White Paper

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File, Web, and Database Server Administration

The Realities Windows and Linux Administrators Face and Their Demands for Change

A META Group White Paper

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Welcome to My World

Server administration continues to grow in complexity based on many issues such as integration, security, governance, and compliance. The goal of this paper is to help IT managers understand the state of server administration for comparison, benchmarking, and priority setting. To understand the challenges, needs, and goals associated with server administration in large IT organizations, META Group conducted a survey in March 2005 of more than 200 server administrators in companies with greater than 1,000 employees. The survey focused specifically on administration of file, Web, and database servers deployed on Microsoft Windows Server or Linux platforms.

Based on the responses from the survey, we highlight the specific pains, needs, and requirements associated with each workload and platform. However, in cases where IT administrator perceptions were consistent across both platforms, we frame the discussion around the combined set of Windows Server and Linux response data. In most cases, the data presented is directional, in that the sample is not large enough for statistically significant comparison. But the insight offered is valuable, because it indicates where resources are spent, what specific needs and challenges are faced, and the potential impact of better server management tools, processes, and training.

Study Approach

A range of industries were represented, with the largest segment falling within IT services, consulting, and education. Large organizations participated; all respondents came from organizations exceeding 1,000 employees, and more than 30% in the categories of Linux and Windows Server had more than 25,000 employees. These respondents represent large IT organizations (ITOs); in the three workload areas of file, database, and Web server, IT staff size exceeded 1,000 employees.

For the purposes of this research, the key workload areas were defined as follows:

- ***Web servers:*** Predominantly, these constitute the presentation layer in an n-tier architecture that hosts internal or external Web sites. This includes Internet, intranet, and extranet Web servers serving Web pages, including HTML, Java Server Page (JSP), Active Server Page (ASP), PERL, and PHP.

- ***Application servers:*** Predominantly, these constitute the application content and business logic layers that process application content in an n-tier architecture. These can be based on an application framework (e.g., .Net,

J2EE) in a service-oriented architecture (SOA). Examples are Microsoft Internet Information Server (IIS), BEA WebLogic, IBM WebSphere, and JBoss.

- ***Database servers:*** Predominantly constituting the repository layer in an n-tier architecture, these include relational database management systems (RDBMSs), online transaction processing (OLTP), data warehousing, data marts, data mining servers, online analytical processing (OLAP), and business intelligence. Examples are Oracle, SQL Server, DB2, and MySQL.

- ***File servers:*** These are dedicated file sharing servers running File Transfer Protocol (FTP), Network File System (NFS), and Windows Common Internet File Services (CIFS). We exclude our preferred network storage (network-attached storage [NAS] appliances and storage-area networks [SANs]) from this definition.

Summary of Findings

The survey findings provide useful insights into the challenges of server administration and the differences in Windows and Linux administration, not only in test and development platforms, but also in real-world production environments. Based on this data, it is clear that some of the common perceptions associated with platform management costs for Windows and Linux simply do not reflect reality. Although organizations tend to be most cognizant of acquisition costs because they are tangible, they often do not consider the largest cost component of total cost of ownership (TCO) — the “people costs” (i.e., the costs of IT staff members who provide ongoing maintenance and support). The key to lowering overall TCO is to decrease these IT staffing costs by making administrators more efficient.

Distinct differences exist by workload type and across platforms. However, the study findings also highlight that both Windows and Linux platforms share certain issues. The key findings in the file server workload highlight that administrators are focused on uptime availability and file restoration as they seek better processes and more automation. Storage and device management is a significant issue in that only 40% of servers are centrally managed and 40% of respondents point to a lack of tools to assess current utilization levels. IT staff members face significant time demands around restoration and find available tools insufficient. Respondents pointed to the need for better tools offering the greatest return in the areas of setup, configuration, security, and backup.

For Web server administration, custom configurations take a significant percentage of staff time. Adding to custom configuration time demands is the fact that IT staffs administer about 50% of servers centrally and believe the lack of

sufficient tools reduces staff and planning effectiveness by about 20%. Time is most often spent around general administration, configuration/setup, and troubleshooting, with the biggest savings opportunities seen in the areas of troubleshooting and security.

Database server administrators cited challenges with ensuring database consistency due to legacy data, closed data formats, and the number of OSs. This contributes to the fact that ongoing management takes 25% of IT staff time, while isolated data repositories lead to incompatibility that is viewed as making organizations less competitive because of reduced data sharing, process efficiency report timeliness, and analysis quality. Here, administrators demand better tools as well and include target areas of notification, patch management, and monitoring.

Across the three workloads, organizations face shared challenges around version control, centralized management, staff, tools, reference materials, and server deployment. Too many versions are in use at most organizations, and consolidation is estimated to offer time savings of more than 25% in Windows and Linux environments.

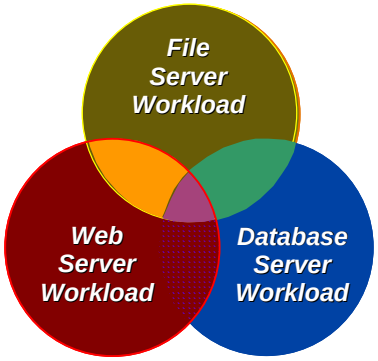
Working from a centralized location or console is a dream for most organizations. The best workload in attaining centralization is a database server where more than 50% of respondents are able to centrally manage 100% of their servers. Improved staff skills are an important need in both environments across all workloads. More than 50% of respondents view finding and hiring qualified staff members challenging. The answer, they say, does not lie in more people, but rather in better tools, documentation, best practices, and server deployment processes.

All administrators indicated that they need better management tools, but some of the blame for not meeting the need must be placed on the administrators themselves, who do not sufficiently research, identify, and implement available solutions. The lack of tools has a negative impact on version currency, update deployment speed, compatibility testing, consistency, meeting service levels, and troubleshooting.

Administrators are looking to vendors for better documentation and best practices, especially in the Linux environment. Areas in need of improvement include read/write edits, permissions, and health monitoring. Part of the value of better documentation and best practices will be seen in server deployment, which, on average, consumes an elapsed period of five business days and more than 25 staff hours for every single deployed server.

Workloads: A World of Difference

The adage “a workload is a workload, is a workload” could not be farther from the truth when comparing file, Web, and database servers. As highlighted earlier, there are similar pains and needs, but now the discussion will focus on the distinct challenges within the file, Web, and database workloads and any noteworthy differences between the Windows and Linux environments. The first area to explore is the file server workload.



Research Findings Highlight the Issues, Needs and Realities Across Three Key Server Workloads

File Server Workload Environmental Issues

Uptime availability continues to be a high priority for file servers as administrators for both environments require availability in excess of six days per week. Each day, Windows Server environments are required to be accessible more than 20 hours per day, in support of file workloads — three hours more per day than their Linux counterparts. The higher availability requirements of Windows Server environments is accompanied by 85% of respondents stating they have 24x7 vendor support in place; for Linux environments, that coverage level was held only by 63% of respondents.

File restoration continues to be a major source of file server administrator time — with an accidentally deleted end-user file requiring an average of 49 minutes to restore in Windows Server environments and 57 minutes in Linux environments. In both cases, the time is significant and represents an area administrators will seek to reduce through more automated processes and better safeguards and tools.

In fact, file services should be moved, where possible, to network storage, where an organization can consider unified management and restore time. Even small to

medium businesses benefit from network storage, with better storage management and increased storage utilization.

File Server Storage and Device Issues

Despite the declining cost of storage, waste continues to be an issue for file server administrators. Within Linux and Windows Server environments, administrators reported that multiple copies of files waste 19% of space, personal files 17%, and the lack of centralized file servers another 13%. The major difference between environments was seen within Linux environments, which face 25% greater storage use inefficiency than do their Windows Server counterparts.

Storage management continues to become increasingly centralized to reduce waste and inefficiencies, because almost 40% of storage devices are managed from a single, integrated console or dashboard. A result of more centralization will be improvements in utilization forecasting. On the topic of forecasting, insight into storage utilization continues to be a weak aspect of server administration; only 60% of respondents said they have sufficient tools to assess current levels. The impact of this is significant, because poor visibility hinders forecasting around storage requirements with planning effectiveness, staff allocation, and the flexible use of resources decreased by 20%, 16%, and 18%, respectively. But the potential for positive impact from better tools is clearly understood; respondents stated it would lead to an increase in planning efficiency of 20% and a 16% improvement in staff allocation.

Moving to network storage services helps reduce the number of copies of a file and offers better backup/recovery process and increased storage availability. Midrange and modular storage now equals 70% of all storage sold, and ITOs should consider it for most storage-related services.

File Server Staff Time Requirements

So just where do file server administrators spend their time? In Windows environments, server administrators tend to spend a greater percentage of their time on storage responsibilities than do their Linux counterparts. The increased time spent in Windows environments centers around file security and user quotas, rights, and restrictions, whereas Linux administrators spend greater time on setup/configuration and adding devices or volumes.

We discussed earlier how better administrative tools will lead to staff time savings. A look at the aggregate perception across both environments shows that the biggest areas where administrations see positive impact from better tools is a potential 33% time reduction in setup and configuration, a 25% reduction in time demands around security, and a 50% decrease in backup task time requirements.

Another area that consumes administrative time is hardware driver compatibility. In this area, Linux administrators spend more than 30% more time on hardware driver compatibility issues than do Windows administrators.

So where is time being saved, if anywhere? A look at the use of tools available in the Windows Server environment provides some insight. In the Windows Server 2003 environment, file server administrators have put various tools to work to try to reduce task time requirements. Users of the Windows Server setup and configuration wizard estimate it reduces the elapsed time to configure by almost 25%. In addition, users of solution accelerators see specific types of impact, with improvements in implementation speed, timeliness, and quality of 38%, 31%, and 27%, respectively. Active Directory is also seen as offering time savings of more than 20% across configuration and ongoing management tasks.

Administrators reported that they are gradually embracing SharePoint services, especially in the areas of self administration, quota management, and site creation. However, a full third of respondents are not exploiting any available services. Those that do not use available services cited a lack of staff skills and awareness and perceived value as major forces around non-adoption. For those that have embraced SharePoint services, the biggest savings have come in self administration, site creation, and site-level restoration.

Web Server Workload Environmental Issues

The scope of Web server administration continues to expand across organizations, as more communication, market coordination, and commerce moves to the Web. Linux deployments are predominantly Internet sites, while Windows is seeing a larger percentage of deployment around intranet applications.

Custom configuration is a significant environmental issue that takes considerable time and planning. Web administrators point out that the areas of configuration management they are most able to manage from a single server are user rights and security settings. More than 50% of survey respondents stated that they could currently manage those configuration elements from a single server and apply them across all Web servers under management.

As was the case for file server administration, the majority of Windows and Linux Web server administrators said that existing tools were sufficient to forecast future Web server requirements. Windows Server administrators, however, said that the positive impact of their tools was significantly greater than that experienced by Linux administrators, especially in planning effectiveness, deployment quality, and

forecasting the business impact of server investments. Respondents who did not say analysis tools were sufficient said they saw the greatest negative impact in terms of reduced process efficiency, planning effectiveness, and staff effectiveness, which decreased by almost 20% in each area.

ITOs should consider management tools, not just of the platform and OS, but also the application server software and framework, such as Microsoft IIS, IBM WebSphere, BEA WebLogic, and JBoss, and the tools the ITO uses to manage the instances of application running on the application infrastructure.

Web Server Staff Time Requirements

Web administrators find their time and efforts stretched across multiple activities, with the largest percentage of time spent on general administration (26%), configuration and setup (19%), and troubleshooting (19%). If organizations were able to optimize staff time requirements through better processes and compatibility and management tools, respondents indicated that they would then be able to spend significantly less time on troubleshooting and security.

To look at where time is being saved, it is helpful once again to focus on specific tools and services found in the Windows Server environment. Web server administrators who use SharePoint services see a similar amount of time savings as gained by file server administrators. The almost 40% savings in deployment and ongoing management time requirements is achieved in the actual and elapsed deployment time as well as an increased ability to enable self-administration among end users. Overall, respondents in both environments stated that current tools enable approximately 35% of Web server issues and content management problems to be resolved through end-user self-administration features. But more work needs to be done, because those results still fall short of the desired resolution rate of approximately 50%.

Another area that drives time savings is training. Training was used by more than 60% of Windows Server and Linux respondents to improve skills associated with Web server deployment and ongoing administration activities. The positive impact is felt strongest in the Windows Server environment; respondents estimated it improves security, reliability, timeliness, quality, and availability by more than 20%.

Database Server Environmental Issues

Can you trust your data? A factor that drives that trust comes from database consistency, which was perceived to be sufficient by more than 75% of respondents across both environments. But consistency barriers exist in each environment. In Windows Server, the key impediments are legacy data, data

formats, and functional requirements; in Linux, the challenges are centered on legacy data, functional requirements, and the number of OSs.

The time dedicated to different database server administration tasks highlights the challenges that stem from efforts to attain and maintain database consistency and legacy data. Ongoing management takes more than 25% of available time, followed in both environments by configuration and patch-management tasks. Of interest is the fact that 60% of Linux respondents indicated a need for better compatibility testing. But it is important to remember that the drive for compatibility testing is as dependent on the DBMS as it is on the OS.

Insufficient database environment interoperability is an issue for administrators of both platforms and results in significant organizational pain that strikes at the heart of competitiveness. Respondents across both environments said that it decreases data sharing by almost 30%, application development process efficiency by 28%, report timeliness by 24%, and analysis quality by more than 20%.

The choices of database, OS, and server platforms are all separate decisions in ITOs, but these infrastructure domains are increasingly being integrated as tightly coupled stacks. The choice of database is paramount, with SQL Server as the DBMS, and Windows obviously as the OS. As a reflection, many shared processes and skills can be leveraged across the entire platform. With Oracle and DB2, the choice of platform may be driven from a legacy DB2/mainframe and Oracle/Unix. But as the Linux 2.6 kernel becomes more broadly adopted, ITOs will see increased momentum from Oracle and IBM to integrate management of Linux DBMS platforms.

Moreover, the benefit of open-source databases (OSDs; e.g., MySQL, Progress) can easily become lost through lack of service support and integration. However, with some ISV momentum, OSDs are gaining traction in the midmarket and among SMBs. Even with this increased momentum, the choice of database and cost of migration to a different vendor's DBMS can inhibit any upfront savings and actually increase ongoing costs.

Database Server Staff Time Requirements

To gain better control over their database server time requirements, database server administration respondents once again identified key areas that require better tools. These areas vary significantly by environment, with the primary areas of focus among Linux administrators being alerting/notification, patch management, reporting, and monitoring. Windows Server database administrators also saw alerting/notification and monitoring as key areas of need and added auditing and overall management to their wish list.

Patches are also a major area of focus among database server administrators. More than 70% of database server administrators in the Windows Server environment are able to administer patches from a centralized location across 100% of database servers; fewer than 45% of Linux administrators enjoy the same capability. The ability to fully centralize patch management was seen as an area of strong impact in both environments because it offers greater than 25% time savings on patch-management activities.

Similar to the other workloads considered, database server administrators noted the need for better tools to help save time. Workload area mirrors others in the potential impact. Windows Authorization Manager was seen by database server administrators as offering staff time savings that exceed 20%. Active Directory (AD) offers similar staff time savings of 23% in managing security issues and 24% in policy management. In addition, the use of Windows Installer is estimated to reduce installation time requirements by 25%. Solution accelerators also were viewed by Windows Server respondents as offering greater than 25% improvement in testing, consistency, implementation speed, reliability, availability, and timeliness.

The tools used for database administration within both environments enable approximately 70% of respondents to track installation consistency and more than 75% of system changes.

Overall, results show that Windows Server administrators felt better about available tools than did their Linux counterparts. But respondents in both environments saw a real need for vendors to provide better forecasting tools to meet their usage and planning needs.

It is critical to define specific functions within server administration. Hardware platform functions should be maintained at the administration tool level, whereas clustering, storage management, and backup/recovery should be part of the storage functions and network storage. Database administrations should focus on database performance and database-focused administration only, leaving storage and server management to the right teams of administrators.

Overall Realities

Now we will examine issues shared in common across workloads and environments by server administrators. The research findings highlight that both Windows Server and Linux server administrators share similar issues on numerous fronts. Many infrastructure services can be shared between Linux and Windows Server deployments. For example, network, security, storage, and systems management services can all be repeatable across Linux and Windows platforms, helping to consolidate and unify costs across the ITO. More than 95% of Linux and Windows platforms are on Intel Xeon platforms; therefore, common server platforms and builds make sense across the two OSs.

Server Administrators Face Pain and Challenges in Five Key Areas

Server Administration Pain Area 1: Managing Multiple Server OSs

For server administrators, the use of multiple OS versions presents a tradeoff between the increased investment cost to migrate all servers to one OS versus the negative impact of managing multiple versions. Respondents indicated that managing multiple OSs resulted in greater staff time requirements, deployment time requirements, and upgrade complexity. In addition, respondents pointed out that several other areas of concern exist, including reliability, scalability, manageability, customization, and security.

For file server management, Windows Server administrators indicated that, on average, their environments were split across Windows 2000 Server (47%), Windows Server 2003 (29%), and Windows NT Server (21%). Linux

administrators manage an even wider range of environments, often having multiple versions of Red Hat, Suse, Mandrake, Debian, and Gentoo. Web server and file server environments closely resemble each other, as more than 50% of respondents reported using multiple distributions. For the Web server workload, Windows 2000 Server represents almost half of the Windows deployments, while Red Hat 3.0 and 2.1 are used in more than 50% of Linux environments. The incentive in both environments to consolidate is strong; Web server respondents estimated that doing so would offer staff management time savings of more than 35% in Windows environments and more than 25% in Linux.

Databases tend to be deployed on more than one OS version in Windows and Linux environments. Based on the survey data, server administrators perceived the greatest negative impact of multiple OS versions with their database servers. Database administrators stated that having to manage multiple OS versions decreases the reliability, scalability, and manageability of the system — due in part to a lack of functionality in earlier releases of the OS.

Windows Server environments see greater homogeneity across database servers than that found in Linux environments. However, though less fragmented, Windows deployments are still fairly evenly split between Windows 2000 Server and Windows Server 2003. More than 75% of Linux database server administrators reported that interoperability between different database environments was an issue, compared to 40% of Windows database server administrators. Perceived negative impact was felt more strongly by Linux administrators in every area except scalability. Two factors contributed to this position, and both add to multivendor, multiversion complexity:

First, in choosing Linux as a database platform, an ITO must choose a leading distribution (e.g., Red Hat, Novell/Suse). Choosing between these vendors can come down to support, geography, ISV issues, or client allegiance. Moreover, this choice adds a step of complexity and possible switching costs if an ITO has one distribution and then moves to another distribution or has multiple distributions. ITOs should aim to consolidate around one Linux distribution, just as they should consolidate around one Unix version first before moving to Linux.

Second, in 2004 the Linux kernel moved from Version 2.4 to Version 2.6. Version 2.6 has now been adopted by leading distributions, but very few 2.6 platforms are in production. Two features in particular in the 2.6 kernel assist database workloads on Linux. These are added kernel threads, which increase parallelism in the OS and better I/O scaling, enabling better network and disk activity. As a result, Linux 2.4 DBMSs will be restricted to four processors/cores, while with 2.6 DBMSs, we expect eight processors/cores to be the maximum in production.

Server Administration Pain Area 2: Getting to Centralized Management

Working toward centralized management from a single location or console is an ongoing focus for server administrators. In managing files servers, fewer than 50% of organizations are able to manage 100% of their servers from a single virtual location. Among those that fall short of the 100% level, an average of 47% of file servers are under single location management. Significant time savings are expected among that group, because they estimate a greater than 25% reduction in staff time requirements around ongoing management if they achieve 100% centralized management.

Web server administrators see a similar reality. Across both environments, fewer than half of organizations manage and configure 100% of Web servers from a single server. For those that have not achieved 100% management, the percentage under single-location management is close to file-server management, at about 40%. Web administrators would prefer to double the coverage level to more than 80%. Those respondents estimated that if they achieved 100% coverage, they could reduce staff time requirements by almost 35%.

Database administrators are doing a bit better than the other workload areas, as 56% of respondents stated they are able to manage 100% of database servers from a single virtual location. Among organizations where 100% management has not been attained, Windows Server administrators reported the ability to manage almost 25% more of their database servers from a single location versus their Linux counterparts. Administrators in both environments said a reasonable target would be to have 85% under centralized control and estimated that they could reduce staff time requirements by 21% if they achieved 100% coverage.

ITOs need to invest in platform management tools because these tools help measure and potentially double server system administrator ratios. Different tiers of servers (e.g., Web, application, database) have different ratios. But the doubling trend of using platform management tools is valid for all tiers. For example, if an administrator is currently managing the average 20 application servers, then using tools correctly can double this number to 40 servers. What is also important is the reuse and sharing of platforms and tools between Windows and Linux servers, because this helps reduce complexity and cost from the portfolio.

Server Administration Pain Area 3: The Need for Better Administration Tools

Windows and Linux file server administrators are constantly considering how to save time with backup, monitoring, and security. It was clear from survey responses that Windows Server file server administrators expect their environments to offer tools that support more task types. In all categories, a higher percentage of Windows Server respondents wanted specific task types addressed, except in managing quotas, where Linux administrators expressed a higher level of need.

For Linux administrators in the Web server areas, time savings will come from better Web management tools, especially around general management, analysis, configuration, and setup. Windows Server administrators saw the greatest impact from better tools in analysis and troubleshooting, which they focus on as improvement areas.

In the database server workload area, distinct differences exist between environments. For Windows Server administrators, the key tool areas are auditing and management; for Linux administrators, the list is broader, with strong interest in alerting/notification, patch management, reporting, and resource management. Windows Server administrators saw a greater perceived decrease in performance, caused by tool limitations, versus their Linux counterparts in the areas of implementation of mission-critical patches, setting controls, and effective governance.

Clearly, database server administrators would like to see better tools provided in the OSs that they use. The lack of desired tool functionality is perceived in both environments to have an equally negative impact in virtually every area. Many administration tools are used to accommodate the traditional Intel server sprawl. These tools have been used predominantly on file servers, mail servers, and application workloads. These tools and processes for Windows and Linux should be used also on database workloads.

In addition, file-serving workloads should be moved to some form of file service, with some networked storage solution as necessary. Storage resource management tools offer similar benefits when applied to network storage.

Server Administration Pain Area 4: A Focus on Documentation and Best Practices

For file-server administrators, finding the right answers and guidance is challenging for both Windows and Linux environments. Although almost 70% of Windows Server administrators said they believe vendors provide sufficient best practices and documentation, this satisfaction rate drops to less than 50% among Linux respondents. When it comes to current best practices and documentation in the Web server area, Windows Server excels in setup, installation, and application access while Linux sees particular strength in setup and installation.

Database server administrators saw a strong need for better documentation around troubleshooting, reporting, distribution, auditing, and security. The findings highlight a desire among Windows Server administrators in this workload area to move beyond setup and installation to focus on the successful management of data. Linux administrators saw a need for better documentation in those areas as well but placed a stronger emphasis on setup and installation as areas that need better vendor-provided resources.

Moreover, the technology in Linux for file serving somewhat lags that in Windows Server. Linux file serving using NFS as a Unix alternative is fine. Linux file serving in a Microsoft world is more problematic. For this, Linux uses Samba open-source technology. Currently, Samba 3 does not integrate well in mature AD deployments. If an ITO has deployed AD, then it should be cautious of deploying Samba. Samba 4 is due 2H05/1H06 and has primary controller capabilities in an AD deployment.

Server Deployment: Responding to Changing Organizational Needs

Another area that requires significant administrator time is server deployment, which still consumes time and resources. For file servers, from beginning to end, the process takes an elapsed time of almost five business days, with a total actual time investment of 25 staff hours.

Web servers are more time-consuming to deploy than file servers are, due to increased security, data integrity, and internal versus external requirements. Deployments average 25% more elapsed time and more than 50% more actual staff time than do other server workloads.

A dramatic difference was observed between Windows and Linux as total elapsed time to deploy a Web server in the Windows environment was just under half the time required in Linux, and the actual staff hours a Linux Web server deployment

requires is estimated at 3x that experienced by Windows administrators. A similar reality was seen among database server administrators, who reported that the total elapsed deployment time and actual staff time requirements were more than double that experienced by Windows Server administrators.

However, using the right administration tools as a service to the platform, these time scales can be reduced across the board. OS distribution should be a part of platform management, not OS management. An example can be seen with server blades, where the blade management tools distribute the Linux or Windows OS to the blades. The administration tools for blades are Insight Manager or Director, and these tools should be used on regular servers for OS deployments, not just blades.

Key Takeaways

The survey provided some useful insights into the differentiation of Windows and Linux administration, in not only test and development platforms, but also real-world production environments. In this sense, such valuable feedback can be seen as a collection of valid references — not just a survey of results. Given the scope of this survey, our recommendations are high-level and generic. We recommend that ITOs consider the following directions when implementing or reviewing administration functions:

- ITOs should move to one Windows Server OS version, based around a mature Active Directory implementation. This will enable a smoother transition to Longhorn and future Microsoft OSs.

- ITOs should rationalize all Unix-to-Linux efforts onto a single Linux Distribution and single version during the next three to five years. Through 2005-07, this should initially be Web and application server platforms, and DBMS platforms through 2005-10.

- Linux should be considered only on common server platforms with Windows and share services for network, storage, security, application framework, DBMS, and, most important, system administration. Most ITOs will see .Net and J2EE frameworks coexist on these common platforms. Successfully managing both platforms requires focused portfolio planning and management.

- ITOs must invest in administration tools before any consolidation or rationalization project. This will help measure as well as double server administration ratios. These administration tools also need to be separated by service. Therefore, low-level administration tools keep the hardware level while the OS manages the APIs.

Bottom Line

Running key server workloads on Linux/open-source software may appear to have some upfront cost advantage over Windows. However, this is not true. When one examines the ongoing costs of service support and integration, these potential upfront costs are offset. ITOs, rather than procure the cheapest OS, must instead administer with the best that helps them cut down the biggest variable cost of all — people.