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Navigator™

Navigating Information Technology Horizons[SM]

EMC Enhances Commercial Storage —
Plus a Big Boost for the Larger Enterprise

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Management Summary

When the average consumer is in the market for a new audio system, he has a variety of options to consider. Where you go and what you sound test depends upon where you plan to install the new device. Are you looking for an inexpensive clock radio for the bedroom or a high-end sound system for your home theatre? Perhaps you are looking for a car radio with seven speaker surround sound and 100 watts/channel to entertain commuters in nearby cars. You can find an audio system at a department store or at a specialty store, many times different models from the same manufacturer. If you are concerned about quality, however, if doesn't matter if you are looking for a low-cost or high-end solution, you will always start the search with a name that you can trust, such as Bose, Denon, or Pioneer to name a few.

The same philosophy applies to the enterprise where reliability is an essential component of any procurement decision. If the enterprise copy center is looking for a new copier, there are many name brands to consider. However, with deadlines to meet and quality a requirement, the search would probably start with a Xerox or HP dealer. Budget is always a factor, especially when you must consider the recurring cost of paper, toner, and maintenance. This also applies to the enterprise data center. Several vendors can satisfy the storage needs for the enterprise data center, depending upon the size and architecture of the storage environment. This is where the big money is spent. Some can satisfy the needs of a storage area network (SAN), others for network-attached storage (NAS). Some manufacturers can provide cost effective solutions at the entry-level, while others specialize at the high-end of the enterprise. One company that specializes in storage for enterprises of all sizes is EMC, the leader in storage solutions. EMC provides high-end solutions for Fortune 500 customers with mainframes, with their *Symmetrix* product line. For the past seven years, they have also delivered solutions for the mid-sized enterprise with their *CLARiiON* line of disk arrays. For the past few years, they have also been satisfying the needs of smaller customers with a line of *CLARiiON AX100* entry-level products. Now EMC is refreshing the entire CLARiiON family, as well as introducing an entry-level virtual tape library, the *CDL210*, specifically aimed at the SME market requirements.

At the CLARiiON entry-level, EMC has now introduced the AX150 and the AX150i. For the mid-sized SME, EMC has upgraded their second-generation CX line with the third generation CX3 family. To find out how these new products can help improve your bottom line, please read on.

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SME Data Center Requirements

The proliferation of enterprise data is causing a giant headache for every data center, regardless of size. Unfortunately, there is no single source of this problem for the CIO to solve to make that data center headache go away. In fact, there is a wide set of issues that have conspired together to raise both the cost and the complexity of the information technology (IT) architecture. *Server sprawl* has led to inefficiencies in both server and storage utilization and management. Government regulations have led to the rapid expansion of *business-critical* data. Expansion and economic growth require faster access to ever-expanding *mission-critical* data. Best business practices demand frequent snapshots of the mission-critical data to ensure *rapid recovery* in the event of a failure. IT infrastructure that appeared to be a sound business investment on the surface can result, in fact, in wasted resources and enterprise profits going down the drain. It is urgent that the CIO be able to control all of the factors that go into calculating the total cost of IT ownership (TCO).

IT professionals have realized for quite some time that 85% of x86 server CPU time idles away unused. They now realize that 85% of the energy expended to power and cool these servers is also wasted, and with the cost of energy going up dramatically, that could mean the difference between profit and loss, survival, and bankruptcy. What sometimes goes unnoticed, however, is that disk storage installed with under-utilized servers is also going unused while other mission-critical servers are in need of additional disk resources to satisfy growing databases. Unused internal and direct-attached storage (DAS) contributes directly to wasted resources. In addition, we know that the *value of data* changes over time. Information that is mission-critical one day can be significantly less valuable 30 days later. The data center needs to match the value of data to the cost of storage.

Consolidation of disk devices into pools of shared storage resources can reduce the risk of wasting money and reduce the complexity of the environment, easing the management burden and lowering management costs. One potential problem, however, is that some consolidation platforms require the installation of homogeneous devices, such as all Fibre Channel (FC) or all Serial ATA (SATA). This can result in the forced installation of business-critical data on the most expensive storage, or worse, mission-critical information being stored on lower performing devices. What the data center seeks is a flexible, heterogeneous, multi-tiered, storage system that with the following characteristics.

- Share infrastructure between high-performance FC and high-capacity SATA;
- Interconnect to low-cost iSCSI SANs and fully-functional FC SANs;
- Provide scalability to protect the investment that the enterprise makes without having to over-provision today;
- Operate in a heterogeneous operating system environment with interfaces to Windows, Linux, Netware, and Solaris;
- Provide continuous access to multiple tiers of data;
- Enable a rapid and reliable backup and recovery to ensure continuous access to enterprise data in a seamless D2D environment;
- Provide a graceful degradation in the event of a major disaster;
- Provide an economical reservoir of low-cost storage for archiving.

Defining the problem is one thing; solving it is another. Fortunately, for the beleaguered SME data center staff, a few companies out there have the engineering know-how and commitment to persevere to solve storage problems. It should be no surprise that one of those few is EMC, a company founded on the principle of providing a better storage solution for enterprises of all sizes.

EMC Storage Solutions

EMC is a leader in enterprise storage solutions. Their *Symmetrix* family has provided high-performance, and high-cost, storage for mainframes and high-end UNIX servers for the past two decades. With the acquisition of Data General a decade ago, EMC reinforced their position in the mid-range with the *CLARiiON* family of storage arrays. Recent changes, however, in the way that smaller

companies do business has created a strong market opportunity for storage companies to position their product line, and distribution channels, to satisfy the expanding needs of thousands of SMEs[1]. EMC responded to this opportunity by implementing *Insignia*, a line of hardware and software products to assist the SME in storing, managing, protecting, and sharing essential enterprise information assets.

Now EMC is upgrading the cornerstone of the Insignia line, the *CLARiiON AX100*, with a new entry-level array, the *CLARiiON AX150*. EMC has also recognized the need for an entry-level virtual tape library to improve the efficiency of backup and recovery for the mid-sized enterprise and branch offices, introducing the *CDL210,* an attractively configured, and priced, member of the *CLARiiON Disk Library* family. In addition, EMC is also responding to its mid-range base with the introduction of a new family of *CLARiiON CX* disk arrays, increasing the performance and capacity to enable both consolidation and information lifecycle management within a single platform.

EMC CLARiiON AX150/150i

Designed for the consolidation and sharing of a high-performance RAID array within an SME, or a department of a larger enterprise, the AX150/150i is easy to install and enables the direct or networked[2] connection for up to 10 hosts, running Windows, Linux, Solaris, or NetWare. The AX150 extends the capability of the AX100. Configurable with either a single- or dual-controller, the AX150 supports SATA II with native command queuing for enhanced performance, twice the throughput (3.0 Gb/s), twice the number of snapshots (8), and extends host connectivity from 8 to 10. It supports from three to twelve high-capacity SATA II drives in a 2U rack-mountable chassis, providing from 750GB to 6TB of scalable data storage using 250 and 500GB devices running at 7200 rpm. The single-controller version provides an ideal target for organizations looking for high-performance disk-to-disk (D2D) backups or for first-time

networked storage users. 512MB of battery-backed cache protects two direct-attached servers, or up to ten SAN-connected hosts, for 96 hours in the event of a power outage. Optional, hot-swappable power supplies provide further protection. The AX150 has a RAID 5 and RAID 1/0 option to protect against data loss when a drive fails.

The dual-controller configuration is designed for the most mission-critical SME applications. Dual-active controllers with mirrored cache and hot-swappable power supplies further protect the availability of enterprise data, eliminating a single-point-of failure issue, and enabling the distribution of storage traffic over two HBAs. The dual-controller implementation supports four direct-connect hosts for consolidation and the sharing of storage resources. The AX150 is configurable with a tightly coupled, rack-mounted UPS to enable a graceful shutdown through the standard browser-based *Navisphere* management software, in the event of a prolonged power disruption. The dual-controller version consumes a maximum of 326W[3] to help control data center energy expenditures.

EMC CLARiiON DL210

As more enterprises look to D2D solutions to increase service levels for backup and recovery, EMC has leveraged the CLARiiON AX100 disk array[4] to improve reliability and performance, and to reduce risk. The CLARiiON DL210 complements the *CLARiiON DL7x0* family, extending the range of the CLARiiON Disk Library family of easy to use disk-based backup and recovery solutions downward, reducing the backup window by 30-60%, reducing recovery by up to 90%, and lowering the price for virtual tape to around $50K, enabling access by the SME and departmental communities. Based upon software developed through EMC's partnership with FalconStor, and integrated with EMC's own Release 7.3 of *NetWorker*, the CDL v2.2 helps the data center expand the use of the disk library beyond just tape backup and better track protection and recovery services to the ILM value of information. The DL210 is a low cost solution that enables access to up to 16 virtual

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[1] See *The Clipper Group Captain's Log* dated December 14, 2004, entitled *Why "SMB" is a Meaningless Acronym - Trying to Define the "Middle"* and available at http://www.clipper.com/research/TCG2004096.pdf.

[2] The networked connection may be either a 2Gbps Fibre Channel or 1Gbps iSCSI.

[3] The single-controller version consumes 250W.

[4] The CDL210 will be qualified with the AX150 later this year.

tape libraries and 24 virtual tape drives, supporting up to 24TB of raw data with a throughput of 380MB/s[5].

The CDL210 also enhances media management, extends support of VTL to IBM's *System i* platform (enabling the first VTL platform for that environment), provides new and expanded reporting and monitoring through EMC *Backup Advisor*, and enables the availability for "shredding" of virtual tape cartridges. Most importantly, this fourth generation, the CDL v2.2, enables the backup server to maintain full control of all operations and have full visibility to both the virtual and physical tape cartridges.

The CDL210 is easy to install and use, fitting into the existing data center backup/ recovery environment without requiring changes to current operations. The CDL also enables the data center to improve the utilization of the backup hosts, migrating from virtual tape to physical tape at the convenience of data center operations, away from peak processing time.

The CDL210 emulates leading open systems tape libraries, with a wide variety of tape drives, along with most of the commodity backup applications for deployment and implementation with minimal user intervention. See Exhibit 1, at the right, for a partial qualification summary.

EMC CLARiiON CX3

EMC may be investing newfound attention to the entry levels of the storage market as exhibited by the introduction of the AX150 and CDL210, but that has not prevented them from re-doubling their efforts at the mid-range, at the same time. With the introduction of the third generation of the CLARiiON CX product set, the *CLARiiON CX3*, based upon the *UltraScale Architecture*, EMC has delivered a highly resilient storage array with twice the capacity, twice the memory, and 2.5 times the processing power of the previous generation, the *CX300*, *CX500*, and *CX700*.

The CX3 family is made up of three new platforms, the CX3-20, CX3-40, and the CX3-80, each capable of the installation of a heterogeneous mix of low-cost, high capacity drives and high performance devices, as well.

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[5] The CDL740 will support up to 495TB of compressed data with a throughput of 1,200MB/s.

Exhibit 1 – CDL Qualifications

- Tape Libraries
  - ADIC *Scalar24/100, i500, i2000*
  - IBM *3583, 3584*
  - Overland *NEO 2000, 4100 (DL210 only)*
  - Quantum *M1500, M1800 (DL210 only)*
  - STK *L-Series, 97xx, 5500, 8500*
- Tape Drives
  - *DLT, SDLT, AIT, SAIT*
  - *LTO, LTO2, LTO3*
  - IBM *3590, 3592*
  - STK *9840,* STK *9940*
- Backup Applications
  - EMC *NetWorker, Data Manager**
  - Veritas *NetBackup, BackupExec*
  - IBM *Tivoli Storage Manage*r*
  - Many more

* Not supported on DL210

Source: EMC

The CX3 scales disk capacity, cache, and connectibility throughout the range. (See Exhibit 2, below). With a new level of affordability, ease of use, and outstanding reliability, EMC has continued their pattern of innovation in the storage market, while, at the same time, protecting the investment that their customers have made in EMC technology, software, and training. Some of the state-of-the-art technology features that produce these new levels of performance and reliability include the following.

- Full end-to-end 4Gb/s design;
- Advanced cache mirroring;
- Improved fault detection, isolation, and error correction;

Exhibit 2 - CX3 Scalability

	CX3-20	CX3-40	CX3-80
Disk Capacity	120	240	480
LUN Connect	512	1024	2048
Cache (GB))	4	8	16

Source: EMC

- Improved redundancy and fault tolerance; and

- *UltraPoint* auto-sense speed detection.

In fact, the CX3 is the first mid-range array to deliver end-to-end performance at 4Gbps, although I use the term mid-range carefully, for with expandability to 480 disks, the CX3-80 can support 239TB of storage, which is more than some models of the *DMX-3*. **The CX3 is a self-contained ILM data center supporting multiple tiers of storage.** The CX3 supports 73GB and 146GB high-performance 15K RPM FC devices and 500GB, 7.2K RPM, low-cost LCFC devices as well. The CX3-40 and CX3-80 support 2Gbps devices at 10K rpm and 4Gbps drives at 15K RPM concurrently on dual redundant loops. EMC's UltraPoint technology includes light indicators on the device trays to signify the speed of any device in order to facilitate drive replacement or expansion. The CX3 protects the investment that the enterprise has made in data with new virtual LUN technology to enable non-disruptive movement of data across tiers, allowing the migration of data from 2Gbps devices to 4Gbps devices. The CX3 also protects the investment that EMC customers have made in EMC's Navisphere application set. CX3 improves the performance of applications such as *SnapView*, *MirrorView*, and *SAN Copy* by as much as 30%. In addition, these features run on all new models, including the CX3-20[6].

Previous benchmarks executed on the CLARiiON CX700 have indicated superior performance to competitive systems in OLTP, Microsoft Exchange, and backup-to-disk workloads. Results for these same tests on CX3 show an even greater difference disparity, with the new UltraScale models exhibiting upwards of a 20% improvement.

EMC has also implemented new serviceability features for customers who wish to do self-maintenance for a wide range of customer replaceable units (drives, power supplies, cooling, and connectors) and new wizards to guide installation and replacement. The new lower cost 3-year warranty covers 5-day, 9-hour/day service.

Conclusion

EMC continues to provide break-through innovation for all levels of the enterprise and for enterprises of all sizes. With the CLARiiON AX150 and AX150i, they have extended the capability of the smaller enterprise to consolidate the data center and share data between multiple servers reducing the total cost of ownership for the IT infrastructure. They have also taken the AX platform and integrated it with the CLARiiON Disk Library to enable those same customers to not only consolidate, but also protect their business-critical and mission-critical data using D2D technology previously only accessible to larger ventures.

EMC has also taken care of the mid-sized enterprise with the CLARiiON CX3 enabling multi-tiered growth within a single array, while lowering costs. Wherever you are in the storage spectrum, EMC has a solution that can save you money. You should look and see what is right for your enterprise.

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[6] *MirrorView* and *SAN Copy* do not run on the CX300.

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