Filing Information: October 2004, IDC #4269

Global Headquarters: 5 Speen Street Framingham, MA 01701 USA P.508.872.8200 F.508.935.4015 www.idc.com

Adapting to Change: Blade Systems Move into the Mainstream

John Humphreys
Kelly Quinn
Jessica Yang

WHITE PAPER

Adapting to Change: Blade Systems Move into the Mainstream

Sponsored by: Hewlett-Packard

John Humphreys Jessica Yang
Kelly Quinn

INTRODUCTION

In the past few years, economic uncertainties, mergers and acquisitions, corporate restructurings, and an ever-changing business climate have resulted in a higher degree of variability for corporate IT environments. When growth is erratic and business needs are less predictable, it becomes increasingly important for companies to have an IT infrastructure that is flexible enough to react quickly to changing business needs. To be able to react quickly to market shifts and adapt in real time to change, companies need a flexible and dynamic IT infrastructure, and IT managers need a computing environment where change can be easily implemented.

The challenge IT managers face today is to satisfy at the same time both the strategic and tactical needs of the corporation. They are simultaneously trying to simplify the management of multiple dispersed data centers, to address practical concerns associated with floor-space constraints and cabling issues that are inherent in distributed computing environments, and to reduce costs by increasing efficiency through superior management and automation.

IDC research into these concerns indicates that blade servers are rapidly becoming the platform of choice in addressing these tactical and strategic operational challenges.

Businesses considering adopting blade servers are increasingly part of the mainstream market. These companies do not identify themselves as early adopters of technology. They have little interest in being the first company in their industry or market to migrate to the latest technology innovation, preferring instead to wait until a technology has proven itself and its value proposition is clearly articulated before moving forward. We find that these companies are moving, adopting, and deploying blades within their existing infrastructure — that the refreshed old server or build out new infrastructure is a basis for the migration to blade-based systems.

IDC defines a blade as *an inclusive computing system that includes processors and memory on a single board*. When blades are plugged into a chassis with a backplane that provides networking and power, the result is a *blade server*. Blade servers are more dense than rack-optimized servers because key components, such as power, networking, and storage, are not physically located on individual blades.

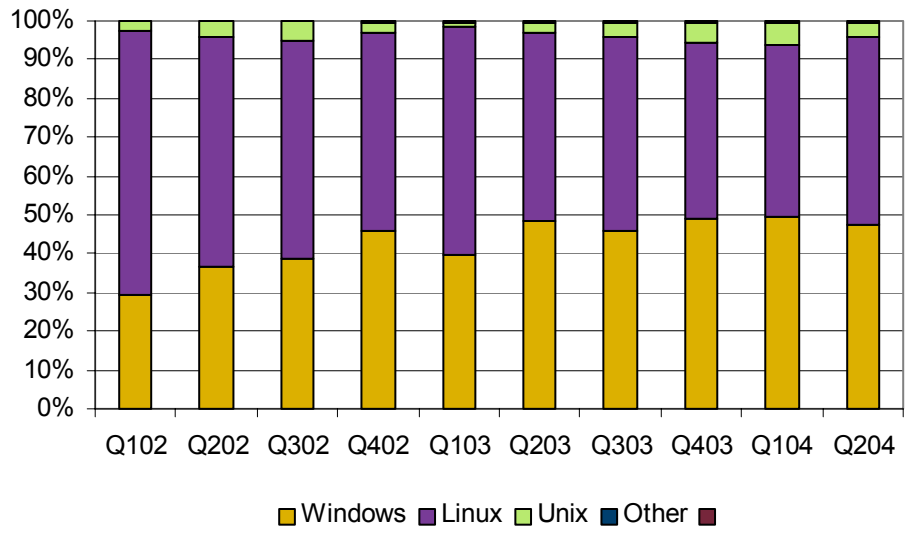
IDC Research on Blade Servers

Even as rack-optimized servers have become widely deployed in recent years, the market for blade servers appears to be rapidly expanding beyond early adopters in high-performance computing (HPC) and Web-serving niche markets and shifting toward more mainstream users. Since IDC has been covering the blade servers in 2002, the market has experienced a 372% increase in blade server shipments.

One indication that blade servers are moving into the mainstream market is the shift in deployments by operating system, as shown in Figure 1. In 2002, approximately 70% of the early blade server adopters in the United States were running Linux, primarily because blade servers were initially targeted at Web infrastructure workloads. In 2003, the market share of blade servers using Windows showed a steady increase, with Windows shipments surpassing Linux shipments for the first time in 4Q03. This trend suggests that blade servers are being adopted outside of HPC and Web infrastructure environments and are increasingly being deployed to support commercial applications and database workloads.

FIGURE 1

Shift in Blade Server Operating System Share, 1Q02 - 2Q04



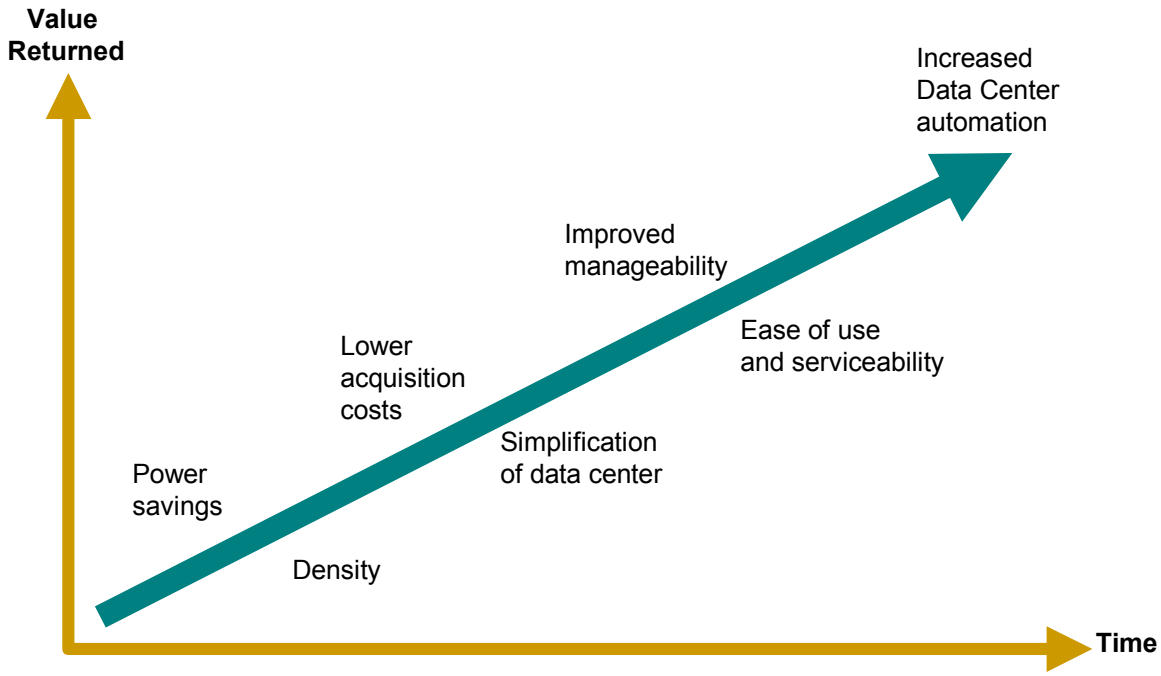
Source: IDC, 2004

Blade Server Users Report Improved Manageability

Over the course of the last few years, IDC has found a steady migration of benefits from very tangible yet secondary concerns, such as increased density of servers and lower power consumption, to more intangible yet substantial benefits, such as improved manageability and increased datacenter automation. Figure 2 outlines this value migration for blades systems.

FIGURE 2

Blade System Benefits



Source: IDC, 2004

Conversations between IDC and both early adopter and mainstream IT organizations about drivers for adoption of blade technology reveal that users of blade servers have experienced a host of benefits associated with the platform. A major driver of blade adoption is the move toward enhanced, integrated systems management. As the blade server market continues to develop, improved systems management solutions will emerge. Vendors in the server blade space recognized the importance of integrated systems management as a means to combat the rising cost of single-server, single-application environments. IDC expects systems management functionality to continue improving over time.

The driving force behind the movement toward better systems management is more effective leverage of the IT administrator resources. For instance, blade server users report that the IT administrator is no longer consumed with the many mundane and time-consuming server management tasks, as blades offer on-board management and provisioning systems that leverage significantly more automation in their systems management and deployment processes.

Customers often cite the ease of use and serviceability of blade servers as drivers for adoption. Because the blade itself is a field replaceable unit, if a system goes down, the administrator is able to easily replace it and quickly restore service. Additionally, because blade servers are a "wire once and reuse" infrastructure, administrators no longer have to deal with complexity when adding new servers into their environment or when upgrading or replacing units within the datacenter.

Vendors have been focusing on delivering enhanced provisioning capabilities that allow the user to quickly and in a one-to-many mode make changes to the software running on the blades. This provisioning capability is useful not only in initial system deployment for quickly and easily deploying the operating system and application, but it also enables the user to easily make changes to the software stack. This is especially useful when patching or upgrading a system and effectively streamlines change management processes. Whether it is adding new software or applying patches and upgrades, the embedded deployment and provisioning packages that are part of the blades servers are critical to enabling an IT environment that minimizes the expense and time associated with change management.

Platform for Server and Network Consolidation

When investigating initial implementations, IDC found that the overwhelming majority of blade server users characterize the platform not only as an increased density scale-out platform, but also as a platform for server consolidation as they go through a process of reducing the number of data centers, centralizing IT resources, and reducing the number of physical servers within those data centers.

System managers find that the use of blade servers allows them to manage the blade chassis and the blades within that chassis as single entity. The blade server architecture also enables them to use a scale out, pay-as-they-grow model for expanding IT capacity.

Because a blade chassis typically contains network switching options, users increasingly see the blade server platform as offering a layer of network consolidation as well. Network consolidation with blade servers is becoming increasingly more valuable as the server vendors partner with leading networking vendors to deliver a best-of-breed solution within a single infrastructure.

Simply put, blade server technology allows customers to centralize and physically consolidate servers and some network resources. This process of consolidation is the first step toward more automated and virtualized IT resources. IDC believes that users who take this path are likely to look toward provisioning, virtualization, and utility services as a means to offer more available IT services with greater efficiency.

Economic Benefits

Users report that increased density of blade servers is a key driver for adoption, especially for those users who are hosting their enterprise in an outsourced or collocated datacenter. Because blade servers occupy less physical space than rackmounted servers, the total cost for housing a blade server can represent a significant cost savings for a business. Moreover, blade servers offer lower power consumption through a combination of fewer watts required for each blade as well as an associated reduction in heat output, resulting in lower cooling costs per square foot in the datacenter.

Thus, blade servers enable customers to realize cost savings in both capital and operational expenses, as well as in opportunity costs.

Operating Expenses

As is rapidly becoming evident, while the potential of reducing costs across a shared infrastructure is appealing as a means of lowering the capital expenses associated with acquiring technology, the real economic benefits are realized by streamlining and lowering the time and expense associated with managing change in the IT environment.

The improved approach to server deployment that blades enable helps eliminate the hours and days previously spent by IT personnel mounting servers to racks, running cables, setting up power connections, and so on. With blade servers, additional server capacity can be deployed in minutes.

Perhaps the most significant reduction in operating expenses to be derived from deploying blades in the enterprise is the substantial reduction in the administrator-to-server ratio. The trend over the past few years has been to reduce IT personnel drastically and to task the personnel that are left with the Herculean job of managing many more servers than before. The use of blade servers frees up valuable time for IT personnel so they're no longer tied to monotonous server maintenance tasks and instead can be leveraged to be available for more critical tasks. Research shows in some cases these mundane manual tasks can consume up to 60% of IT admin time.

Capital Expenses

There are three important elements to consider when evaluating the viability of blade servers: proper planning for initial build out, resources required for deploying the system, and estimating what future needs may be in terms of scaling the system.

Blade servers do require more predeployment planning than traditional tower and rackmounted servers. Specific facets of the blade system — such as power consumption, cooling, network connections, and cabling — must be mapped out with some detail in order to ensure the availability of the required resources before physically installing the blade server chassis. However, once blade server chassis are put in place, future build out is a simple matter.

In contrast to traditional tower and rackmounted servers, blades servers offer the ability to scale IT resources at an economical rate as capacity and demand increase. The architecture of the blade server was specifically designed to be leveraged for economies of scale; whether with one blade in a chassis or 10, the number of cooling fans, power supplies, cabling, and network connections remains the same. As a result, the cost per server is continuously reduced as more blades are installed.

Opportunity Costs

What may be most important for specific customer segments that deploy blade servers is softer, less quantifiable cost savings. For example, companies that deploy blade servers in support of mission-critical applications avoid the opportunity cost associated with downtime.

Consider the deployment of blade servers in support of a medical center's essential diagnostic testing equipment and the resulting data, such as from an x-ray or an MRI machine. Medical records must be available when and where they're needed. If a server outage occurs and records are not available for a patient's appointment or a committee review of patients' conditions, the outage results in a waste of time and cost for patients, physicians, specialty nurses, and supporting medical and administrative staff. Supporting critical workloads with blade servers allows for quicker recovery when blades fail, and redundant designs can allow failover to on-board spare blades.

Need for Breadth in Vendor's Blade Product Portfolios

In the two plus years that blade servers have been actively sold in the market, the diversity of systems has grown tremendously. Initially, blades were offered as a form factor for large scale, ultra dense datacenter environments to be used in capacity clustering or Web infrastructure solutions. Blade offerings have now expanded to include 2-, and 4-processor configurations and are currently being used in a variety of computing situations ranging from the Web or access tier to the application tier of the datacenter. Looking ahead, there is both a deep interest in marrying blade servers with scale-up database solutions, such as Oracle 9i or 10g, to allow pay-as-they-grow scalability in the third tier of the datacenter as well as a total solution for the small and medium business.

Increasingly both small and medium businesses (SMBs) as well as distributed businesses are turning to blade server platforms as a solution that contains all their critical services in a single infrastructure. The blade platform, for these customers, is attractive as it maintains a pay-as-they-grow scalability, offers a single server/single application model, and provides headroom for future grow — so as these businesses grow, they can add more servers as they need them.

For blade servers to be widely adopted, vendors will need to provide a portfolio of products that meet a large variety of computing needs, as no one product is sufficient for all of an organization's computing needs. Moreover, customers need blade server suppliers that not only have a broad portfolio of server products but also have a portfolio of internal and external systems management, automation, and virtualization products that can be integrated to deliver an effective business solution.

HP BladeSystems

HP is committed to help businesses maximize the benefits of IT investments and streamline the management of IT infrastructure. In support of that commitment, HP has defined, developed, and brought to market a new class of hardware and software solutions. In its taxonomy and research, IDC calls this new class blade servers, while HP refers to the class as blade server systems and its products as HP BladeSystems. In describing HP's offerings, we shall use their terminology.

As a leader in the blade server systems market and as the largest volume vendor shipping servers using x86 processors, HP has taken a leadership role in the development of blade server systems as well as its surrounding ecosystem. HP has developed a set of products that help customers more closely match their computing needs with a specific blade server system architecture and environment. Rather than taking a prescriptive role, HP's approach is based on customer choice. To accomplish this, the company has developed a broad set of technologies that can be leveraged for HP BladeSystems products. As shown in Table 1, HP's portfolio includes not only dual-processor through quad-processor blades, but also a variety of form-factor, networking, and storage options so that users can create systems that best fit their needs and requirements.

TABLE 1

HP BladeSystems

Model	Form Factor (servers/enclosure)	Processor capacity	Chip types
BL20p	8 servers/6U	2P	Intel Xeon and Xeon EM64T
BL30p	16 servers/6U	2P	Intel Xeon and Xeon EM64T
BL40p	2 servers/6U	4P	Intel Xeon and Xeon EM64T
Networking Options: RJ-45 Patch Panels, Gbe Switches, Fibre Channel Switches			
Operating System Options: Windows, Linux (Red Hat and Suse), Netware, SCO UnixWare, SCO OpenServer, Solaris, IBM OS2 Warp Server (coming soon)			

Source: HP, 2004

Through this modular approach, HP BladeSystems products effectively combine form factor, processor type, CPU capacity, networking needs, and operating system preference to encompass and deliver on the many needs and opportunities that currently exist in today's computing environments as well as those that are rapidly emerging.

In addition to a modular system design, HP has incorporated intelligence into the chassis so that the process of deploying new blades is dramatically streamlined. Specifically, what the company has done is to allow the slot in the chassis to be preprogrammed with a certain application or "personality" so that once the blade is placed into the slot the application is automatically provisioned with the user-defined software image. This means that all the user needs to do once the slot has been "programmed" is to populate that slot with a blade, and the server configuration process is handled automatically. This "intelligence in the chassis" is only one of many process-focused improvements HP is making with its blade systems. HP estimates that approximately 50% of all blade customers are attaching blades to storage area networks (SANs). With this in mind, HP has optimized its blades not only for HP SAN environments, but also for most major third-party SAN environments.

Blade Server System Management

When it comes to new systems management capabilities and improvements over previous generations of technology, manageability is where blades shine. Not only do blade systems have the basic features and functions of monitoring and management built in as part of the platform, but increasingly the systems themselves are enabling both higher degrees of automation and virtualization — with the vision of creating pools of resources that can be coupled with applications to deliver critical business services on demand.

In this way, HP's blade management is organized into two categories: infrastructure management and life-cycle services. Infrastructure management automates the critical day-to-day tasks of discovering and inventorying infrastructure, monitoring the services, and alerting to any faults or events. The life-cycle services include the more future-oriented capabilities of pooling resources and marrying services supply with demand in real time.

Fundamentally, HP's blade solutions focus on building a management solution stack with the goal of delivering simpler, more streamlined system monitoring, management, automation, and virtualization technologies. These solutions, part of HP's Adaptive Enterprise vision, include System Insight Manager (SIM) and Integrated Lights Out (iLO) management chip, which is embedded on every blade system board. HP also includes the ProLiant Essentials Advanced Pack for remote management, and the ProLiant Essentials Rapid Deployment Pack (RDP) for deployment and the provisioning of software, patches, applications, and operating systems. HP even offers ProLiant Essentials Services that ensure users are getting the most out of their suite of software tools.

The foundational technologies of HP Systems Insight Manager offer best-in-breed infrastructure management capabilities today, but they also provide a clear migration path for more value added life-cycle services that can be incorporated at the user's preferred pace.

HP's infrastructure management products and life-cycle services include the following capabilities:

- **Auto discover and inventory**. Automatically discover and identify managed devices, clusters, and configuration data. (SIM, OpenView Operations)

- **Remote management of virtual machines**. This enables greater flexibility and efficiency in monitoring and controlling virtual machines, as well as facilitating the automatic migration of physical compute nodes to virtual machines. (HPSIM, ProLiant Essentials Virtual Machine Management [December release], OpenView Operations with VMware Smart Plug-In)

- **Hardware and software maintenance automation**. Because blades are hot-swappable, hardware maintenance requires no server downtime. It takes only a few seconds to remove one blade, insert another, and have the replacement blade provisioned with the old blade's system image. Software tools enable multicast deployment of all software upgrades, patches, and new applications. The automation of the hardware and software maintenance functions alone can drastically reduce the drain on IT personnel resources. An additional advantage available with blades is the N+1 redundancy, which can be used to offer high available applications as well as spare capacity for scale out services. (HPSIM, ProLiant Essentials RDP)

The Capital Region Orthopaedic Group

The Capital Region Orthopaedic Group is an organization of 21 surgeons and medical and administrative staff based in Albany, New York. Founded in 1959, the Group has a long established history in the medical community of the area, as well as deeply entrenched methods of managing patient information. In 2002, the Group decided that it was time to move its operations to a digital format and become a "chart-less, paper-less, and film-less" practice. This meant moving all paper- and film-based procedures, including patient records, x-ray films, and scheduling and billing processes onto a computer without any compromise in the ability to deliver patient care.

When the Group decided to make the move to a fully digital office, it was faced with the daunting task of identifying and deploying a solution that would address the hardware and software needs of the electronic medical records and PAC systems of the vendors with whom they were already working. The Group's CTO, Raymond F. DeCrescente, Jr., wanted a single source for the required hardware and software needs rather than having to manage multiple vendors and facing the nightmare of finger pointing that can be endemic in a multivendor solution. When DeCrescente discussed his needs with an engineer from HP, he realized that HP was the only vendor that could completely meet — and in some cases exceed — the many requirements the Group had for the project.

A key driver in his decision to work with HP was the reliability of the ProLiant solution. "I needed to have an environment for [the physicians] that was going to be something I could trust first before I was going to let them use it," said DeCrescente. "I was looking for something that was going to give our physicians the most reliable, more redundant and most highly available solution that I could find." DeCrescente decided the HP solution, particularly with its locally based support team, was the right one for the Group.

DeCrescente opted for the HP ProLiant BL20p and BL40p blade servers from HP. For DeCrescente, the decision to move to blades was an easy one. "Blades lend themselves better to a highly available, redundant, constant up-time environment," said DeCrescente.

Blades offered the ability of hot-swapping functionality — another key feature that drew DeCrescente to the HP solution. "Blades offered hot swappable drives. They had hot swappable power supplies. They come with a rapid deployment pack that allows you to quickly blowout a new server if you have a hardware failure," said DeCrescente. The redundancy that is built into the HP ProLiant server system was equally important to DeCrescente. The availability of data from all the Group's systems — as in any mission-critical environment — was of absolute importance. Downtime of just a few hours could mean tens of thousands of dollars of lost revenue. DeCrescente could not afford to risk deploying a solution that lacked as complete a focus on redundancy as HP's ProLiant has.

The Group started with eight blades and a storage area network (SAN) architecture. As the Group's workload grows, DeCrescente's organization is taking full advantage of the SAN environment and has scaled up to 12 blades across three chassis. HP built in a complete approach to redundancy for the Group's blade servers, including redundant chassis, redundant database servers, and a setup so that, in case of failover, "it's kind of like failover upon failover," said DeCrescente. We've done everything to find out where we can fail and then taken steps to see that we don't."

DeCrescente particularly appreciates the fact that the blades are running on 48 DC power supplies and the advantages they afford his IT group. "They don't really use a lot of power. They don't create a lot of heat," pointed out DeCrescente.

To date, DeCrescente has been very pleased with the result. His experience with what was essentially a turnkey project with HP has been entirely positive, and he continues to laud HP's services team for their responsiveness to all of his needs. The response of his clients — the 21 physicians in the Group and all the accompanying staff – has been excellent. When asked what key advantages he found in deploying blade servers, DeCrescente was very clear in his response: "Highly scalable, highly valuable, easily managed and the most reliable…All of those descriptions are what the blades offer over a standard setup."

Life-Cycle Services

- **Automation of server and external storage provisioning**. Servers can be repurposed directly through management software rather than having to be altered physically. Doing so saves time and expense normally incurred when personnel are required to physically travel to a site to repurpose servers manually. Blade-by-blade maintenance procedures also allow for continuous availability of most blades while allowing system software to be updated automatically. (HPSIM, ProLiant Essentials Rapid Deployment Pack, StorageWorks CommandView [which can link into HP SIM], OpenView Application Manager using Radia)

- **Automation of server recovery, including network and storage changes**. Because redundancy can be built-in, the blade servers can maintain high levels of availability, which helps companies avoid the expensive drain that can occur when IT administrators must be sent onsite to a datacenter to troubleshoot failures in rack-optimized or tower servers. Instead of having to send IT administrators to a datacenter to deploy or replace a single blade, with solutions like HP RDP, a spare blade is brought up and provisioned on the fly without need for manual intervention. This makes it a fully automated N+1 blade recovery solution, allowing the failed blade to be replaced or serviced at a later time. （ProLiant Essentials RDP, ProLiant Essentials Integrated Lights-Out Advanced Pack)

- **Scheduled reprovisioning and performance-based dynamic scaling**. Management software enables automated workload balancing to keep resources at peak utilization and automatically adapt to high and low points in demand. From a console, IT administrators can quickly and efficiently reprovision many blades in a few seconds. (ProLiant Essentials Workload Management Pack, ProLiant Essentials Rapid Deployment Pack)

HP is making strategic investments in innovative software manageability technology to further this differentiating capability. Novadigm and Consera are two recent acquisitions aimed at the change management and virtualization market spaces, respectively.

All of these elements contribute to the most significant economic benefit to be derived from deploying HP ProLiant blade server systems: the reduction of demand on IT administrator resources. IDC research indicates that approximately 60–70% of server life-cycle costs are associated with administration of server management tasks (e.g., server deployment, maintenance, tuning, platform migration, upgrades, and reconfiguration). Because HP BladeSystems have been designed to automate server management, tasks that previously occupied days of IT administrator time (and all associated expenses) can be offloaded to the blade server system itself thus enabling significant reduction in operating expenses.

Future Proofing

One final consideration with regard to capital costs is the "future proofing" that is inherent in HP's BladeSystems. HP has specifically designed the p-Class series of infrastructure — enclosures, power supplies, etc. — to support future generations of ProLiant BL blade servers, including the AMD-based blades that will launch in calendar 1H05. Furthermore, HP ProLiant blade servers share the same hardware components (hard drives, chipsets, and array controllers) and the system management tools as other ProLiant server systems. This foresight on HP's part translates into investment protection for customers.

Maximizing the success of any datacenter implementation requires thorough planning, expert implementation, and committed support. HP offers a full portfolio of hardware and software services to ensure the successful planning and implementation of HP blade systems — and HP is committed to providing responsive support to ensure the long-term value of customers' IT investments.

One of the most critical aspects of adopting blade systems is ensuring datacenter readiness. HP offers a complete datacenter assessment service, covering security issues, hardware and software support requirements, enterprise management, mission-critical support, as well as preparation for future iterations of the technology. Additionally, HP Datacenter Environment Services can assist customers with determining the best approach for optimizing their datacenter power and cooling facilities, both with an eye to present demands and flexibility to accommodate future generations of servers.

Customers can leverage HP's expertise when it comes to designing, building, and deploying their blade server solutions. HP's Factory Express offers a portfolio of standard, configured, integrated factory solutions and deployment services. Each solution is tested and built to the customer's specifications. HP also offers an instant capacity-on-demand service where racked and ready systems are staged at a customer site, eliminating upfront infrastructure costs for the customers. The "pay-per-use" model allows flexibility for customers to use and to pay for the additional capacity if and when they need to.

In short, while we always recommend that companies weigh and compare the actual products, with blades we also feel it's important to emphasize that users that are considering adopting blades not only look at the hardware but also the services the vendors offer. While blades do not represent a major divergence from traditional standalone devices, there are enough differences to warrant first-time users look at and consider a services-led engagement.

IDC Analysis

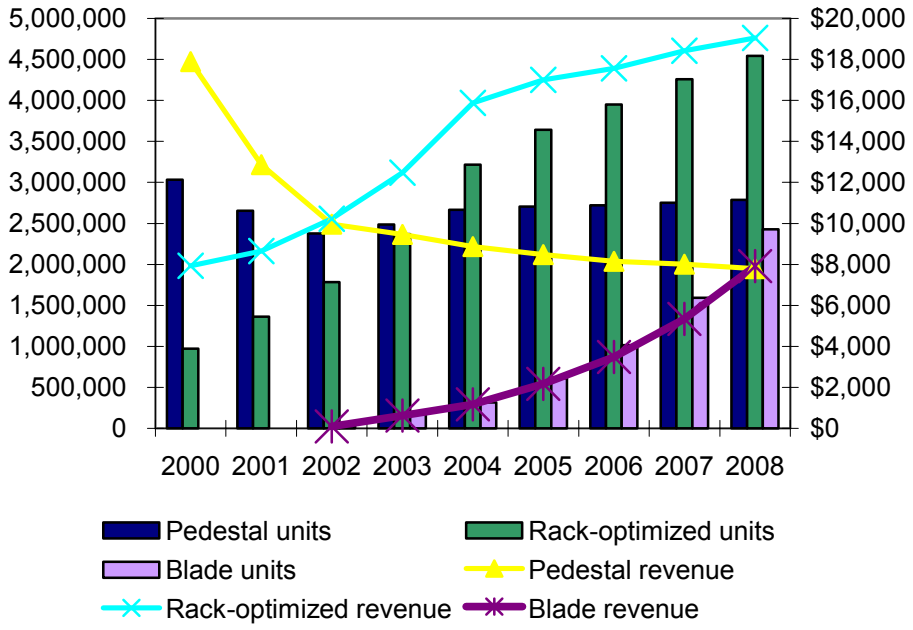
Businesses considering adopting blade servers are increasingly part of the mainstream market. These companies do not identify themselves as early adopters of technology. They have little interest in being the first company in their industry or market to migrate to the latest technology innovation, preferring instead to wait until a technology has proven itself and its value proposition is clearly articulated before moving forward.

Mainstream customers value standards and are cost conscious. They like the idea of open solutions that both encourage competition and provide a technology road map for the future. They look for tested solutions and integration, and they move cautiously when adopting new technology. IDC believes that not only are the ecosystem requirements for such a broad adoption of server blades in place, but that blade systems are emerging as mainstream technology.

As server architectures become increasingly modular, IDC believes the market share for blade servers will grow to 25% of server units shipped in 2008. As Figure 3 shows, spending on blade servers is expected to surpass pedestal server revenue in 2008. The rack-optimized server segment is expected to experience declining growth rates during the forecast period and to account for 47% of server shipments in 2008, as blade server architectures compete successfully against rack-optimized alternatives.

FIGURE 3

Worldwide Volume Server Market by Form Factor, 2000–2008



Source: IDC, 2004

As the blade server market continues to evolve, so will the form factor for blades. Server manufacturers recognize that there is a need for a variety of blade products and have introduced a diverse range of products supporting alternative chip architectures and CPU configurations. Like in the rack-optimized and pedestal server markets, a portfolio of blade products is necessary to handle the broad spectrum of computing workloads. Blade servers will support front-office terminals, Web farms,

back-office applications and will serve as nodes in clusters for parallel computing applications targeted at both technical and financial verticals.

The increasing broad portfolio of blade server features also extends to onboard networking options that are rapidly becoming ubiquitous. Vendors are not only adding options for Ethernet and Fibre Channel switches, but they are expanding their portfolios into emerging interconnects like Infiniband as well as working to broaden the networking vendors they support in order to integrate seamlessly with corporate networking products from Cisco (planned 05 release) or Broadcom for Ethernet or Fibre Channel, respectively.

HP Challenges

IDC believes that HP's blade server initiatives will face several challenges regarding the perceived maturity of the server blade market and its associated technologies. In general, as the market matures, it will be critical for HP to demonstrate how blade server systems do, in fact, address the needs of IT organizations and overcome the concerns associated with any new server architecture. For a volume market to emerge, customers must not view blade servers as specialty solutions. Blade servers must mature to become an important form factor that offers benefits and enhancements above and beyond traditional standalone servers.

In addition, all server blade vendors will need to combat the perception that there is risk due to a lack of blade server standards. IDC research indicates that mainstream users value standards because standardization reduces support costs in a multivendor environment. Users do not intend to mix server blades obtained from multiple vendors in a single chassis. Instead, users expect price competition and investment protection so that technology acquisitions made today will not be discontinued tomorrow. HP has already begun to combat this perception by designing the p-Class blade server system to support multiple generations of blades as well as a full range of pClass bladed platforms targeted from low end to high end computing.

With respect to blade servers and management, the challenge of employing even more granular and distributed infrastructure leads directly to an increased demand for efficient management. Today's enterprises are already struggling with the proliferation of servers in their data centers; computing blades run the risk of only exacerbating the issue. To migrate to blade servers successfully, customers will need to leverage powerful system management tools, including a robust and automated provisioning system.

HP Opportunities

As a major system supplier, HP has the opportunity to accelerate development of management, automation, and virtualization tools for its blade server systems by harvesting work done for its traditional server lines. An aggressive schedule for the development of these tools along with strong third-party relationships, service offerings and acquisition strategy provides HP with a strong foundation for development of necessary blade server software ecosystems.

HP enjoys a leadership position, which provides the company with the opportunity to influence and structure the blade server marketplace. More user education will be

needed to further illustrate not only the blade server value proposition in general but also how blade server technology can be leveraged to satisfy specific customer concerns. To this end, HP can leverage its role as a developer of core server blade technology, continue to promote an ecosystem approach to the market development, and continue development of infrastructure life-cycle services to address system maintenance issues.

HP has the opportunity to influence system-level standards such as onboard networking options. Users want networking options that conform to their specific in-house standards. The challenge for blade server vendors in general is to create enough blade system volume to make developing a switch an appealing proposition for the networking vendors. This process has already begun in earnest. Companies, such as Cisco, now offer Ethernet switch options that not only work in the blade system chassis but also integrate with blade and chassis management software.

Finally, HP must continue to find ways to encourage independent software vendors to test and certify applications for its server blades. The full promise of the server blade architecture begins with plug-and-play hardware components, but depends on the successful deployment of enterprise workloads that deliver business value to the enterprise. IDC applauds HP's approach, which is to cultivate an ecosystem of software and services in conjunction with the development of blade server system hardware as well as a series of reference architectures that customers can leverage as they make the transition from standalone servers to blade systems. HP has cultivated relationships with leading operating systems vendors like Microsoft, RedHat, and SuSE, as well as independent software vendors such as VMWare, Oracle, and F5 Networks, in order to encourage this ecosystem.

Conclusion

Over the course of the last 12 months, blade server technology has begun to attract the attention of the mainstream customers in the server market. Adopters of the technology today, who largely consider themselves as pragmatic, have stepped forward after a period observing early adopter experiences. The most frequently cited reasons that these customers have chosen a blade server system include the ease of use, serviceability, manageability, and cost saving.

In addition, these more mainstream blade adopters reference the advantages of increased performance density and the portfolio of blade server system products, including blades, more processor choices, multiple operating systems, new networking options, and new storage options. The enrichment of the surrounding blade ecosystem has encouraged mainstream customers to deploy blade servers into their data centers to support mission critical business processes.

Copyright Notice