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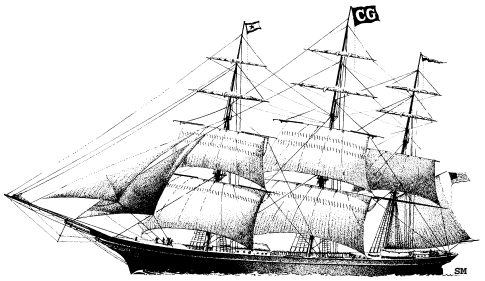

Navigating Information Technology Horizons℠

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Reliability, Responsiveness, Risk-Reduced — HP Delivers Scalable Storage to the SMB

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Management Summary

Anyone in one of the construction trades will tell you that any long-term project requires a solid foundation to ensure a strong and durable result. If you are building a wall, or a house, or even a bridge, you need a reliable underpinning, preferably with a base made of concrete. Depending upon how heavy the load, how fast you need the concrete to set, and how long you expect the structure to stand, along with the air temperature and humidity, the mixture of sand, lime, aggregate, and water may vary. There is no fixed blend of ingredients to ensure the proper support. There is no absolute. There are many recipes. Only experience will enable the contractor to pour the right mixture for the right job.

In the same vein, there is no standard formula for the SMB developing a centralized, multi-tiered storage architecture for the data center to support accelerated growth while mitigating risk within a fixed budget. The same is true when the small or medium-sized business transitions from a server with internal storage, a.k.a. direct-attached storage (DAS), to a first storage area network (SAN), there are many factors that must be considered to establish the new storage foundation, with cost always rearing its head. The data center staff must factor in the performance of the disk array, as well as the scalability of the architecture. The reliability and response time of SAS drives need to be measured against the higher capacity but usually slower speeds of SATA. Information is expanding by 50% to 100% annually; you need to consider total capacity needs for the next three years and also to determine what percentage of that data is mission-critical, or Tier-1, and which is business-critical, or Tier-2. Reliability and availability are two more factors that need to be included in the storage blend to satisfy site requirements. The functionality provided by Fibre Channel (F.C.) may be overkill, especially when you factor in the cost of a F.C. SAN. A low-cost iSCSI alternative may provide the functionality that you need while remaining inside the limits of a restricted budget. A dual-controller solution with redundant components providing no-single-point-of-failure may provide the availability required.

When looking for the right blend of I.T. components to form the storage foundation of your data center, the I.T. staff needs to look no further than H.P., a company with a long history of delivering focused storage products to all sizes of enterprises. With the recent announcement of the *StorageWorks 2000 Modular Smart Array (MSA2000)* family, HP has introduced an expandable array that meets the flexibility requirements of any SMB, or department or remote office of a larger enterprise. With easy to use features, the MSA2000 has the performance and scalability normally found in solutions that are more expensive. With offerings for both F.C. and iSCSI, the data center staff can tailor the MSA-2000 to the storage requirements of any mission- or business-critical application, or use it as an archive for backup or the long-term storage of compliance data. To learn more about the MSA-2000, please read on.

IN THIS ISSUE

The SMB Data Center

The IT staff of every SMB data center faces many of the same consolidation issues as the staff of a mid-sized enterprise data center, including the requirements for high availability, scalability, and reliability. They also face new problems created by the accelerated growth of data and the transition to virtualized operating environments on open systems servers, characterized by the increasing deployment of *VMware* throughout the enterprise. These problems all add to the total cost of ownership (TCO) of IT resources through the inefficient utilization of enterprise resources, excessive administrative overhead, and a complex server and storage infrastructure. From an executive viewpoint, **the data center must simplify its IT infrastructure and reduce the TCO of the data center. No other option is given**

The SMB[1] is under attack from a proliferation of system resources caused by under-utilized servers running at less than 20% efficiency and over-provisioned DAS storage, configured to support one specific server and one specific application, leaving large portions of allocated disk unavailable. These resources consume an excessive amount of floor space and waste too much of the energy required to both run the platforms and, at the same time, the air conditioning necessary to cool the data center. The consolidation of multiple open systems servers onto a single multi-core platform was the first step in gaining control of IT deployment and the administrative complexity destroying the IT budget. Virtualizing the servers was the next step that many CIOs have taken to improve resource utilization and reduce TCO. **The SMB staff must now address the storage component of the infrastructure in order to find a way to simplify the deployment and management of mission-critical and business-critical applications while at the same time protecting the enterprise from the loss of data, deliberate or accidental**.

Today's data center needs an affordable, yet easy-to-use, networked-storage solution that supports not only multiple users, but multiple applications and servers as well. Not every data center has a storage specialist, and most do not have the F.C. guru required to deploy many of the complex solutions that populate today's enterprise storage architectures. Most, if not all data centers, however, do have a member of their IT staff who is well versed in the IP-based architecture of the LAN, enabling the SMB to deploy an iSCSI-based storage network.[2]

The accelerating growth in data collection demands a scalable solution; one with a low-cost entry and a clearly-defined expansion path that will enable the SMB to preserve the investments it is about to make, as additional needs are defined and deployed. Because of the mission-critical nature of many SMB applications, the storage solution must be reliable and highly available with redundant access paths and the availability of data protection utilities (to duplicate data for backup and/or disaster recovery purposes). In addition, the storage solution must be able to thrive in the virtualized world created by VMware, *Virtuozzo*, and *Citrix/Xen*, which partition and manage the operating environment.

The data center staff needs to find a way to change the storage paradigm in order to eliminate, or at least reduce unusable disk space, and reduce the overhead burden from excess power requirements and administrative staffing. They need to find ways to simplify deployment by minimizing the number of storage devices clogging the enterprise infrastructure, and better utilize those resources that remain. In the past few years, HP has been working toward just that goal.

HP product set

HP has an extensive offering of storage arrays and is continually extending that set, from the entry level to the largest enterprise. However, they have been focusing on the SMB market for some time, with both the *StorageWorks All-in-One (AiO)* series and the *StorageWorks Modular Smart Array (MSA)*. Although the focus of this bulletin will be on the MSA2000, we need to look at the AiO family to understand the foundation that HP has put in place.

With the AiO family, HP provides a combination of shared application storage via iSCSI and file services via NAS, with multiple models available, ranging from the *AiO 1200*, introduced in 2007 to the *AiO 400*, introduced in February. The AiO 1200 is a system designed for IT staff

[1] and many departments and remote offices

[2] See the March 31, 2007, issue of Clipper Notes entitled *iSCSI SANs – Panacea or Placebo*, which is available at http://www.clipper.com/research/TCG2007037.pdf.

with no specific storage expertise, concentrating on reducing the TCO and complexity of migrating storage from DAS to SAN and NAS for the SMB. It is not a downsized model from a functionality standpoint – it simply looks at storage management from the application standpoint with setup and migration wizards to facilitate deployment and management in a *Windows* environment, eliminating complexity. It supports up to 9TB of high-capacity, hot-plug SATA drives in a 2U chassis, or 3.6 TB of SAS devices for applications requiring higher performance.

The recently announced *AiO 400r* and *AiO 400t* continue the capability for shared application storage, but come with reduced configurability to lower the TCO and increase the access to the SMB. The AiO 400r is a 1U model based on the *ProLiant DL160 G5* rack-mounted server and can support up to 2TB of storage using SATA drives. The AiO 400t is based on the *ML110 G5* tower, and supports up to 1TB of storage using SATA. The AiO 400t starts at only $3,799.

Until recently, HP provided SAN support to the SMB community through the *StorageWorks Modular Smart Array (MSA) 1000*, with a base of more than 125,000 units installed. With scalability up to 42 SCSI drives, the MSA1000 could support up to 20 hosts and up to 12.6TB of storage, with 300GB drives, in a 4U chassis. It can connect to 32 LUNs, with a maximum capacity of 2TBs per LUN. With a 2Gb FC interface, the MSA1000 lacked the throughput, host interface, drive selection, capacity, and redundancy characteristics required by a virtualized data center to support the consolidated servers (densely partitioned and heavily used) that populate today's environment. In response to the requirements of their customers, HP has gone back to the drawing board and updated the MSA1000 with the *StorageWorks Modular Smart Array 2000* (*MSA2000*). The MSA2000 has the features and functions of an enterprise-level SAN in an SMB framework to deliver a multi-protocol network storage array for the SMB community.

HP MSA2000

HP designed the MSA2000 as an easy to use, multi-protocol SAN device for a virtualized server environment with an expressed goal to help their customers lower storage costs, especially the SMB migrating to shared storage for the first time, through more effective centralized storage, increased storage administrator efficiency, and improved business continuity. They made it affordable, yet highly available, and they have included the advanced storage functionality required to support mission- and business-critical applications. In addition to the SMB, the MSA-2000 is an ideal vehicle for departments and remote offices of larger enterprises to develop, test, and deploy small applications. The MSA-2000 scales easily in a shared storage environment, enabling the data center to protect the investment made in enterprise storage. It is particularly compatible with HP's *BladeSystem*, with common tools, such as HP *SIM*, that work across the product lines and is accessible from any web browser. In addition, since the MSA-2000 management software is built into the array, you do not have to set up the array from each server. This is significant in a blade environment where you want to virtualize the servers.

The MSA2000 is available in F.C. (*MSA-2000fc*) and iSCSI (*MSA2000i*) configurations with F.C. throughput improved to 4Gb/s from the 2Gb/s of the MSA1000 and iSCSI throughput set at 1Gb/s per port for the two ports of each controller. HP also updated the backend disk interface from U160 SCSI to 3Gb/s SAS, with a sweet spot designed to support four to six servers.

In addition to the throughput, HP has made a multitude of improvements to the MSA1000 design in order to make the MSA2000 an appropriate target for a virtualized server architecture. First, HP improved device scalability from 42 disks in the MSA1000 to 48 in the MSA2000, with 12 devices per 2U drive enclosure. With the availability of 750GB SATA drives, this increases total capacity up to 36TB[3] from the 12.6TB available before. HP has also improved disk utilization with the availability of both SAS and SATA drives, enabling a multi-tiered architecture within the MSA2000. The MSA2000 can be configured with 146GB or 300GB SAS drives at 15K RPM. 500GB and 750GB SATA drives are also available at 7200 RPM. This enables the IT staff to dedicate the right tier of drives to data based upon capacity, price, reliability characteristics, and performance.

[3] The MSA2000 capacity will expand to 48TB with the availability of 1TB drives this summer.

In order to meet the needs of a virtualized server environment, HP expanded the number of LUNs available from 32 in the MSA1000 to 256 in the MSA2000, with a maximum LUN size expanded to 16TB as opposed to 2TB on the MSA1000. The MSA2000 can support up to 64 hosts on a F.C. SAN, up from 20 on the MSA1000, or up to 16 hosts on an iSCSI SAN.

In order to improve the reliability, availability, and serviceability (RAS) functionality of the MSA2000, HP included multiple RAID configurations and a full set of ease-of-use features. The MSA2000 provides support for RAID 0, 1, 3, 5, 6, 10, and 50, with RAID 6 especially critical for large-capacity SATA drives that require long rebuild times. The new RAS features include customer replaceable hot-plug components, such as power supplies, fans, dual-ported drives, and optional dual active-active controllers with automatic failover for improved business continuity. HP has also included a 1GB persistent cache with non-volatile RAM on each controller, eliminating the need for a battery-backup or separate UPS. In addition to simplifying cache operation, HP has eliminated the necessity to dispose of hazardous material (in the batteries).

In order to enhance business continuity further, HP has included optional management software to restore data in case of a failure. With HP's *StorageWorks MSA2000 Snapshot* software, the data center can increased data protection by creating recovery points, taking a "picture" of what the data was at any point in time. These snapshots can be maintained even as the data continues to change. The data center can recover to any snapshot as a complement to its backup/recovery strategy. HP's *StorageWorks MSA2000 Volume Copy* software is similar to the Snapshot utility but with one significant difference – Volume Copy makes a physical copy of the data instead of just a "picture" to another set o drives within the array. The IT staff can also mount a Snapshot or Copy to another server for backup, application testing, or data mining. Both Snapshot and Volume Copy are controller-based, using no host resources that could affect the performance of a mission-critical application.

HP has developed the MSA2000 with ease-of-use in mind – from configuration, to ordering, to deployment. Despite this, HP has recognized the need for on-site integration, data migration, and hand tailoring of the MSA2000 into a variety of heterogeneous environments. In order to facilitate this, HP has trained their vast network of partners to create, install, and integrate an end-to-end solution to increase storage capabilities and improve performance. With an installed base of 125,000 MSA1000s, according to HP, there is no way that HP could handle this task by themselves.

An entry-level MSA2000 array starts at $5,000 for a single controller, iSCSI system with no drives, while a dual-controller system with six 500GB SATA or six 146GB SAS drives begins at $9,894.

Conclusion

With their foundation in storage arrays firmly rooted in the enterprise, HP is not delivering storage to the SMB that is "good enough". With the MSA2000, they are delivering a scalable storage array that meets, and exceeds, all of the requirements of the SMB data center, and similarly, the needs of a department or remote office of a larger enterprise. The common themes that appear in all of these markets are a need for scalability, iSCSI as well as F.C., support for both SAS and SATA drives in order to satisfy the needs of multi-tiered environments, support for virtualized servers, and simplified support for business continuity.

HP has met the challenge in all of these categories with scalability to 36TB (and 48TB on the way), configurations that support both F.C. and iSCSI, and an easy-to-use multi-tiered architecture. If your organization has storage requirements that are doubling annually and you are looking for an affordable SAN solution that can take advantage of in-house knowledge of iSCSI, while protecting the investment that you make in IT resources, look into the HP StorageWorks 2000 Modular Storage Array. It may be the solution that you seek.

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