Competitive Snapshot

IBM eServer BladeCenter Linux Solution: Redefining the Cutting Edge

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INTRODUCTION

The introduction in 2001 of blade servers by IBM, HP, and other vendors was initially claimed by many as an event that could elementally shift IT and business behavior. Trumpeted especially for their exceedingly dense form factor, which can pack three to four times as many servers into the same footprint as conventional rack-mounted installations, vendors presented blade solutions as ideal for server/datacenter consolidation efforts. But some funny and not so funny things happened on the way to the consolidation revolution. Beset by an increasingly stagnant economy and global political unrest, businesses of every stripe simply tightened their belts and hunkered down, hoping that recovery would be just around the corner. This behavior was especially prevalent among of Small to Medium sized Businesses (SMBs) with 100 to 1,000 employees, which tend to be more sensitive to economic cold snaps than well-insulated larger enterprises.

Despite the theoretical allure of blades, many companies resisted or ignored the technology, especially when most vendors delivered blade products that were little more than conventional servers in a different suit of clothes. Smaller may be better in some cases, IT customers seemed to be saying, but it is hardly a reason to throw out an entire wardrobe. However, the introduction of IBM's eServer BladeCenter late in 2002 offered a significantly different architectural and strategic approach to blades than many other vendors. While leveraging IBM's well-known eServer xSeries and other IBM technologies, the BladeCenter is a wholly integrated IT ecosystem that offers highly scalable and extensible total solutions based on a unique and powerful integration of servers, storage and networking technologies. It also offers an ideal Linux IT infrastructure environment for consolidation and application deployments such as ebusiness and web portals. Could the BladeCenter, then, represent a fundamentally new approach that will push blade solutions further into the business market?

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TABLE OF CONTENTS

Riding the Tiger: Business Realities and Needs of SMBs

For SMBs, the ongoing sluggishness of the economy is especially painful, resulting in less slack in budgets, less access to ready capital, and more precarious survival scenarios. SMBs face greater risks of extinction in a recessionary chill than the large enterprise behemoths that can hunker down and wait for markets to heat up. Still, smaller does not necessarily mean less able. Since they are notably more nimble than large enterprises, SMBs can react quickly to market shifts and demands, and easily reinvent themselves to meet customer needs. Indeed, their size makes it logistically easier for SMBs to meet, work with, and understand clients personally, a key practice at the heart of keeping customers happy, satisfied, and coming back for more. However, living and working in a smaller pool means SMBs are usually in need of constant and regular sustenance.

For that reason, SMBs cannot afford to cut back on investing in technology. Falling far behind the curve by sitting pat on existing technology infrastructures can be as fatal as overspending. Failing to keep pace with partner, customer, or supplier IT environments leaves SMBs unable to maximize existing relationships or to create new ones. Keeping pace with the generalized IT deployment curve is essential to the SMB, but its smaller margin of error requires that the SMB be cautious when investing in IT. SMBs tend to look for solutions that are proven and dependable, and do not require users be a pioneers or explorers of hypothetical IT worlds; SMBs seek familiar solutions that work for them and that can extend and leverage their existing IT investments.

Blade Servers: Looking Sharp?

When blade servers appeared in 2001, they were initially positioned as edge servers by most vendors, a concept that failed to resonate across the greater marketplace. As blade technologies matured over the intervening year and half, vendors described them as a means to consolidate IT processes across all levels of the enterprise, with a value proposition of reduced costs and complexity that is as appealing on both a divisional and enterprise-wide level. This has opened up myriad opportunities to position blade servers as solutions with inherent value to enterprises of all sizes. For example, IBM promotes blades as an ideal platform for Linux solutions, leveraging the economies of scale in an integrated IT infrastructure along with the economies of open source software and flexibility of the Linux environment. This concept should be of particular interest to cost-sensitive SMBs.

Blades versus Conventional Servers

How do blades compare with and differ from conventional rack-mounted servers? For the most part, blade solutions utilize the same industry standard x86 architecture as “pizza box” style rack servers, with a few vendors delivering or developing 64-bit RISC-based blade products. Additionally, some have expressed interest in hybrid 32-/64-bit blade solutions based on AMD’s new Opteron processor. From a technical standpoint, x86-based blades perform the same as rack servers with the same chipsets, and support the same range of Windows- and Linux-based business applications. Most are configured as one- or two-way machines. Storage can be contained within the blade itself or externally attached, depending on the kind of applications that a business plans to deploy. In general, one may expect less internal storage to be available in blades as compared with similar rack servers.

While the most obvious contrast between blades and rack servers is their smaller form factor, this difference leads to a number of economies of scale that are not available from conventional server form factors. Blades can consolidate server and datacenter operations into smaller spaces, but it is their ability to leverage common resources, via the chassis and

its backplane, that differentiates blades and their unique value. That said, what are some common differentiators between blades and conventional rack servers?

- Scalability: Blades can scale out IT capabilities with cost-effective industry standard servers to meet current and evolving business needs. Adding processing power can be as simple as sliding a new blade into the chassis with some vendors offering hot-swappable components.
- Extensibility: Blade chassis can accept blades with different processors, allowing businesses to scale up performance. This helps extend IT investment — good news for SMBs struggling to keep up with the IT deployment curve.
- Ease of management and service: The integrated wiring design of blade chassis provides a consolidated view into the blade environment, streamlining server deployment and configuration. A chassis can also contain components designed to monitor the status of the other blades, the chassis, and associated connections.
- Common resource sharing: Cooling fans, power supplies, and cables are easily shared in blade environments. Blade customers can enjoy substantial reductions in installation costs and time associated with attaching power, connectivity, and cooling hardware. Shared power and cooling resources also can help reduce power consumption.
- Linux: Linux is a particularly interesting option for blade environments. Some Linux distribution companies do not charge additional OS license fees for adding servers, lowering the costs of scaling systems out. Additionally, vendors including IBM offer pre-tested, pre-configured Linux/blade solutions to ease experimental Linux deployments.

For these reasons, and not mere speeds and feeds, we believe that blade servers offer a unique opportunity for any enterprise deploying them. For the SMB, the value propositions of extensibility, investment value retention, ease of maintenance, management, and reduced complexity are substantial, in light of the financial and staffing restraints that are day-to-day realities. This combined with the way blades leverage the x86 architecture utilized by most SMBs adds to their overall value. In the case of blade servers and SMBs, familiarity breeds contentment.

Blade Players

A host of vendors including IBM, HP, Dell, Sun, NEC, RLX, and RackSaver offer blade solutions. Vendor sales figures suggest that customer interest in blades is healthy and that blades are here to stay. We expect that as blade shipments continue to rise, the increasing demand among enterprises for refreshed technology should allow blades to compete increasingly with stand-alone and conventional rack servers. Eventually, we expect blade sales to overtake and eclipse rack servers.

What follows is a short review of the blade offerings of four major vendors, illustrated in part in Table 1. All are substantial players in the IT community and their strategic focus on blade solutions as part of their larger enterprise offerings, along with their ability to provide blade-related service/consulting make them, in our opinion, the players to watch.

Table 1: Blade Vendors at a Glance

Vendor/ model	Processor/ RAM	Max. Internal Storage	Chassis/ max blades	Rack/ max blades	Integrated Network connects	OS support
IBM BladeCenter HS20	1-/2-way Xeon up to 8GB SDRAM	80GB IDE or 46.8GB SCSI	7U/14 blades	42U/84 blades	Gb Ethernet/ Fibre Channel	Windows 2k/ 2003 Server, Red Hat, SuSE, Novell
HP ProLiant BL 20p	1-/2-way Xeon up to 8GB SDRAM	292GB SCSI	7U/8 blades	42U/48 blades	Gb Ethernet	Windows 2k/ 2003 Server, Red Hat, SuSE, United Linux
Dell PowerEdge 1655MC	1-/2-way Pentium III up to 2GB SDRAM	146GB SCSI	3U/6 blades	N/A – why?	Gb Ethernet	Windows 2k/ 2003 Server, Red Hat
Sun Sun Fire B100s	1-way UltraSPARC IIi 2GB memory options	30GB IDE	3U/14 blades	N/A - why	Gb Ethernet	Solaris 8

IBM

IBM's eServer BladeCenter features the company's Integrated System Management processor, Light Path Diagnostics, Predictive Failure Analysis, and IBM Director management capabilities.

HP

HP's ProLiant BL blade servers include Integrated Lights-Out (iLO) Management Advanced software tools. A Dual Port Fibre Channel Mezzanine Card (2GB) is available as an option in some models.

Dell

Dell's PowerEdge 1655MC blades include Dell OpenManage Remote Install, a suite of remote server deployment solutions designed to support the deployment, recovery, or re-tasking of servers remotely.

Sun

Sun's Sun Fire B100s Blade Server includes Advanced Lights Out Manager, and Sun ONE and N1 blade management solutions are available at an extra charge. A Sun Fire x86 blade based on AMD's Athlon processor that will support Solaris x86 and Linux was originally planned for release in mid-2003, but Sun has extended the schedule to the end of the year.

IBM's eServer BladeCenter Solution

In evaluating IBM's BladeCenter offering, one should take into account the total solution. Overall, we believe it is important to consider operating systems, middleware, storage capabilities, and management capabilities as critical elements of any blade server offering. Such a holistic view helps capture the entire synergistic impact that IBM's BladeCenter offers as a total solution and demonstrates the greater value proposition of BladeCenter to SMBs. In short, the whole of the BladeCenter is greater than the sum of its parts.

The Linux Difference

The Linux operating system offers platform extensibility that allows developers to create Linux-based applications that can be recompiled to run on virtually any hardware platform. For an SMB seeking to leverage its applications across myriad hardware platforms, Linux can potentially deliver more extensibility than other proprietary offerings. Applications developed for middle range servers can run on big iron and vice versa.

Perhaps IBM's most distinctive competitive advantage over its blade server rivals — and one of the most compelling reason SMBs should consider IBM's BladeCenter solutions — is the company's commitment to Linux. IBM has developed Linux solutions across all its hardware platforms, from the BladeCenter and x86-based eServer xSeries products through its POWER-based eServer iSeries and eServer pSeries solutions, as well as the company's eServer zSeries mainframes. An SMB deploying today's BladeCenter and Linux solutions not only has the ability in the future to add newer, more powerful hardware to its existing blade deployment, it can also leverage its Linux development efforts across higher end IT solutions as business grows and IT requirements change accordingly.

Extensibility also plays a role in reducing the costs of Linux development. This value proposition is enhanced by the lower initial licensing costs associated with Linux deployments, and the ability for Linux to be delivered across the enterprise without incurring additional seat license charges. Linux offers users easier and less invasive upgrade paths than most proprietary solutions, as well as associated lock-in costs. Overall, Linux solutions offer savings on day one that continue out to day *n*.

IBM's strategic commitment to Linux should be of particular interest to any organization that does not have the luxury of experimenting with untested, narrowly distributed, or potentially short-lived technologies. IBM's long-term Linux strategy assures that the technology will have substantial and ongoing support not only from IBM but also from the company's host of ISV partners, who cannot help but notice IBM's commitment to Linux across its middleware portfolio, including DB2, WebSphere, Tivoli, and Lotus. Additionally, IBM's new Express hardware, software, and service offerings are targeted at the discreet installation, management, and usage requirements of SMBs.

Why Middleware Matters

Middleware, the layer of software between the operating system and end user applications, provides essential services including transaction control and secure and reliable access to data. Increasingly, middleware has become critical to delivering the application flexibility, and interoperability customers require to participate in what IBM describes as the on demand world, or what HP describes as the Adaptive Enterprise.

SMBs looking to deploy systems based on IBM's BladeCenter with Linux need to consider middleware infrastructure requirements, both for their inhouse developed applications and those purchased from third parties. There are many middleware options available, ranging from open source software to commercial products from IBM, Oracle, BEA, and many others. Open source middleware may be appropriate for those with sophisticated inhouse technical skills but most SMBs are likely to purchase commercial middleware products. IBM has, through its DB2, WebSphere, Tivoli, Lotus, and Rational offerings, a comprehensive portfolio of middleware solutions. The company's commitment to middleware development — as opposed to end user applications — is conducive to promoting a well-stocked market place of vertically and market focused ISV-developed business solutions.

Storage and BladeCenter

IBM's BladeCenter offers an intriguing value proposition for data center environments. Along with the integrated internal storage available with each BladeCenter server, IBM provides many fully integrated external tape and disk storage options. The networking technologies integrated into the BladeCenter chassis include GB Ethernet and Fibre Channel switch modules, which help simplify storage management and lower management costs. BladeCenter can easily support conventional Ethernet while providing for future expansion into Storage Area Network (SAN) deployments.

IBM's FAStT product line is targeted at SMBs looking to consolidate storage, enabling a single point of control for data, data management, disaster recovery, and maintenance. The ability to attach FAStT solutions to BladeCenter in a Linux environment can help businesses to grow their storage infrastructure at their own pace while exploring the benefits of Open Source solutions. FAStT storage servers support high availability, which helps avoid costly downtime and makes BladeCenter and Linux IT environments suitable for business critical applications. The FAStT Storage Manager software allows for management of multiple servers from a single console, on-line management of RAID levels, and the ability to create and modify arrays, logical drivers, and storage partitions, among other features. FAStT Storage Manager also provides on-line diagnostics to help speed problem determination and resolution.

Additionally, IBM's Tivoli product line provides a variety of storage management capabilities for blade environments. The Tivoli Storage Manager Express offering was designed with the needs of SMBs in mind, offering an open, integrated, and autonomic solution for managing storage capacity, availability, events, performance and assets, and producing a comprehensive view of storage assets from clients to server.

Managing Blades

Unlike conventional servers, blades offer simple, scalable, and strategic deployment and upgrades, significantly reducing the amount and complexity of tasks such as cabling. According to IBM, the integrated wiring of a fully populated BladeCenter rack reduces cabling by as much as 83%, eliminating much of the "spaghetti effect" clutter that plagues many data environments. Additionally, shared power, cooling and connectivity can further reduce the complexity and costs associated with datacenter support: key issues critically important to SMBs.

BladeCenter supports hot-swapping for maintenance and performance improvements, significantly reducing server deployment and configuration time. The inclusion of an Integrated System Management processor, Light Path Diagnostics, Predictive Failure Analysis, and IBM Director in BladeCenter servers also enhances integrated systems management capabilities, by continually monitoring the performance and status of blades within an enclosure, as well as switches and power. This provides IT managers with alerts on potential problems and system failures, helping to ensure BladeCenter resiliency and high availability.

Blades Support On Demand Businesses

IBM's on demand initiative reflects the day-to-day reality of most businesses, including SMBs. In an increasingly global market, customers expect attention whenever they need it, not when companies get around to it. If a customer is not satisfied with the level of support from one source, a multitude of competitors are waiting in the wings. The same holds true for business suppliers and partners. As businesses of every size come to rely more and more on IT, it is crucial that their computing environments are flexible and robust enough to respond

to the constant, unpredictable shifts of the marketplace, which serves as the genesis of on demand businesses.

Though IBM's original capacity on demand (CoD) offerings focused on the company's higher end mainframe and POWER-based products, the company has announced a statement of direction to deliver a BladeCenter Standby CoD offering this year, adding Intel-based servers to the IBM System Group's portfolio of Capacity Upgrade on Demand (CUoD) offerings. The offering improves responsiveness and cash flow — the customer pays for the additional capacity when they activate it — which should be particularly notable to SMBs interested in easing their IT upgrade paths.

Why IBM eServer BladeCenter is Important to SMBs

Like all vital beings in times of difficulty, SMBs seek the means to remain viable today and into the future. To that end, they seek business tools that allow them to participate fully in the market and focus on core business processes aided and abetted essentially by IT deployments. At the same time, SMBs are largely risk-averse when it comes to IT investments, having little time, patience or money for IT experimentation. For SMBs, IBM eServer BladeCenter combines the state of the art with proven workhorse x86 technologies that are well established and understood. The following points illustrate this unique and compelling value proposition for the SMB marketplace.

- **Cost Effective Industry Standard Components:** IBM's eServer BladeCenter offers what we see as a tried and true hardware solution. Given IBM's efforts to pre-integrate and pre-test all BladeCenter components, there is little risk of being cut by bleeding edge technology here; a key element of the eServer BladeCenter value proposition. But hardware components are just one part of this multi-faceted offering from IBM. Also included in the larger solution are equally familiar and battle tested industry standards, compliant middleware, storage, management, and Linux support which provide market resonating capabilities.
- **Unquestioned Linux Support:** The ongoing adoption of Linux — by vendors, ISVs and customers — should give substantial if not overwhelming comfort to SMBs. Linux offers a viable, predictable migration path away from the uncertain demands of proprietary software vendors. IBM's commitment to Linux across all its product lines, including BladeCenter, should reassure SMBs considering Linux that such a commitment on their part will not leave them high and dry at some future date.
- **An Established Portfolio of Middleware Offerings:** WebSphere, DB2, Lotus, and the new Express portfolios are important components of the value proposition. IBM's middleware strategy should help ensure that ISVs across the market and within vertical industries will have easy access to the platforms and tools to build applications that are anything but "one size fits all."
- **Flexible and Scalable Storage:** IBM's FAStT disk solutions offer scalability that fits the needs of SMBs, with up to 6TB of capacity on the FAStT 600 and up to 32TB of capacity on the FAStT 700 and 900. BladeCenter's integrated GB Ethernet and Fibre Channel support make this system an ideal solution for storage deployments from tape to NAS to SAN. Additionally, IBM's Tivoli enterprise management software is fully integrated with BladeCenter's IBM Director systems management software, enabling higher returns on investment through reduced management costs.
- **Reduced IT Complexity:** BladeCenter solutions offer reduced installation and ongoing maintenance costs from day one by greatly reducing the number of cables and fans, bandwidth, and power connections needed for each processor brought online.

Shared resources mean faster server deployment and configuration, and less ongoing complexity. Shared components help reduce the number of overall failure points, reducing diagnostic and repair times.

- **Future Proof Infrastructure:** BladeCenter offers compelling scalability and extensibility. Today's blades will coexist with tomorrows in the same enclosure. The ability to capture ongoing value from existing blade-based IT investments should give SMBs the comfort that money spent on BladeCenter solutions will continue to provide value well into the future. This "mix and match" capability offers an investment protection and return on investment that other solutions simply cannot.

These examples illustrate that the IBM eServer BladeCenter is much more than an alternative hardware form factor; it provides integrated, multi-faceted total solutions for virtually any SMB IT need.

What Does It All Mean?

SMBs are subject to a host of unique IT and business issues that require solutions that both solve immediate problems and provide a strategic foundation on which to expand. Being risk-averse, SMBs seek proven technologies with widespread industry support that will provide them with a rich mix of IT suppliers and supporters. Understandably, SMBs seek to avoid vendor lock-ins, rapidly obsolescing technology and serial "rip and replace" deployments. At first glance, blade servers might not seem to be the answer to SMBs' problems, even though they are based on industry standard components. We do not believe that a mere form factor change is a particularly compelling argument to inspire a switch from conventional stand-alone or rack-mounted servers. But this is where IBM eServer BladeCenter differs from earlier blade or edge server solutions.

IBM's eServer BladeCenter is more than a form factor shift. The integration of servers, networking, storage, and applications, which includes hardware combined with the company's Linux, middleware, storage, and management solutions, offers a distinctly different — and much more substantial — value proposition for SMBs. More than a just a smaller server footprint, the eServer BladeCenter portfolio offers a total solution approach that provides SMBs the means to contain costs, scale their business, and leverage existing and future IT investments.

IBM's ongoing support for Linux and middleware should help ensure that SMBs will have access to an ever growing number of ISV-developed applications and solutions. In essence, the IBM eServer BladeCenter Linux solution is greater than the sum of its total parts. Overall, we believe that the current capabilities of IBM's BladeCenter solutions along with the company's commitment to their supporting technologies offer plenty of incentives for SMBs to consider BladeCenter for easily consolidating and upgrading their IT deployments today, as well as cost-effectively scaling and extending them tomorrow.