.

There has also been a more generalized consolidation in the Unix market, with fewer vendors and important flavors of Unix. Linux compatibility has provided a focal point to these vendors. The increasing use of Web services will lessen the dependency upon the exact client operating environment in use and make it easier to create and maintain combined environments. These developments have set the stage for a combined Unix/Linux solution to emerge as a alternate to Windows in both client- and server-side configurations.

Considerations

There are still numerous challenges in using Linux in the enterprise. These include both problems with Linux itself, relating to its incremental advance into the enterprise, and with Unix compatibility. Major issues include:

- **Linux poses a threat to Unix** by promoting market confusion and lowering revenue to major Unix vendors. Over the long term, this could make Unix/Linux combinations vulnerable by depriving vendors of the funds they need to add features for Unix's up-market retreat.

- **Competition with Windows.** While Linux has been expanding upmarket, Windows has been expanding everywhere, especially into the enterprise datacenter. Windows has also expanded into the embedded market, a key area where Linux has a chance to expand.
- **Lack of packaged applications.** While highly specialized and technical applications for Linux abound, along with basic applications, such as word processors and spreadsheets, there is a real lack of advanced desktop applications. This is especially daunting given that most office environments are on Windows, creating changeover and compatibility issues.
- **Lack of common Linux user interface (UI)/end-user features.** This will become more of an issue as Linux moves beyond very technical audiences. Applications and operating systems "train" users by getting them acclimated to certain features. However, Linux interfaces have lacked the consistency and ease of use necessary to create a large base of nontechnical users.
- **Balkanization of Linux.** Given all the activity in this space, it has been hard enough to maintain consistent upgrades of Linux. If the large hardware vendors conclude that the Linux distribution community is no longer offering enough value-add, it is possible that each of the major hardware vendors may unveil their own branded version of Linux and ship that version with their hardware.
- **TCO issues.** The greatest cost of a software application is not the upfront cost of purchasing it. Rather, it is the sum cost of implementing and maintaining it, as well as the utility and ease of use it provides to employees and other users. As Linux moves up-market, IT managers will be applying much more demanding TCO accounting. This, however, could provide an opportunity for services firms that are able to capitalize on this trend.

Conclusion

A Linux/Solaris combination in the datacenter promises many companies high performance for low cost. This is being made possible by continued development and improvement in Linux, as well as greater support from high-end Unix vendors.

However, there are numerous issues companies should keep in mind in order to have a successful implementation. These range from compatibility issues to support and total cost of ownership. Adopting such a strategy can bring an ideal mix for many companies who want to add features and save money, but such a strategy will require both planning and vigilance.