IDC
Analyze the Future

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WHITE PAPER

Building for the Future: Deploying a SAN Solution That Protects Your Datacenter Investments

Sponsored by: HP

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EXECUTIVE SUMMARY

Today, IT managers at midsize organizations face many of the same storage planning and management issues as managers at larger enterprises. They also must deal with several unique requirements, however. IT managers at midsize organizations need solutions that are easy to acquire and to set up; that deliver "investment protection" for future improvements in performance and scale without forcing the displacement of installed systems; and that address specific needs for greater management efficiency without disrupting current operations.

The evolving storage requirements and the unique challenges faced by midsize organizations make their selection of storage systems and storage management solutions a key concern. These organizations need:

- Simple solutions that complement their efforts to boost IT utilization levels through server and storage consolidation
- Scalable solutions that enhance overall application reliability and data protection goals while also accommodating the current and future performance requirements of diverse applications
- Complementary storage management solutions that boost IT staff efficiency and reduce the time required for administrators to manage expanding IT assets

HP, a leading worldwide supplier of server, storage, and IT management solutions, is well-positioned to help midsize organizations grow and better manage their SANs and network storage–based information assets. With the addition of HP StorageWorks 8Gb Simple SAN Connection solution that delivers 8Gbps Fibre Channel (FC) support at comparable costs to 4Gb FC solutions, HP provides simple, "future-proof" solutions to:

- Meet the evolving performance needs of consolidated server and disk-based backup/recovery environments
- Support ongoing data capacity growth and centralize the process of organizing and using all storage assets
- Significantly improve the efficiency of IT management processes

CHANGING DATACENTER ENVIRONMENT DRIVEN BY ASSET CONSOLIDATION

The effective collection and use of information are key requirements for organizations in today's competitive business environment. With the right information, delivered at the right time and in the right place, companies can make smarter decisions, react more quickly to changing conditions, and boost employer productivity.

When making IT investment decisions, organizations need to judge offerings based on three business requirements. Does the proposed investment:

- Help reduce or control increases in the cost of doing business?
- Enable more rapid innovation in products or services?
- Ensure the integrity of the business in the face of potential disruptions?

Business and IT executives in midsize businesses (companies with 500 to 5,000 employees) and smaller independent business units within larger enterprises care deeply about these issues, but they also must deal with several unique requirements. IT managers at midsize organizations:

- Don't have the time or staff to evaluate, select, and self-integrate best-of-breed hardware and software from multiple suppliers
- Don't have access to large amounts of investment capital to continually replace existing systems or expand existing datacenter facilities
- Don't want to rearchitect the entire IT management process to address new or changing business conditions

A key and recurring element of the goals for evaluating IT investments discussed earlier is the need for consolidation. The idea of consolidation has a long history in the world of IT. For decades, large organizations strove to consolidate datacenters, during mergers or reorganizations, in an effort to reduce real estate and staffing costs.

More recently, IT organizations of all sizes are working to optimize spending on servers and storage systems and to reduce operational burdens by consolidating many applications onto more powerful systems. The key technologies that organizations are using to meet these goals are server virtualization, bladed server architectures, and storage networks.

Consolidating Applications with Server Virtualization

The expanded use of server virtualization solutions is having a profound effect on overall IT investments, including extensive consolidation of physical server assets and a move to networked storage for virtualized servers.

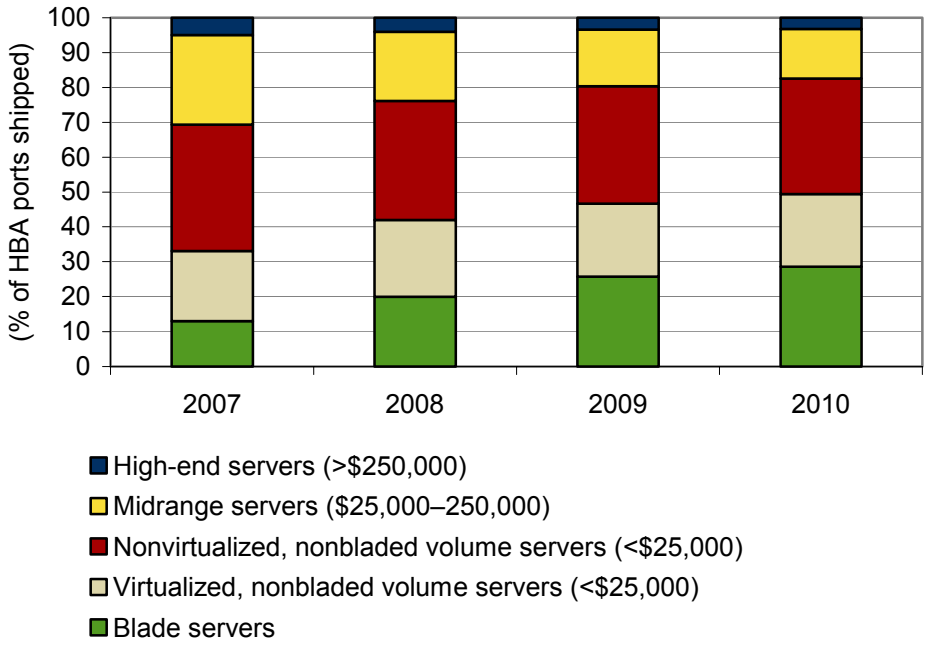
In 2007, companies of all sizes and in all regions increased their spending on virtual machine software (e.g., VMware's ESX) by 32.4% compared with 2006. Much of the growth in spending on virtual machine software came from increased adoption of

server virtualization in midsize enterprises that traditionally deployed 50 to 500 servers rather than the thousands deployed in large organizations. Most of these companies also have SANs in place for their high-end database and transaction-oriented business applications.

In conversations with these midsize companies, IT managers reported that server consolidation based on server virtualization solutions, linked with upgrades to high-performing multicore server platforms such as HP's ProLiant DL 360, typically led to 20% to 60% reductions in physical server deployments as server utilization levels rose. It also led to increases in networked storage capacity requirements ranging from 20% to 50% as most of the virtualized servers previously used internal storage. By 2010, IDC expects that nonbladed servers (both pedestal and rackmounted form factors) running some form of server virtualization will account for 16.3% of all new FC SAN server connections (see Figure 1).

FIGURE 1

Worldwide FC HBA Port Shipments by Server Segment, 2007–2010



Source: IDC, 2008

These managers stated that the use of server virtualization made it possible for them to rapidly provision new server resources for applications (in a few days rather than multiple weeks) without having to acquire additional server assets. By leveraging the application mobility capabilities (e.g., VMotion) now available with many server virtualization products, managers were also able to significantly reduce planned downtime and implement more sophisticated disaster recovery programs across all application sets.

As a consequence of concurrent improvement in server performance levels and the change in server provisioning practices, many organizations are also increasing the number of virtual machines running on a given server. Many report that their typical ratios went from four virtual machines per physical server to eight or more per physical server.

This expansion in the typical server workload, which IDC expects to continue, has major implications for network connectivity. Barring enhancements in network performance, IDC expects midsize organizations will face increasing I/O bottlenecks driven by I/O aggregation in both outbound data networks and storage networks.

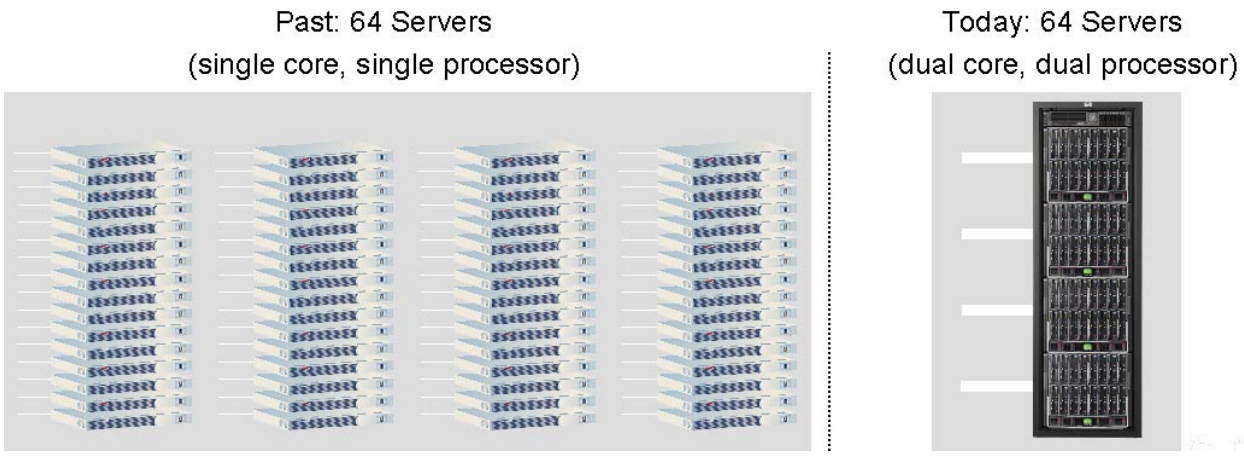
Consolidating Servers with Racks and Blades

Concurrent with the expanded use of server virtualization in midsize businesses, the evolving form factors of server platforms are areas of crucial concern for IT managers. Over the past four years, many midsize businesses deployed more and more server assets in rackmounted form factors because they greatly reduce the space needed in often tightly constrained midsize datacenters. Over time, these rackmounted solutions have become narrower and narrower as more midsize companies opted for 1u servers with limited internal storage and FC-based connectivity.

With the introduction of bladed server platforms such as HP's BladeSystem c-Class in 2007, midsize organizations now have the option to undertake further physical consolidation of their server assets (see Figure 2). The shift to a bladed architecture with its concentration of server resources will place further stress on existing network connections (over and above that created by server virtualization).

FIGURE 2

Impact of Server Consolidation on Network/Fabric Connections



Note:

I/O bottlenecks driven by I/O aggregation:

- Dense compute nodes (multicore processing and blades)
- Virtual environments

Source: IDC, 2008

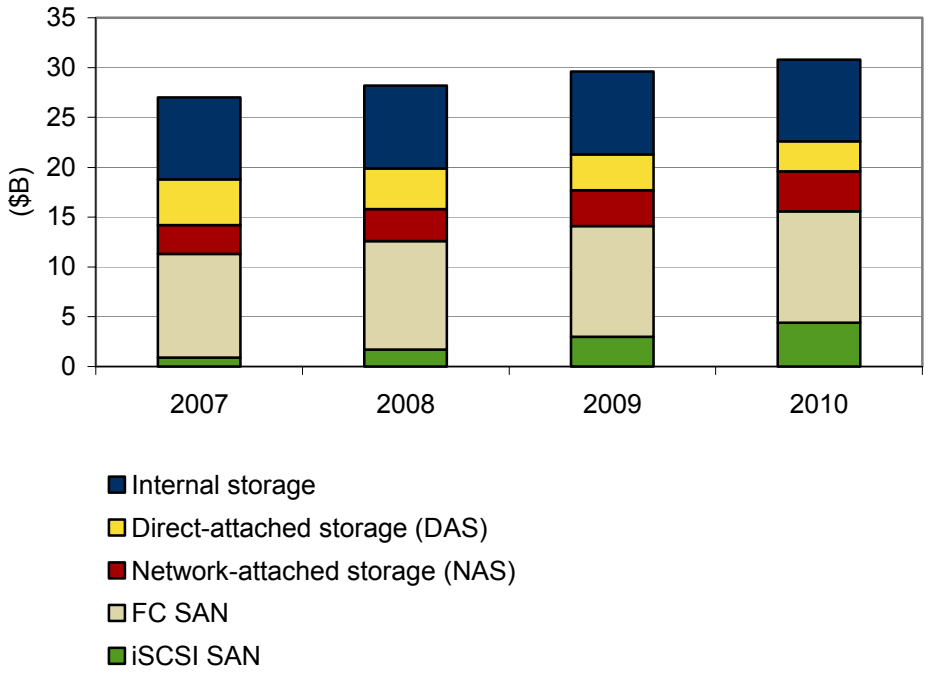
By 2010, IDC expects that bladed servers (including those running some form of server virtualization) will account for 22.3% of all new FC SAN server connections.

Consolidating Storage with Networked Storage

The need to store rapidly expanding and increasingly diverse sets of information is another factor that is redefining the scope of consolidation efforts. As midsize organizations recognize the need to intelligently store information for applications that may constantly move between different virtualized and/or bladed servers, they want to reduce their reliance on isolated internal or direct-attached storage wherever possible. Instead, they want to deploy networked storage systems that support modular tiers of storage with different performance and cost characteristics (see Figure 3).

FIGURE 3

Worldwide Enterprise Disk Storage Spending Forecast by Installation Environment, 2007–2010



Source: IDC, 2008

These more robust, network-based storage environments also provide a common set of storage management and data replication services and make it possible for IT managers to:

- Rapidly and dynamically reallocate installed capacity and provision new capacity to meet changing server workloads and business requirements
- Lengthen the useful life of existing storage assets by boosting performance and reassigning them to meet different application requirements
- Standardize and automate data protection policies and processes through the use of common, consistent data replication services

Once again, this concentration of storage assets has significant effects on network connectivity requirements. SAN-attached storage systems must support many more logical and physical server connections as well as allow for much more rapid data movement between storage tiers and backup systems.

IMPACT OF CONSOLIDATION SOLUTIONS ON YOUR SAN INFRASTRUCTURE

The three major technology innovations discussed earlier are already having profound effects on midsize organizations' existing SAN infrastructures. They are:

- Driving an exponential increase in server connections to storage assets, thereby expanding the traffic on SAN links between storage systems and SAN switches
- Boosting the number and intensity of storage network requests generated by individual servers, thereby placing strains on existing connections between more fully utilized servers and SAN switches
- Encouraging more direct storage system to storage system communications for tape and disk based–backup as well as data snapshots and replication, thereby placing strains on existing SAN fabric environments

When one puts together these trends, one quickly reaches the conclusion that midsize organizations will soon require SAN network upgrades.

Making the Jump to 8Gbps FC Solutions

It seems like just yesterday that the industry was discussing the rollout of 4Gbps FC, but in reality, 4Gbps FC HBAs, switches, and arrays appeared on the market more than three years ago. From both technology and silicon development perspectives, 2008 is the logical time to begin the transition to the next generation of 8Gbps FC.

The difference, this time, is the dramatic change in the server and storage connectivity landscape between 2004 and 2008. With continued levels of consolidation and the use of more powerful multicore servers, the move to 8Gbps FC makes sense at a number of levels.

Thanks to the backward compatibility between 8Gbps and 4Gbps components (HBAs, switches, and arrays) companies can deploy today's powerful servers on existing SANs. At the same time, they are deploying a "future-proof" solution that can run more diverse sets of applications on virtualized servers going forward. This approach makes it easier for IT managers to ensure that the changing storage I/O requirements of these diverse applications do not overwhelm links or create response time issues for critical applications.

When one factors in that any servers deployed in these new consolidated environments will likely be deployed for longer periods (four to five years versus the typical three to four years in the past), IT managers must deploy SAN solutions, today, that provide investment protection through the extended life of the system.

Addressing the Need for More Than Speed

As noted earlier, server virtualization, bladed server form factors, and networked storage are increasingly about more than performance. The enablement of data and application mobility capabilities for low-cost disaster recovery and optimized asset utilization are new capabilities that organizations want to exploit.

Greater adoption of these capabilities by midsize organizations translates into more dynamic movement of applications across different physical server and storage environments. It also means that the quality-of-service (QoS) and flow control characteristics associated with these "mobile" applications need to travel with the applications as they move from one system to another.

When these challenges are combined, it is clear that the real "next-generation" capabilities associated with 8Gbps FC infrastructure will focus on automated reconfiguration and dynamic flow control capabilities.

One of the most critical elements is that N_Port ID Virtualization (NPIV), which creates multiple virtual ports from a single physical Fibre Channel port, enabled virtualized servers to participate and benefit from zoning and other fabric technologies previously available only to physical ports. NPIV was introduced into FC HBAs and switches in the past year, but it is only with broader support from operating systems and server virtualization suppliers that it is fully useful. 8Gbps FC environments will be the first to fully take advantage of this FC-enabled management enhancement.

Improve IT Management Efficiency

The most daunting challenge to future consolidated and virtualized infrastructure plans is a looming crisis in administration.

The ease of virtual server deployment is already leading to a phenomenon that IDC calls "virtual server sprawl." While companies are consolidating physical assets, duplication of individual applications actually increases. As a result, administrative workloads at a physical device level are stabilizing, yet administrative tasks associated with application moves, adds, and changes are actually accelerating, placing a growing burden on IT managers.

Concurrently, IDC finds that many midsize organizations see their storage capacity (in terms of terabytes) growing at over 50% a year. Based on these growth rates, many organizations will have four to five times as much storage capacity in place by 2010 as they have today.

IT managers know that they won't be adding four or fives times as much server or storage IT staff in the next three years. In fact, many don't plan to even double their staff. Achieving this goal will require a quantum improvement in IT management efficiency.

Delivering effective management in the worlds of virtualized and bladed servers as well as networked storage requires more than common control of the physical devices. IT managers need management systems that allow them to manage assets based on performance, capacity, cost, and level of data protection across multiple physical systems. These systems must provide integrated management for both servers and storage from both physical and virtual perspectives. Such solutions will let IT managers shift their focus into areas such as process automation, capacity planning, policy management, and end-to-end application-level performance management.

HP'S 8GBPS FC-READY SAN INFRASTRUCTURE SOLUTIONS

The remainder of this white paper assesses HP products and services that can help organizations deploy "future-proof" 8Gbps FC SAN solutions that cost no more than existing 4Gbps FC. HP's 8Gb Simple SAN Connection solutions along with service offerings from HP's business partners allow IT managers to shift the focus from physical consolidation of servers or storage devices to structural consolidation efforts that boost the use of IT assets, enable central control of information processes, and support dramatic improvements in IT management efficiency.

HP StorageWorks 8Gb Simple SAN Connection Solution

In February 2008, HP launched its 8Gb Simple SAN Connection solutions designed to deliver the latest in Fibre Channel technology to midmarket organizations. HP's goal is to deliver low-cost, "future-proof" FC SAN solutions that allow midsize businesses to move directly from 2Gbps to 8Gbps FC as they consolidate assets through greater use of virtualization and storage networks.

In addition, HP introduced integrated software that enables end-to-end management of the new switch, HBAs, and storage (including the recently introduced HP StorageWorks EVA4400). This bundled software solution simplifies installation, configuration, and storage provisioning for the new SAN adopter and helps expedite the process for the overburdened IT managers in existing SAN environments.

Individual components in the 8Gb Simple SAN Connection solution include:

- HP StorageWorks 8/20q Fibre Channel Switch with 16 to 20 8Gbps FC ports (backward compatible with installed 4Gbps FC HBAs on HP's servers, 2Gbps and 4Gbps disk storage systems, and midsize near-line storage systems) as well as support for advanced capabilities including NPIV (available with the release of VMware's ESX 3.5) and overlapping protection domains (OPD) for enabling more flexible data protection processes.
- HP StorageWorks 81Q PCI-e FC HBA with advanced "virtualization ready" features for enhanced security, quality of service, and dynamic provisioning during live application migrations as well as advanced power management functions (dynamic power throttling) to reduce the impact of HBAs on overall server power consumption.
- HP Simple SAN Connection Manager software (SSCM) with a rapid installation wizard and easy-to-use management services for switch configuration, HBA and switch zoning, HP EVA and MSA storage configuration and provisioning, automated switch/HBA software/firmware downloads, and HBA failover management. SSCM is included at no additional charge with the purchase of an HP StorageWorks 8/20q Fibre Channel Switch.

In addition to offering the individual components, HP recognizes that it also needs to deliver a prepackaged kit for midsize organizations deploying their first SANs. It is also launching an HP StorageWorks 8Gb Simple SAN Connection Kit that includes one 8/20q Fibre Channel Switch (eight ports enabled), the SSCM software, four 81Q PCI-e FC HBAs, required cables, 8Gbps SFP+'s, and a Quick Start Guide/wiring poster.

All of these new products are designed to complement HP's broad portfolio of server, disk storage systems, and data protection systems.

Most critically for midsize organizations, HP, with its broad portfolio of server, storage, networking, and management products delivered by its global network of business partners, can help companies:

- Complete an up-front assessment of the potential benefits of server and storage consolidation efforts
- Develop a robust, flexible, and "future-proof" storage network architecture with rapid built-in data protection
- Provide ongoing management and assessment services to address new technology and business challenges while boosting IT management efficiency

A clear example of HP's long-term commitment to enhance overall IT management efficiency is that SSCM will be closely linked with HP's Storage Essentials storage management software solutions and with HP's server management solution (System Insight Manager) in future releases. Using the combined tools, IT managers will be able to leverage common configuration and diagnostic tools to provision all of the systems supporting business applications in remote offices and datacenters. They will also be able to diagnose problems from end to end.

Potential Challenges for HP

For IT solutions providers such as HP, the dynamic nature of the IT environment poses a number of challenges.

With the StorageWorks 8Gb Simple SAN Connection portfolio, HP is working to affordably deliver the most advanced storage network solutions to meet the needs of midsize organizations. These organizations, however, have a wide variety of IT solutions in place, so HP must continually expand its 8Gbps FC portfolio to cover important operating systems (including Windows Server 2008 as it becomes available), server platforms (including HP blade server systems), new tape libraries, and disk storage systems (including all future versions of HP's own MSA, EVA, and XP systems).

In particular, HP must continue to enhance the ability of its systems to match the needs of more diverse, "virtualized" business applications in terms of performance, reliability, and manageability. To meet this challenge, HP needs to provide more performance monitoring capabilities within its Simple SAN Connection Manager solution. As midsize businesses aggregate applications onto bladed and virtualized server environments with networked storage, they will need simple management tools that deliver application-level perspectives on performance.

The final challenge for HP is to continue educating its business partners and customers about the benefits of setting up an environment that takes advantage of both server and networked storage capabilities. This coordinated environment will play a key role in helping companies build and use IT solutions that are consolidated, dynamic, and adaptable to future needs.

FINAL THOUGHTS AND GUIDANCE

IT managers at midsize enterprises are wrestling with many of the same challenges as their counterparts at large enterprises. They must improve the use of existing IT assets while making wise investments in new solutions that meet long-term needs. Meeting these objectives, however, is harder for medium-sized firms because of budget and resource constraints.

IT managers at midsize firms that acquire server and storage products must evaluate suppliers such as HP based on more than just who is providing the cheapest or highest-performing systems. IT managers need solutions that overcome the traditional shortcomings: the underuse of installed assets, less-than-optimal data/application availability, and excessive administrative overhead. They need to judge suppliers based upon how well their complete solutions allow them to optimize the use of IT investments now and for an extended period.

More important, IT managers must judge suppliers based upon the strength of their business partners. These business partners must have the skills to help IT managers effectively implement server consolidation, virtualization, and networked storage solutions that meet existing needs as well as future expansion.

Finally, much of the administrative cost associated with server and storage deployments focuses on supporting specific business-critical applications such as email and databases. Look for a business partner that leverages emerging solutions to address specific application and business challenges while delivering faster, more consistent implementations with minimal risk of disruption to applications, processes, and business operations.