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Symmetrix V-Max: Virtualized Data Center of Future Scale

Why CIO's should Care

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Summary

In 2007, several [Wikibon](#) members initiated “Tier 1 Avoidance” strategies and decided it was sensible to move as much data off high end storage as possible to [reduce CAPEX](#) and limit software license and maintenance fees. In 2009, CIO's must ask themselves three questions:

1. Is this still the best approach or should we adjust the storage portfolio allocation in favor of [Symmetrix](#)?
2. Will the new Symmetrix bring strategic advantage to my organization?
3. Should CIO's invest in Symmetrix for the long term?

The answer to these questions depends on four factors, including: 1) Confidence that EMC will deliver and continue to invest in the Symmetrix platform; 2) The cost premium of V-Max relative to alternatives; 3) The importance of continuous availability, scale and automation to your organization; and 4) The amount of process investment built up around Symmetrix.

Our initial view is where true 24X7 availability, faster time to deploy, automation and scale are critical to the business; organizations should re-evaluate storage investment criteria across the portfolio and assess the implications of this announcement. To the extent [EMC](#) delivers on its vision, we believe the new V-Max can bring incremental strategic value to many customers and will represent a longer term investment platform.

The Big Picture:

The past decade has seen steady movement toward data center [consolidation](#). This trend is accelerating with higher speed networking, and new protocols such as 10Gb Ethernet and [Fibre Channel over Ethernet](#) (FCOE) are enabling the interconnection of IT resources, including compute, storage, clients, voice, and LAN.

This activity is underscored in the vision being put forth by [VMware's Paul Maritz](#), [Cisco's John Chambers](#) and EMC's Joe Tucci where we are beginning to see a reintegration of data center resources combined with linkages to "the cloud" -- including, most significantly, the Internet. What this vision imagines is a world where customers are able to construct clouds of compute, storage, and connectivity both internal to the enterprise and external to it (e.g., with business partners). When managed together, these are called "private clouds" which are essentially giant virtual computers.

The challenges of today's array infrastructure are well-understood. Arrays are islands with limited cross array management where moving data between arrays is cumbersome, leading to historically over-provisioned and underutilized system. The bottom line is that storage infrastructures must change to support this emerging elastic computing vision in three important ways:

1. Storage resources will be managed at more extensible physical distances.
2. Storage resources must be available 24X7 forever.
3. Storage must support automation of policies and [service level agreements](#) (SLA's).

V-Max and How it Fits

To address these and other issues, EMC has announced a new Symmetrix called V-Max that puts forth a radical new architecture based on a Virtual Matrix design. The V-Max leverages multi-core Intel chips that provide more robust building blocks called V-Max Engines. The V-Max initially supports twice the number of ports and twice the I/O performance of the DMX-4. Symmetrix DMXs cannot be upgraded to the V-Max; however, existing procedures around Symmetrix storage management and local and remote replication solutions such as TimeFinder and SRDF are fully preserved.

The V-Max supports a Virtual Matrix Interface that connects V-Max engines and organizes a set of resources, based on industry standard components (e.g. ports, memory, disk), which can be managed as a single image. With V-Max, EMC is putting forth a vision to allow data to be moved seamlessly across the storage infrastructure so that it can be optimally placed for performance, availability and recoverability. Storage resources can be commissioned and decommissioned dynamically and non-disruptively over increasing distances, enabling true 24 x 7 availability.

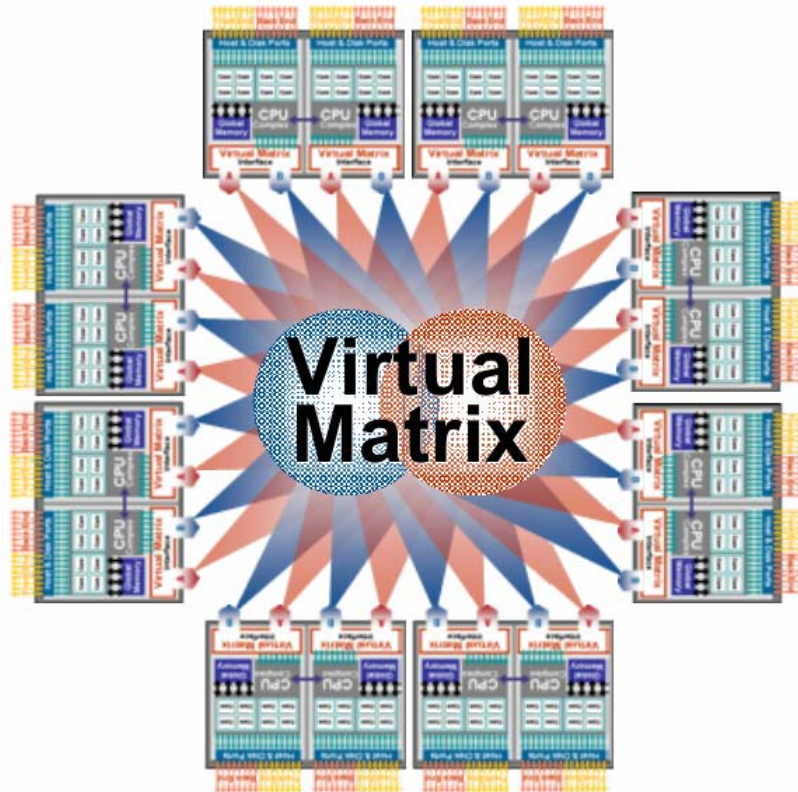


Figure 1 - EMC Virtual Matrix connecting multiple V-Max Engines into a single logical storage resource

Why is this important?

Initially, V-Max will support up to eight engines in a single Symmetrix system. In the mid-term, EMC will be shipping a scale out capability to enable the deployment of so-called federated systems that can be distributed across the data center, enabled by the new architecture. There are four main reasons why this matters:

1. Today the [movement](#) in and out of array infrastructure is highly resource intensive and is often disruptive. The virtual matrix approach will enable dynamic commissioning and decommissioning of storage with true 24x7 availability.
2. The new Symmetrix linear scale out architecture allows the easy integration of all storage resources in a pool supporting a [virtualized infrastructure](#).
3. The architecture accommodates greater flexibility to create [tiers](#) which when automated in the future will further drive down the cost of storage and lower energy consumption.
4. V-Max sets up automation to meet service level agreements and enforce policies across the virtualized infrastructure. The virtual matrix architecture can provide a set of [services](#) to applications, such as remote replication or copy services which can be invoked as necessary.

The business value of this vision is better asset utilization, investment protection for existing Symmetrix processes, [near zero planned downtime](#), automated SLA management at the application level, and delivering the proper levels of performance to make application users more productive.

Users need to understand that some of what EMC has announced such as federated systems and the promise of full automation is future functionality that while extremely impressive, will not be available immediately. The new V-Max systems that will ship in April 2009 include the performance enhancements and the virtual matrix architecture. Some of the automation elements will come later but will work on the V-Max engines that are initially shipped. DMX-4's may fit user requirements well and offer more attractive pricing, however they will not play in the future federated vision.

Should CIO's adjust Symmetrix Investment Strategies?

We believe the following questions are relevant to Wikibon practitioners:

1. Should organizations re-think [tiered storage](#) allocations?
2. Will the new Symmetrix bring strategic advantage to my organization?
3. Should CIO's invest in Symmetrix for the long term?

The answer to these questions depends on four factors: 1) EMC's continued investment in the Symmetrix platform; 2) The cost premium of V-Max relative to 'cheap and deep' midrange storage; 3) The degree to which the Symmetrix platform can automate tiering and SLA management; and 4) The amount of process investment built up around Symmetrix.

Investment Commitment

Wikibon believes CIO's can be confident that EMC is serious. In January of 2008, [EMC landed a haymaker](#) by announcing the incorporation of [flash technology](#) into Symmetrix. Overnight, the company recaptured the performance and innovation highground in this market space. The V-Max announcement brings several substantial investments to the Symmetrix platform including a completely new architecture that represents a significant commitment from EMC. The architecture is unique in its total scale and there is nothing quite like it in the industry today, particularly at the high end of data center storage systems.

The importance of these investments in our view cannot be overstated. EMC is sending a clear message to its customers that it believes in the high end and is intent on protecting existing customer investments in the platform.

V-Max Potential /Scale Cost Advantages

The Symmetrix brand has always stood for great performance, the highest availability and rich software functionality. Historically, the market was happy to pay up for these benefits however

recently other platforms have achieved “near enough” Tier 1 capabilities at lower price points. In order to compete against the broader market which will deliver virtualized arrays, simplified management and limited clustering, EMC must drive sufficient volumes to effectively amortize its substantial development costs.

Can EMC increase shipment volumes? We believe yes and draw an analogy with IBM's mainframe business. IBM effectively increased volumes by knocking out the competition with low cost CMOS systems and Parallel Sysplex, which has strong similarities to the Virtual Matrix Architecture. CMOS allowed mainframes to compete with lower cost Unix alternatives. EMC's CMOS analog is flash and other semiconductor-based innovations that it must incorporate to improve performance and remove spinning disks from the equation, driving tiered storage. On balance, we think EMC's chances are good, albeit not a slam dunk.

Automated Tiering and SLA Management

The Holy Grail of functionality is automation and no platform has fully achieved this capability. While the new V-Max appears to have great potential for automation, it remains an elusive gap in storage products generally and specifically Symmetrix. To truly deliver on the Virtual Matrix vision, EMC must provide the ability to fully exploit tiered storage granularity to optimize costs and do so efficiently within the volume, as opposed to moving entire volumes which is too time consuming.

We believe it is EMC's intent to introduce fully automated storage tiering (FAST), a capability that will automate the movement of data between high performance and high capacity drives based on policies that address business requirements. Timing has not been specified but we believe this capability will ship on V-Max in a 12-15 month timeframe. We expect this capability to be initially managed dynamically based on activity and over time become more policy-based.

Process Inertia

Wikibon members cite a key reason for continued investment in Symmetrix is the processes and procedures built up around the platform. We believe this announcement is cause for CIO's to re-evaluate storage portfolio investment allocations and consider four alternatives as it pertains to Symmetrix:

1. **Invest** – particularly for areas of high availability, flexibility, automated tiering and scaling. We believe approaches like the Virtual Matrix Architecture will alter the economics of high end storage over the next five years. We also believe it is EMC's intent to extend the capabilities of Symmetrix to not only support megascale data centers but to leverage scale and compete for enterprise segments currently served by midtier storage.
2. **Migrate** – in cases where Symmetrix attributes are not aligned with information asset requirements and other platforms make more sense (e.g. NAS).
3. **Sunset** – portions of the portfolio where Symmetrix ROI is not demonstrable and/or Symmetrix does not deliver strategic advantage to the organization in terms of availability, flexibility and scale.

4. **Do Nothing** – A strategy, just not a very good one.

Action Item

EMC's V-Max and Virtual Matrix Architecture represent a new era in high end storage to support data centers of the future. For environments where true 24X7 availability, faster time to deploy, automation and scale are critical to the business, CIO's should deploy this new architecture when it becomes commercially available and monitor its business impact. As delivered in April, we believe the V-Max architecture can bring incremental value to customers seeking highest performance. Longer term, to the extent EMC delivers on its vision, we believe that the V-Max will bring strategic advantage to many environments.

Related Research from The Wikibon Community

[EMC's Vision Thing](#) – Wikibon's assessment of EMC's vision of the data center of the future.

[EMC Lands a Haymaker](#) – How EMC's introduction of flash changed the nature of high end storage, forever.

[Enterprise Flash Drive Cost and Technology Projections](#) – When will flash drives overtake FC-based spinning disk in enterprise storage?

[Developing a Storage Services Architecture](#) – Former Wells Fargo Storage Architect John Blackman provides a practitioner's view of how to develop standardized storage services to support applications.