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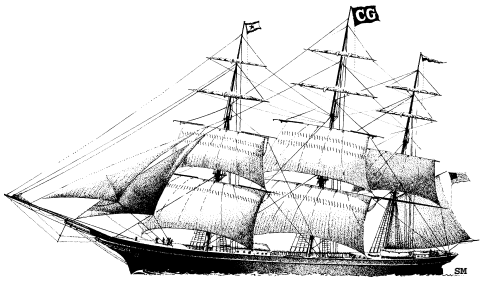

Navigating Information Technology Horizons℠

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Dell Simplifies Storage with New, Flexible, Scalable Array

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Management Summary

Do you remember when there were only three television networks? *Prime Time* was whenever the networks were broadcasting; the rest of the day, you could watch a test pattern. Fortunately, the insatiable desires of the viewing audience have brought about 24-hour programming on more networks than your cable company can deliver, hundreds of stations satisfying a variety of programming appetites. In addition to the traditional Tier-1 networks, such as ABC, CBS, and NBC, you have 24-hour news, 24-hour sports, and 24-hour movies. You can even watch 50-year-old episodes of *I Love Lucy*, **around the clock**! Further, with the push of a button, new functionality such as *DVR* enables the viewer to record any of these programs and store them for playback later. The capacity of DVR devices continues to grow, trying to keep pace with our need to watch all of our favorite programs *whenever we want*.

An insatiable need for information is even more evident in our workplace, in the data center of every enterprise, large or small. We collect and store information for every possible application, from mission-critical order entry programs, to business-critical applications, to historical trend data. Some of that information must be available instantaneously, while other data is not as urgent, with availability in minutes, hours, or even days acceptable. Finding a disk array that can scale to the needs of your enterprise, however, is not easy, especially if you are one of the millions of enterprises known as an SMB. Every SMB faces the unenviable task of reducing the total cost of ownership (TCO) of their data center. The front line of that battle has been engaged in reducing the proliferation of under-utilized servers throughout the enterprise. By consolidating multiple platforms onto fewer servers, the enterprise can reduce their infrastructure; by virtualizing these platforms, the data center can utilize *all* of the performance available in the new, multi-core processor technology. Finding a disk array, however, that meets your needs and is easy to manage is harder, becoming the next front in the war on TCO. Finding an array that scales with your business, protects your data, is easy to administer, and fits your budget is simply impossible. Make that *was* simply impossible.

With the recent announcement of the *Dell AX4-5 Storage Array*, Dell has introduced an expandable array that meets the needs of any SMB, or department or remote office of any major enterprise. With easy-to-use features, the AX4-5 has the scalability normally offered in more advanced storage arrays. With interfaces for either Fibre Channel (F.C.) or iSCSI, the AX4-5 has the flexibility required to satisfy the needs of the SMB with no storage specialist available, or the higher performance requirements of a department with F.C. expertise in place. It also has the scalability to meet the high capacity requirements of one SMB with SATA and the high performance needs of another with SAS. To learn more about the Dell AX4-5, please read on.

IN THIS ISSUE

The SMB Data Center

The IT staff of the SMB data center faces many of the same traditional problems as the staff of a mid-sized enterprise data center with a requirement for high availability, scalability, and reliability. They also face new problems created by the dynamic growth of data and the rise of virtualization, characterized by the increasing deployment of VMware throughout the enterprise. These problems manifest themselves as:

- Inefficient utilization of enterprise resources
- Excessive administrative overhead and
- A complex server and storage infrastructure

Taken from the view of the CxO, **the data center must simplify the IT infrastructure and reduce the total cost of ownership (TCO) of IT resources.**

The enterprise is under attack from a proliferation of system resources caused by underutilized servers running at less than 20% efficiency and over-provisioned DAS storage, configured to support one specific application, leaving large chunks of allocated disk unavailable. These resources consume too much 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 platforms onto a single multi-core server was the first step in gaining control of the deployment and administrative complexity destroying the IT budget[1]. Virtualizing the servers was the second step that many CIOs have taken to improve resource utilization and reduce the TCO of the data center. **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 certainly 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 meteoric growth in data collection demands a scalable solution; one with a low entry cost and a clearly defined expansion path that will enable the SMB to preserve the investment it makes, as additional needs are defined and deployed. Because of the mission-critical nature of many SMB applications, the storage solution must be highly available with redundant access paths and access to replication 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 Xen virtualization, 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.

Dell Storage Array Options

Dell has had a full set of storage platforms, for both direct attached (DAS) and network attached (SAN) storage, for some time. These include the Dell *MD3000/3000i*[3] for DAS and iSCSI SAN and the Dell/EMC lineup of *AX* and *CX* arrays for both DAS and SAN attach.

The *PowerVault MD3000* and *MD1000*

[1] See the March 31, 2007, issue of Clipper Notes entitled *Reducing Cost and Improving Performance – Consolidating the Smaller Data Center*, which is available at http://www.clipper.com/research/TCG2007049.pdf.

[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.

[3] See **The Clipper Group Navigator** dated November 13, 2007, entitled *Dell Expands Storage Tiers for the SMB – Introduces Low-Cost, Extensible Storage*, which is available at http://www.clipper.com/research/TCG2007087.pdf.

expansion drawer[4] are entry-level storage arrays capable of supporting up to 45 SAS or SATA devices[5], via either direct attachment or an iSCSI SAN. With 1TB SATA drives installed, the MD3000 can support up to 15TB in a single 3U drawer, or 45TB fully loaded. It can provide unified storage for up to four directly attached non-HA hosts or two highly available systems, and with the MD3000i, up to 16 iSCSI SAN connected servers. The dual storage controllers provide failover and redundant enclosure management via 512MB of battery-backed cache on each controller, with an optional virtual disk snapshot and virtual disk copy capability[6]. As an SMB's first SAN, the MD3000i has a simplified management interface and an entry-level price of $7,300, including 146GB of storage capacity.

Dell has also offered a pair of SMB storage solutions developed through their partnership with EMC: The *Dell/EMC AX150/AX150i* and the *Dell/EMC CX300*. The AX150 is an entry level SAN solution for up to ten SAN attached hosts, F.C. or iSCSI, as well as up to four direct attached hosts, with an entry price of $5,340 for 3x250GB SATA drives. It supports up to 9TB of storage in a single drawer using 750GB SATA drives. The AX150 comes with *Navisphere Express*, *Snapview Express*, and *PowerPath* management utilities.

The CX300 is the entry point into the Dell and EMC CX series and comes with a choice of DAS, SAN, or NAS deployment. It supports up to 60 drives with a 2Gb F.C. interface, with an entry configuration of 5x146GB F.C. devices for $30,979. The CX300 comes with the full *Navisphere Manager* storage management software to manage, discover, monitor, and configure the CX300 from the web. Now Dell is introducing the newest member of their storage array lineup to provide the data center with the ease of use and entry price point of the AX150 and expansion and performance capabilities of the CX300 – The *Dell AX4-5 Storage Array*.

[4] See **The Clipper Group Navigator** dated June 23, 2006, entitled *Dell Expands Storage Portfolio – Provides Choice for All Tiers*, and available at http://www.clipper.com/research/TCG2006051.pdf.

[5] F.C.X. is not available on the MD3000.

[6] Up to 4 snapshots per virtual disk and 128 snapshots per system. Up to 8 simultaneous virtual disk copies.

The Dell AX4-5 Storage Array

The Dell AX4-5 has the design characteristics that the data center requires in order to simplify and protect enterprise storage. Based upon many of the design characteristics of the mid-range CX3 family of arrays, including 5 "9"s reliability, the AX4-5 has scalable performance with expandable capacity and non-disruptive upgrades, at an entry-level price that an SMB can afford. The AX4-5 enables seamless data migrations to allow the data center to move applications effortlessly without disrupting mission-critical applications. It has the flexibility that you demand in any multi-tiered storage environment where information lifecycle management (ILM) dictates the value assigned to any data set. The AX4-5 supports both a 4Gb F.C. interface and 1Gb iSCSI to provide the appropriate architecture for your storage needs. In addition, the Dell AX4-5 enables the data center to protect enterprise data with a wide range of RAID architectures and point-in-time snapshots.

An entry-level Dell AX4-5, with either a F.C. or an iSCSI interface, has dual storage processors (DSP) and four 750GB SATA drives for $13,239, at list. The DSPs contain 2GB of cache to protect your data throughout the data path. The AX4-5 can also support up to 60 drives, including 146GB and 400GB SAS devices for data requiring higher performance drives. When available, the AX4-5 will also support 1TB SATA drives for a maximum capacity of 60TB per array. With expandability to up to 64 SAN-connected hosts, the AX4-5 can help to simplify SAN deployment for any SMB, protecting the storage investment along the growth path. The Dell AX4-5 is especially easy to use in remote locations, with simple set-up and management wizards implemented in conjunction with "Needs Attention" alerts. An IT administrator in the data center can walk an on-site non-IT employee through any cabling or component replacement procedure with Terra Cotta touch points identifying all parts that can be hot-swapped.

With *Navisphere Express*, included with the entry-level AX4-5, the IT staff can manage and monitor the array from anywhere on the web, , with support for up to ten hosts and AX4-5 SAS or SATA drives through a simple, wizard-driven management tool to:

- Provision storage in seconds;

- Dynamically expand capacity as required through CLARiiON *Meta-LUN*s; and
- Enable the data center to complete dynamic and seamless data migrations between multiple virtual machines at the same time via the Virtual LUN capability, helping to avoid application disruption.

In addition, Navisphere Express also includes integrated snapshot capabilities to facilitate non-disruptive backup operations and *EMC PowerPath*, to manage failover capabilities for high availability.

With the forthcoming availability of the full *EMC Navisphere Manager*, along with *EMC SnapView*, *EMC MirrorView*, and *EMC SAN Copy*, the Dell AX4-5 can be deployed with exactly the same functionality as the CX3 family, further simplifying deployment and management of the storage network. In fact, MirrorView can replicate data between the AX4-5 and a CX3 array. (See Exhibit 1, at the right.) This provides Dell with a high-performance, high-reliability solution, at an economical price to replace the functionality provided by both the AX150 and the CX300.

The combination of the AX4-5 and VMware can extend and accelerate the benefits of virtualization to the SMB. The AX4-5 enables the data center to leverage IP skills and infrastructure for cost-effective infrastructure virtualization deployments. This includes the capability to integrate *VMotion* onto the AX4-5 via an iSCSI SAN.

Conclusion

In order to simplify storage deployment and reduce the total cost of ownership of the storage network, the data center must dedicate the same amount of attention to consolidate and virtualize the storage infrastructure as they have been paying to the server network. The AX4-5 is one device that can replace both the AX150 and the CX300 in the data center of any SMB or department or remote office of a larger enterprise. It has the same high-availability features found in mid-sized data centers that are needed to run mission-critical applications on an entry-level platform. The AX4-5 has the reliability features of the Dell/EMC CX3 family, providing five "9"s availability on an SMB budget. It has the superior scalability characteristics of systems that proliferate larger data centers; including capacity, connectivity, and software functionality to support both current and future needs. Moreover, this growth does not come at the expense of the data center budget. It is the ideal solution for entry-level systems for the SMB, bridging the gap between the AX150 and the CX300 with scalability and functionality. Moreover, it has the ease-of-use features that enable remote set-up and management to reduce TCO concerns further.

Exhibit 1 – AX4-5 Software Functionality

- **EMC Navisphere Manager** – A robust configuration, management, and event notification tool from a single management station for multiple AX and CX arrays;
- **EMC SnapView** – Provides a point-in-time view of data for nondisruptive backup;
- **EMC SAN Copy** – Enables migration or distribution of data within a F.C. SAN fabric;
- **EMC MirrorView** – Provides synchronous or asynchronous mirroring of information between two or more F.C. arrays (including the CX3 family).
- **EMC Replication Manager** – For integration with MS *Exchange*, *SQL*, and *Oracle*.
- **EMC PowerPath** – For data management between the array and its hosts.

Source: EMC

If your enterprise, like many others, has storage requirements that are growing at 50% (or more) annually and you are looking for a simple-to-use, scalable disk array with an affordable entry price and investment protection for years ahead, you should look at the Dell AX4-5 Storage Array. It may be the perfect complement to your server consolidation efforts.

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- ***The Clipper Group can be reached at 781-235-0085 and found on the web at www.clipper.com.***

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