



## EMC Kicks Up Performance and Right-Sizes Its High-End Symmetrix Storage Offering

Analysts: Anne MacFarland and Mike Fisch

### Management Summary

In the old days, enterprises bought IT on the big side, with room to grow, in anticipation of a rosy future. Now that seems, at best, quaint. Those same enterprises are now focusing on what they really need - or on how to spend wisely. Some are turning to networked herds of storage. Some are looking to software for leverage. All are looking for leadership and expertise to get the most out of what they can afford.

EMC stands on the pitcher's mound of this new, different storage ballgame with a new attitude and a new set of high-end hardware options to augment its refreshed *CLARiiON* line and *Centera* introduction. This is not one new pitch but five - the new *Symmetrix DMX* members of EMC's Symmetrix product line.

**The theme behind the new DMX pitch is: *Know thy requirements and right-size accordingly.*** EMC is offering a continuum of high-end capabilities, from the modular, rack-mount Symmetrix *DMX800*, to the one- and two-bay integrated, custom-configurable *DMX1000* and *DMX2000*, to the turbo versions of the integrated arrays for the ultra-high performance customers. These new offerings are not big for the sake of big. They are sized for the fulfillment of enterprise needs for high-performance data access from a vendor with a full array of hardware, software and service offerings.

A lot has changed with this announcement. The most significant is **the fast, new *Direct Matrix* that replaces the bus architecture found in previous-generation Symmetrix arrays.** It promises a big leap forward in storage access speeds. EMC has standardized on a focused number of drives to minimize costs, architected for full utilization of the offered capacity (with larger configurations expected), and offers parity RAID to up usable capacity where mirroring is not needed. All of the current Symmetrix software and *Enginuity* operating environment runs on the new models; EMC's existing Symmetrix customers are protected.

While EMC is conforming to the modest tastes of the times, all is not frugal. **With the Symmetrix DMX series, EMC tempts its customers with truly extravagant innovations that can set an enterprise of modest ambitions to dream, *what if...?*** Like a good garden catalog, EMC's expanded software and now totally-reengineered hardware products offer a wealth of capabilities that will warm the soul of the beleaguered enterprise, and will stimulate planning for the growing season.

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## The Innovations

In this much-anticipated product release, EMC has renovated its *Symmetrix* family of high-end storage arrays. This is a hardware renovation, so the Symmetrix software and *Enginuity* operating system stays the same. Here are some of the more salient features.

### *The Direct Matrix Architecture*

**The big news is that EMC has replaced the internal bus in previous Symmetrix generations with a new high-speed *Direct Matrix* architecture.** It consists of multiple, redundant, point-to-point connections (up to 128 at 500 MB/s each) between the major system components – front-end channel directors (server interface), global cache directors, and back-end disk directors (disk interface). (The Symmetrix DMX models contain differing

numbers of these interconnected components, according to their level of scalability – see chart below.) There is no central bus in this architecture through which data must pass. Plus there are separate matrices for data (up to 64 GB/s) and control (6.4 GB/s). The result is minimal latency, no contention, and very high aggregate bandwidth. **This means faster data access and, ultimately, application performance and increased service levels.** Furthermore, the bandwidth is high enough that the current models cannot saturate it, leaving headroom for future processor, disk, and cache upgrades. For instance, EMC states that the DMX architecture could support 2,048+ drives, though the initial models will offer up to 288. This suggests not only that bigger machines are on the horizon, **but also that the Direct Matrix will be the Symmetrix architecture going forward.**

**The Symmetrix DMX Family — At A Glance**

	<i>DMX800</i>	<i>DMX1000</i>	<i>DMX2000</i>	<i>DMX1000P</i>	<i>DMX2000P</i>
<b>Direct Matrix Configuration:</b> (channel directors) x (cache boards) x (disk directors)	2 x 2 x 2 modular	6 x 4 x 2 integrated, or custom configure	12 x 8 x 4 integrated, or custom configure	4 x 4 x 4 integrated	8 x 8 x 8 integrated
<b>Aggregate Bandwidth of Data Matrix</b>	16 GB/s	32 GB/s	64 GB/s	32 GB/s	64 GB/s
<b>Max Cache</b>	32 GB	64 GB	128 GB	64 GB	128 GB
<b>Max Host Connectivity</b> (FC and FICON are 2 Gbps)	16 x FC	48 FC, 48 ESCON; <i>24 FICON in Q3 2003</i>	96 FC, 96 ESCON; <i>48 FICON in Q3 2003</i>	32 FC, 32 ESCON, <i>16 FICON in Q3 2003</i>	64 FC, 64 ESCON; <i>32 FICON in Q3 2003</i>
<b>Max Raw Capacity</b>	17.5 TB	21 TB	42 TB	21 TB	42 TB
<b>Max Drives</b> (2 Gbps, dual-ported FC)	120	144	288	144	288
<b>Drive Capacities</b> (@10K RPM; coming soon: 73 GB @ 15K RPM)	73 GB and 146 GB	73 GB and 146 GB	73 GB and 146 GB	73 GB and 146 GB	73 GB and 146 GB
<b>RAID Options</b>	0, 1, parity (3+1, 7+1)	0, 1, parity (3+1, 7+1), 10 for OS/390			

## The Cache

Each Symmetrix DMX cache board contains four independently-addressable regions, so the new Symmetrix can support up to 32 concurrent I/Os through cache memory. This helps overall system performance since cache is the gating factor for certain application workloads (e.g., OLTP). The Symmetrix DMX series employs a variety of cache algorithms to guard against memory chip or bit failures. New algorithms include striped checksums as well as *Triple Modular Redundancy with Majority Voting* that cuts down on the number of false cache errors.

## The Back End

EMC has switched from SCSI to dual-ported, 2 Gbps Fibre Channel (FC) drives in the Symmetrix DMX. They are faster and allow EMC to standardize on one set of drives for both its CLARiiON and Symmetrix arrays to help lower costs. In fact, the same Disk Array Enclosures used in the CLARiiON CX600 can be used in the new modular Symmetrix DMX800 (*more later*). EMC offers a choice of 73GB or 146 GB drives at 10K RPM, which can be mixed within an array. This allows customers to tune for performance or capacity, depending on business needs. 73 GB drives at 15K RPM are expected soon. The new Symmetrix will support up to 64 volumes per drive and 8,000 LUNs per system.

## Parity RAID

In response to customer demand, the Symmetrix DMX family will offer parity RAID support right at launch. It performs well, according in-house benchmark testing, and allows customers to save money by consuming fewer disks than RAID 1 (mirroring). It comes in 3+1 and 7+1 configurations.

## Right-Sized Storage Arrays

### The Modular DMX800 – The Wild Card

The new DMX800 is a new, entry-level Symmetrix with modular, rack-mount packaging. It combines high-end bandwidth

and performance<sup>1</sup> with characteristics of midrange storage – more competitive pricing, granular scalability, no raised-floor or cooling requirements, and easier self-maintenance. At announcement, it supports open systems environments only and scales to 120 disk drives, 32 GB cache, and 16 FC host connections. **The DMX800 is the *wild card* in this announcement, and it opens up a wealth of possible uses:**

- A super-capable modular array that looks like a CLARiiON but is priced above it, that lures midrange customers into the garden of Symmetrix DMX functionality,
- A right-sized platform for enterprises that find standard integrated storage arrays a bit larger than they really need,
- A remote-mirroring platform for SRDF fans that is less expensive to start, or
- A remote, distributed, or departmental storage array that can accompany its bigger Symmetrix brothers in the data center for a complete, all-Symmetrix storage solution.

### The Integrated DMX1000 and Still Larger DMX2000

Many enterprises considering Symmetrix high-end storage will find the DMX1000 and DMX2000 offer the best mix of capacity, performance, and connectivity for their application requirements. The various configurations of these models can meet a variety of information storage needs, even within a single array.

### The Turbo “P” Models

For enterprises that crave ultra-fast performance (*and you know who you are*), EMC offers the Symmetrix DXM1000 P and DMX2000 P models. The “P” stands for performance, of course. These turbo models

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<sup>1</sup> Midrange storage like EMC’s CLARiiON can perform very well with application workloads in a particular band (tunable, to a degree). However, the DMX800 with its high-end architecture would be better at broad, unpredictable workloads, multiple applications, and handling bursts of traffic. It comes down to customer choice and the requirements they may have for storage performance.

have a wide and balanced number of channel directors, cache modules, and disk directors (4x4x4 or 8x8x8) to eliminate bottlenecks and deliver the highest performance. For example, these models double the number of back-end loops to the disk drives and cut by one-third the maximum number of FC host connections. The result is broad and consistent bandwidth and throughput for customers who need it and are willing to pay a little more for it. They also serve as a demonstration of what the new Symmetrix series and Direct Matrix architecture can do.

### What Symmetrix DMX Does For the Enterprise

The breadth and variety of the Symmetrix DMX portfolio, particularly when taken in conjunction of EMC's other offerings, allow EMC to engage the customer on many levels. Once discussions settle down to fairly granular application and data access requirements, the emphasis shifts from what differentiates EMC from competitors to what EMC can do to meet the business needs of the enterprise. **By offering alternative approaches within its portfolio, EMC recasts the conversation in favor of the customer – their customer.**

### Conclusion

EMC has kicked up performance and broadened the coverage of its high-end Symmetrix series. Whether an enterprise needs extra-high performance, high-end storage for the data center, or modular storage for distributed applications, Symmetrix offers a right-sized solution. **By offering more alternatives, EMC allows the customer to choose, while still choosing EMC.**



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- ***The Clipper Group can be reached at 781-235-0085 and found on the web at [www.clipper.com](http://www.clipper.com).***

### ***About the Authors***

**Anne MacFarland is Director of Enterprise Architectures and Infrastructure Solutions for The Clipper Group.** She joined The Clipper Group after a long career in library systems, business archives, consulting, research, and freelance writing. Ms. MacFarland specializes in architectures and strategic business solutions offered by enterprise systems, software, and storage vendors, in trends in enterprise systems and networks, and in explaining these trends and the underlying technologies in simple business terms. Ms. MacFarland earned a Bachelor of Arts degree from Cornell University, where she was a College Scholar, and a Masters of Library Science from Southern Connecticut State University.

- ***Reach Anne MacFarland via e-mail at [Anne.MacFarland@clipper.com](mailto:Anne.MacFarland@clipper.com) or at 781-235-0085 Ext. 28 (when you hear the automated attendant, dial “128”).***

**Michael Fisch is Director of Storage and Networking with The Clipper Group.** He brings over seven years of experience in the computer industry working in sales, market analysis and positioning, and engineering. Mr. Fisch worked at EMC Corporation as a marketing program manager focused on service providers and as a competitive market analyst. Before that, he worked in international channel development, manufacturing, and technical support at Extended Systems, Inc. Mr. Fisch earned an MBA from Babson College and a Bachelor’s degree in electrical engineering from the University of Idaho.

- ***Reach Michael Fisch via e-mail at [Mike.Fisch@clipper.com](mailto:Mike.Fisch@clipper.com) or at 781-235-0085 Ext. 25 (when you hear the automated attendant, dial “125”).***

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