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Competitive Snapshot

Optimizing Enterprise IT:
IBM eServer pSeries and Consolidation

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Optimizing Enterprise IT

INTRODUCTION

Enterprise computing environments often grow unpredictably for reasons that are not especially difficult to discern. The fact is that business computing evolves to meet the needs of businesses themselves, which seldom develop linearly or work out precisely the way they were intended. Partners and suppliers often walk very different games than they talk. Most importantly, the customers on whom companies stake their efforts and hopes are tough to please and even harder to anticipate. As a result, it should not be surprising when a state-of-the-art IT infrastructure starts showing stress and stretch marks early on, an especially critical issue for companies that regard the access to and availability of digital data as business-critical. At the same time, IT itself never stands still. The continuing ascendancy of Moore's Law and the ongoing efforts of IT vendors have provided businesses access to desktop computers that outstrip supercomputers of a decade ago and high-end IT solutions whose performance would have once been the stuff of visionary science fiction tales. On one level, the easy availability of a wide range of affordable, top line technology is great news. On another, it means that many businesses' IT infrastructures tend to be complex patch-works of individual solutions whose performance and capabilities vary widely.

The result of all this has been a growing need for IT consolidation, whose original notion focused on reducing an enterprise's total number of servers by moving their functions to more powerful or larger servers. However, many enterprise customers understandably shy away from consolidation, believing it to be by definition too expensive, too complex, and even too dangerous an exercise on which to risk precious company data. Is this a fair assessment? In a word, no. While many earlier consolidation models suffered admitted shortcomings, increasingly robust server and management applications have helped provide solutions to those problems. Additionally, more and more vendors believe there can be more to IT consolidation than mere server replacement. For example, IBM has focused its efforts on developing and delivering a quartet of 64-bit enterprise IT consolidation options that extend to storage, applications, and datacenters themselves, and leverage the company's POWER-based eServer pSeries solutions, Linux offerings and its On Demand initiative.

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Getting a Handle on IT

While the interest in and need for IT consolidation may be the end result of enterprise infrastructure evolution, what are some of the more granular related issues inspiring consolidation-minded businesses? The fact of the matter is that over a decade of innovation has offered enterprise customers an embarrassment of IT riches and options, from increasingly powerful desktops and servers, to hugely commodious data storage devices, to highly scalable networking solutions. Add to this mix the ready availability of affordable broadband Internet connectivity and you have all the pieces in place for a business computing revolution. However, while history illustrates that not all revolutions end happily, the idea that too many choices could result in a negative outcome is somehow counter-intuitive. After all, variety is supposed to be the spice of life. We would argue that the essential value of enterprise IT solutions lies not in sheer variety, but in stability, predictability, and manageability. By comparison, enterprises that fail to consider IT solutions strategically often end up with tactically designed, hurriedly deployed, and widely distributed heterogeneous IT infrastructures that are complex, cumbersome, and difficult to manage, and which tend to rely on expensive excesses of capacity to meet peak computing demands.

At the same time, other issues are further complicating this already complicated scenario. The need to quantify the value of ebusiness solutions against their costs is being undermined by competitive pressures and lack of skilled IT staff. Ongoing global political and economic uncertainties have heightened virtually every company's perception of and concerns about security, privacy, and risk management. In other words, enterprises are coming to expect more or better performance from increasingly stressed IT infrastructures. As a result, overworked support staff often resort to tactical patches that may fix this week's problem but open the system to longer-term difficulties, breaking the cardinal rule of strategic enterprise computing: that IT solutions exist to help businesses, not hinder them.

Getting a Handle on Consolidation Fears

So if IT consolidation is so great, everyone should be doing it, right? Well, not really. The fact is that businesses have tended to avoid traditional consolidation solutions for a number of understandable if not always rationally supported reasons. In fact, while the following concerns may seem real enough to those who bear them, they are essentially disconnected from the realities of modern IT consolidation solutions and practices.

- Too expensive. The argument here is that while consolidation may look good on paper, the overall costs of the effort will outweigh most, if not all, expected benefits. More to the point, since there is no such thing as a one-size-fits-all consolidation solution, whatever benefits a company might enjoy are unpredictable to the point of being unjustifiable. This flies in the face of the notable stability and robustness of currently available 64-bit solutions that makes the results and value of consolidation efforts based on these technologies far more predictable than traditional solutions.
- Too complicated. This argument is born out of the difficulties many enterprises experience in managing their existing IT infrastructures and resources. If you cannot manage what you already have, what are the chances of effectively managing an even larger consolidated environment? Gun-shy enterprises would answer "little to none." However, vendors today provide a wide variety of service and support offerings specifically designed to ease consolidated IT management and training issues. More importantly, one of the simplest promises of consolidation is to greatly decrease complexity for better infrastructure management.

- Too dangerous. This argument appeals to the fears of disaster felt by corporate leaders the world over. In a world where digital information is essential to the operation and survival of virtually every major global corporation, what happens if a consolidated data environment goes down? Even worse, what would be the ramifications if some portion of a consolidated information repository were unrecoverable? Confronted by such hypothetical risks, can IT consolidation efforts ever be justified? Some would say absolutely not, but we disagree. A number of contemporary enterprise IT capabilities, such as server partitioning and Capacity Upgrade on Demand (CUoD) make contemporary consolidation solutions far more resilient and scalable than many approaches, and offer new opportunities for leveraging IT resources and lowering costs along the way.

In other words, what we are discussing is not your Granddad's consolidation solution. While these new technologies may not be fully understood by corporate decision makers, they have the potential to offer much greater benefits than risks. That said, what does consolidation actually consist of? Traditional efforts tended to focus on server consolidation, which still constitutes the lion's share of many vendors' offerings, but what exactly is server consolidation? Simply put, server consolidation attempts to reduce complexity by reducing the total number of servers in a given infrastructure. This is accomplished by moving the data and/or processes from large numbers of aging or smaller servers, server farms, or storage devices onto fewer, larger, or more powerful machines, or clustered systems.

Why Consolidate?

What are the essential benefits of consolidation? In short, consolidation is really about IT optimization or getting the most from IT resources and data. From a practical standpoint, consolidation can enhance system performance, availability, and resiliency, and increase overall server utilization; all critical issues for enterprises that need to wring the maximum bang out of their IT bucks. Consolidation can also reduce overall infrastructure complexity, which helps to simplify IT management procedures and operations. In turn, such simplification can tangibly affect the bottom line by reducing management efforts and associated costs, bolstering TCO. Perhaps most importantly, embarking on a consolidation effort helps businesses consider their IT infrastructures in an integrated, strategic manner. Over time, we believe that such an approach can result in enterprises coming to regard their IT infrastructures as valuable strategic business assets that provide critical support for greater company initiatives. Good enough, but is server consolidation all there is to this process?

Consolidation Options

Though a number of vendors have broadened their solution sets to include more than simple server consolidation, IBM in particular has parsed out IT consolidation into four options described on the company's Web site that are designed to fit the discreet needs of a wide range of enterprise IT users. They are:

- **Physical Consolidation.** Physical (server) consolidation consists of migrating existing server and storage workloads of the same application or platform type onto fewer or larger systems of the same application type or platform.
- **Centralization.** Centralization involves the physical relocation of often widely dispersed IT assets, in the process reducing the overall number of datacenters or data processing sites.
- **Data Integration.** Data integration efforts focus on combining stored enterprise information assets in different formats into a similar format or platform.

- **Application Consolidation.** Attuned largely to performance, application consolidation co-locates multiple applications and data within a unified environment for the purpose of enhancing business integration or automation.

IBM's four options provide a systematic approach to the areas and opportunities involved in IT consolidation. However, we believe a closer examination of 64-bit consolidation solutions from three major vendors involved in this area, IBM, HP, and Sun, would provide useful comparisons and contrasts for enterprises considering consolidation efforts. The following chart provides an overview of each vendor's consolidation solution, followed by a more detailed look at those offerings.

Table 1: Consolidation Solutions by Vendor

Vendor	Processor Type	OS Support	Related Vendor Efforts	Focus/Applications
IBM	POWER4+ (w/POWER5 planned for 2004)	AIX, Linux	On Demand, Autonomic Computing	Datacenters, server farms, utility computing, application/database, integration
HP	Itanium2 (w/migration plans for Alpha, PA-RISC and Non-Stop platforms)	HP-UX, Linux	Adaptive Enterprise	Datacenters, server farms, utility computing, application/database integration
Sun	SPARC III	Solaris	Sun Tone, SunONE, iForce	Datacenters, server farms

IBM

Based on the company's high performance POWER-based eServer pSeries solutions, IBM's 64-bit consolidation options also leverage the company's greater Linux and On Demand initiatives. In POWER, IBM offers a processing platform that is more flexible and extensible than HP and Sun, whose own 64-bit solutions are only that. What this means for customers is that since IBM's POWER investment and roadmap extend far beyond the 64-bit world to include 32-bit and embedded solutions, the POWER platform is better capable of weathering market and industry fluctuations. Additionally, the company's AIX OS is well known and supported by a large number of enterprise ISVs and developers. We also see IBM's ongoing open systems and Linux strategies as key to its consolidation offerings, since the reduced OS and administrative costs of Linux compared with proprietary UNIX and Windows solutions go to the heart of the ease-of-management and economic factors that drive many companies' consolidation efforts. In addition, the company's migration of virtualization capabilities including dynamic logical partitioning (DLPAR) to the pSeries platform is particularly applicable to enterprise consolidation efforts. Finally, IBM's recent inclusion of On/Off processor Capacity on Demand (CoD) and memory Capacity Upgrade on Demand (CUoD) capabilities for its pSeries products offers enterprise users easier methodologies for scaling and updating consolidated systems.

HP

HP's consolidation offerings are similar to IBM's, in that they leverage the company's proprietary HP-UX OS along with Linux and CoD upgrade solutions. However, HP's approach to consolidation also differs markedly from IBM's, since it is a presented as a

specific element of the company's greater Adaptive Enterprise initiative. Additionally, HP's close alliance with Microsoft has resulted in the company promoting Microsoft's new 64-bit Windows Server 2003 platforms as a consolidation alternative. The most striking element of HP's consolidation strategy is that the company's 64-bit solutions are in a state of radical transition. HP's decision to migrate all of its 64-bit platforms including PA-RISC, Alpha, and Non-Stop to Intel's Itanium2 platform makes a good deal of sense strategically, since the company has invested considerable human and financial resources in Itanium development, but is it a good choice for businesses considering consolidation? That is unclear. Despite concerted promotional efforts by HP and Intel, Itanium's market penetration has been marginal. While Itanium benchmarking results appear promising, how well Itanium systems perform in real world circumstances is a matter of debate. Additionally, a migration to Itanium offers the same challenges and headaches as a migration to any other 64-bit platform. Overall, HP's consolidation offerings may make sense to HP customers who are willing to make the jump to Itanium, but their value to other users is less obvious.

Sun

In a sense, Sun's approach to IT consolidation follows a predictable path marked by the company's ongoing devotion to its proprietary SPARC/Solaris platform. In Sun's favor, despite ongoing challenges to and erosion of its formidable market share, the company remains a leader in 64-bit systems with devoted followers across a range of business sectors and industries. Sun's IT consolidation solutions focus on the datacenter environments that are the company's primary target markets, and are likely to incite interest among the company's existing enterprise customers. However, the allure of Sun's solutions outside of its customer base is uncertain, since a decision to deploy Sun solution largely requires the abandonment of other platform solutions for SPARC/Solaris. This situation has been complicated, in part, by Sun's largely incoherent Linux strategy. While most other vendors have figured out ways to embrace and leverage Linux, Sun's approach has been fraught with uncertainty and reversals, enforcing the market perception of the company as a proprietary systems house. Given these circumstances, we regard Sun's IT consolidation solutions in much the same way we see HP's: as more interesting to the company's devoted users than to potential greenfield customers.

IBM IT Consolidation: A Closer Look

In considering IBM's IT consolidation offerings more closely, it is probably wise to determine first what IT consolidation is not. Though traditional consolidation efforts and most contemporary projects include reducing the overall number of servers in a given IT infrastructure, consolidation is not just about server/workload reduction and it is not merely a hardware or even specific platform play. Similarly, consolidation is not a simple solution, nor is it somehow separate from recognizable IT solutions and ebusiness applications. Instead, effective consolidation is about assessing existing business IT resources and optimizing them or deploying optimized components that support an enterprise's greater strategic efforts. By enhancing the performance and capabilities of IT resources, consolidation can help marshal those resources to drive a company's strategic objectives. IBM's systemic Total Solutions approach closely follows this general guideline by assessing a customer's greater business strategy, along with the IT assets being considered for consolidation. By clearly assessing the strategic needs of the enterprise, IBM can better define the business value of a consolidation deployment.

The Linux Difference

IBM's Linux solutions are particularly notable for IT consolidation. Why is this the case? Linux offers lower upfront OS licensing costs and allows companies more autonomy in following OS upgrade paths than that provided by many proprietary OS vendors. From a purely practical standpoint, Linux can also lower support and administrative costs, by providing free access to information from Open Source users and developers, as well as by leveraging the in-house UNIX expertise many companies possess. Linux solutions are highly flexible, extensible, scalable, and secure, and work across a wide range of servers, including all of IBM's eServer platforms. This is particularly interesting from the standpoint of IT consolidation, since it allows a consolidation effort to extend across all of a company's IT assets, including 32-bit systems and their proprietary OS environments. This issue is also bolstered by ISVs growing interest in Linux; IBM estimates that there are over 5,000 business applications for Linux, many of them available for free or at low cost, with more coming. Overall, we believe Linux will be a significant driver of current and future consolidation opportunities.

On Demand

Introduced in late 2002, IBM's On Demand initiative introduced a vision of open, integrated, autonomic, and virtualized solutions and services that serve to extend the flexibility, resilience, and robustness of enterprise IT environments. As such, IT consolidation can provide a key element to any company's implementation of On Demand computing. Nevertheless, IBM's On Demand is more than a strategic vision, and the company has delivered s series of targeted offerings designed to make On Demand computing a reality for its customers. In May, the company introduced On/Off CoD features for its eServer p650, p670, and p690 servers, which allow customers to activate and deactivate processors when they are needed. Additionally, IBM introduced a Memory on Demand feature for the same pSeries servers, allowing customers to permanently activate memory in 4GB increments as needed. To help quantify the value of these new offerings, IBM also introduced a Trial CoD program that offers customers a 30-day trial at no additional charge of capacity upgrades for both memory and processors. Finally, IBM announced plans for a Software on Demand feature that would allow customers to price select software for pSeries by the day when temporary capacity is turned on. Overall, IBM's On Demand offerings are designed to improve IT efficiency and cost-effectiveness by optimizing computing resources, fully complementing the greater aims of IT consolidation.

IBM's POWER Play: A Future Roadmap

As an elemental part of IBM's eServer pSeries story, the company's POWER processors are well known as a leading 64-bit enterprise platform. However, POWER is uniquely different from competitive 64-bit platforms such as Intel's Itanium, HP's PA-RISC, and Sun's SPARC in the degree to which the POWER architecture scales. Probably the best-known iterations of this aspect of POWER are the PowerPC chips utilized in Apple's Macintosh laptops, desktops, and servers. However, POWER solutions also scale down to embedded chips used in set top boxes and other consumer devices, and provide functionality for a variety of enterprise computing devices including controllers in EMC's Symmetrix storage arrays and on AMD's new Opteron chipsets. In fact, POWER's scalability begs the question of just what makes an industry standard platform. The industry standard designation of Intel's IA-32 platform is based on the number of OEMs that utilize the chips and the number of users this represents. But if scalability up to and including 64-bit applications were added as a determining factor, POWER would be in a class of its own.

Beyond scalability, POWER and by extension IBM's pSeries solutions have profited from the company's longstanding strategy of migrating mainframe capabilities throughout the rest of its platforms. Virtualization capabilities such as DLPAR, which allow virtual servers to be rapidly deployed and decreased, offer a cost-effective and flexible solution for meeting workload peaks. IBM is also planning future virtualization offerings including multiple (10X) partitions per processor, and virtual I/O, storage, and LAN capabilities. In addition, IBM's autonomic computing initiative features including self-healing, self-configuring and self-optimizing capabilities, can tangibly reduce long term IT management and support costs.

IBM continues to drive POWER at the high end, with the release in May of the highest performing POWER4+ processors to date. The new POWER4+ at 1.7 GHz, which is available in the top end eServer p690 and the HPC-focused p655, offers twice the high-performance memory with 567MHz, Level 3 (L3) cache, and a new I/O subsystem with nearly triple the I/O bandwidth of previous systems. The eServer p690 also doubles LPAR support to the processor level. In all, the POWER4+ chip is available in the 1.2, 1.45, 1.5, and 1.7GHz iterations based on "server on a chip" designs that contain two processors, a high-bandwidth system switch, a large memory cache, and I/O interface. The future POWER roadmap includes releases of the POWER5 processor in 2004.

IBM eServer pSeries: Consolidation in Action

IBM focuses its IT consolidation efforts on delivering strategically designed, systemically deployed options, but a close examination reveals that the company provides more than consolidation for the sake of consolidation. IBM's consolidation options are especially well suited for optimizing ERP and database performance, making these areas of primary interest for many of the company's consolidation customers. The practical experiences of the two following enterprise clients demonstrate just how well IBM's approach to IT consolidation can work.

Fossil, Inc.

Based in Richardson, TX, Fossil, Inc. is a leader in the watch design and fashion accessory space. Founded in 1984, the company now operates in ninety countries. To deal with the complexities of operating globally, Fossil decided to use SAP to tie together its operations with the goal of providing virtually all of the company's employees access to the same company data by 2005. Fossil received proposals from IBM, HP, and Sun, and finally decided on a consolidated IBM solution consisting of IBM eServer pSeries p670s and p690s, iSeries servers, ESS Shark storage, IBM desktops, Tivoli management software, and IBM maintenance services. According to Fossil, the p690's mainframe characteristics including partitioning and dynamic resource allocation were especially appealing and followed the company's long-term plans to acquire the highest levels of server performance at the lowest cost. Additionally, the company will use the p690 for SAP application testing prior to its rollout to the full network, and will leverage p690 systems for backup and recovery processes.

Graybar

Graybar is a Fortune 500 company that distributes electrical, telecommunications and networking products via 250 North American distribution facilities. Graybar recently completed the "go live" phase of an SAP-based $90 million ERP program that consolidates the company's enterprise information, applications, and data warehouses including an inventory database of hundreds of thousands of product units and 4,200 representative manufacturers. According to Graybar, the new IBM/SAP system is expected to reduce

inventory levels, decrease order-to-payment cycle time, and improve productivity through process automation, standardization, and simplification. Graybar is using over sixty IBM eServer pSeries p690, p670, and p660 systems running AIX to serve as the IT backbone for more than a dozen mySAP business applications. The consolidated infrastructure also includes IBM xSeries 360 servers running the mySAP Enterprise Portal, along with IBM Enterprise Storage Servers (Shark) and Linear Tape Open Libraries. The primary application servers will be housed in a datacenter at the company's headquarters in St. Louis, with back up/recovery functions located at a datacenter in Kansas City.

What Does It All Mean?

A short study of technology history along with a peek at industry news suggests that IT complexity is not going away. The continuing evolution of existing solutions along with the ongoing emergence of new technologies will ensure that computing performance and its attendant complications are likely to continue unabated. At the same time, IT management and optimization solutions such as consolidation options offer enterprise customers a clear path through this confusion. However, the size and nature of most enterprise IT environments requires more than simple traditional server consolidation.

Overall, IBM's Total Solutions approach to IT consolidation, along with the company's four deployment options, provides comprehensive solutions for optimizing enterprise IT environments and enhancing the overall business value of business processes including ERP and database applications. By assessing the current state of an enterprise's strategic aims along with its IT infrastructure, IBM can help customers fashion consolidated IT environments that help drive rather than hinder their business objectives. Additionally, IBM's consolidation offerings are considerably enhanced by the company's long-term commitment to Linux solutions and to the company's strategic On Demand initiative. In particular, we believe these elements play key roles in driving the efficiency and cost-effectiveness of IBM's consolidation options. Finally, IBM's current 64-bit eServer pSeries offerings and its future roadmap for POWER-based enterprise solutions demonstrate IBM's intention to ensure that the company's IT consolidation offerings evolve to meet the evolving needs of their customers. Overall, we believe enterprises looking for an ideal platform for IT consolidation efforts would be wise to consider IBM's eServer pSeries solutions.