

EMC E-Lab: The Heart of Data Center Leadership

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In the past several years, a long established storage industry has grown into a multi-billion dollar market place, with literally hundreds of vendors that bring innovative technology into the marketplace. Many of these vendors suffer a long slow uptake in the market, with little ability to influence the long-term direction of technology with their solution, or in many cases even fail. Often, this is due to an inability to reach sufficient levels of interoperability with other technologies, fully understand customer challenges, and assure customers they can do what it takes to support the integration of their technologies in the complex data centers of today.

With so many new companies bringing innovative technologies to market, it is remarkable to look back through the history of the storage industry, and observe that most of the core, significant technology change has been brought to market by large companies. Whether it is by internal development or acquisition, it is usually the support of a technology by a large vendor that standardizes it and brings about widespread adoption. In the ocean of storage vendors and solutions, EMC has become the flagship for innovative technology leadership – historically often bringing new technologies to market, and driving their acceptance in the marketplace.

For the almost 30 years that EMC has been in the industry, it has taken more than the manufacture of enterprise arrays to earn this reputation. It has in fact taken a willingness to be constantly re-immersed in the flames of emerging standards and evolving technology, and have the ability to not only to emerge from the flames unscathed, but to constantly grab the reigns of leadership with each new technology in order to enable the industry and users alike to effectively integrate and deploy new technologies.

Some in the industry wonder why EMC always seems to be in a leadership position when it comes to new storage technologies. One factor is EMC's E-Lab. It is a large facility leveraged for technology qualification, but just as importantly one that immerses EMC in the same challenges their customers face in data centers the world over. E-Lab is a foundation for not only innovation, but EMC's expertise in support and professional services as well. For the customer, the value proposition is simple: EMC can be looked to not only for leadership in transformative data center technologies, but also for "buck-stops-here" support, and comprehensive consultative services when it comes to integrating those technologies into the complex data centers we face today.

EMC and the Leading Edge

Nearly since their entry into the market almost 30 years ago (1979), EMC has been aggressively growing while expanding their technology capabilities. Today, they are the market leader in SAN and NAS solutions, while also delivering an expansive technology portfolio that crosses nearly all domains of information management, including data protection, information security, information lifecycle management, content management, on-line storage services, professional services, consumer devices, and more.

EMC's rich history in storage brought about the first days of what we today recognize as enterprise class storage, originally supporting mainframe storage, with the introduction of the Symmetrix storage array in the early 90's. EMC continued to grow that platform and brought FC connectivity to prominence in enterprise storage in the mid-90's. Symmetrix today is the most recognized enterprise storage array today. Similarly, EMC's CLARiiON is backed by a heritage just as rich, albeit from the Data General Corporation that EMC acquired in 1999. CLARiiON was in fact one of the first RAID storage arrays in the market, and over its lifetime set the stage for competing products by being one of the first storage arrays to introduce features like dual active controllers, fully redundant components, storage management features within the array, FCAL technology for drive and interface connects, mirrored cache, and more.

Today, EMC's technology portfolio is comprehensive for storage, and reaches well outside of pure storage concerns to encompass all manners of information management technology. On the storage front, EMC is the only vendor in the industry to simultaneously offer technologies as diverse as both file and block storage virtualization to the market. Around information management, EMC has circled a virtual army of technologies ranging from best-in-class document management to best-in-class security.

Meanwhile, over the years during which EMC has harnessed these broad reaching technologies into their product portfolio, they have also built a significant services portfolio. While EMC has always been recognized as a go-to vendor for "conquer-all-challenges" support, over the past few years EMC has also grown a world class \$500M annual revenue consulting organization. This organization today stands ready to deliver on all of EMC's broad technology portfolio while leading customers to best practices with an array of services ranging from "Information Governance" to "Data Center Transformation."

As is evident, EMC has historically marched steadily forward and often carried the storage industry along with it. Altogether, EMC today has a resume with which few in the industry can compare.

The Challenge of Change

While many in the industry recognize EMC as a vendor of best-in-class solutions, few

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recognize the challenge a large vendor faced in keeping up with constant change in infrastructure technologies. Over the past several years, within the multi-billion dollar field of storage, more than 100 vendors have come into the market, and the majority of those vendors have come and gone. Some vendors were certainly acquired by bigger fish that could integrate their innovations with their existing solutions while better supporting the acquired technology in the marketplace. But many have faded away because the challenge of earning customers when faced with a small vendor's limited ability to validate and support their solution was just too great. Today, the challenge of interoperation with other solutions is simply mind-boggling. With the introduction of all of these companies and new technologies, qualifying the compatibility of solution components, and then supporting them, is more difficult than ever.

In the past few years, the number of connectivity technologies and vendors have multiplied, going from SCSI, IDE, ESCON, FC and NAS to iSCSI, Ethernet, SATA, SAS, faster FC, InfiniBand, FCoE, FICON, VTLs, de-duplication, Scalable NAS, and more from an entirely changed vendor landscape. Simultaneously, the number and types of servers and storage arrays that can be attached to any one of these fabrics today is simply astounding. Meanwhile, the change hasn't ended there, as today the complexity within IO paths and IO stacks has multiplied as well, encompassing the likes of block storage virtualization, file storage virtualization, a plethora of multi-path

solutions, the technologies behind such acronyms as NPIV, VSANs, IVR, and more.

If you think about the challenge of evaluating the impacts of each and every one of these technologies on existing storage systems, supporting customers through their adoption – regardless of whether they are introduced through your technology or a competitive vendor's – the enormity of the task is simply mind boggling.

And we have only discussed one technology domain in the enterprise – storage. Today's enterprise is becoming more consolidated and converged than ever before, and network, communication, server virtualization, and other technologies multiply the challenges facing leading edge vendors many times over.

So in the face of astoundingly complex infrastructure technologies, how can any vendor – much less large ones with large product portfolios – possibly hope to deliver existing solutions with confidence and simultaneously leave room for innovation and industry leadership? We periodically have this conversation with the large vendors in the industry, and one conversation remains the same. EMC has harnessed a unique approach to developing new technology, building exceptional expertise throughout the EMC ranks, and simultaneously driving both interoperability and innovation by EMC, partners, and competitors alike.

EMC's Secret Weapon: E-Lab

EMC has long possessed a powerful functional organization that is seldom recognized outside a close circle of partners, competitors, and the elite technologists within EMC itself. This group has long served as the foundation for deep EMC differentiation in technology leadership, interoperability, and comprehensive customer support and services. This organization is called E-Lab, and as far as we know, few other vendors in the industry have managed to harness similar capabilities as comprehensively, or as long, as EMC has.

In a nutshell, E-Lab is an extensive development, testing, and interoperability facility located in Hopkinton, MA, and Singapore, and consists of over a hundred engineers and nearly a billion dollars of equipment. But EMC E-Lab is more than a facility, and like we've said before, is a state of mind revolving around constant, deep reaching development and testing that not only qualifies solutions, but leverages each experience to enhance EMC support and services as well. At the end of the day, qualified solutions and the technologies they are tested with gain a place on the vaunted EMC Support Matrix (ESM – available in the well known hard copy or within the on-line E-Lab Navigator), that effectively states that EMC will act as “buck stops here” support for that solution.

The ESM or E-lab Navigator simplifies getting answers to simple interoperability questions, and is available to EMC customers and partners. But that list isn't

exclusive to EMC solutions, and E-Lab in fact performs interoperability testing with competitive solutions just as often as partner and EMC solutions – so this makes EMC an industry-wide tool, and EMC often uses it to provide feedback to competitive solutions that have interoperability issues. Moreover, ESM is a statement of EMC's consulting qualifications as well, because EMC leverages E-Labs to constantly hone their consulting expertise in the face of the very same infrastructure and information management challenges that their largest customers face each and every day.

Case in point, let's look at what EMC is doing today (beyond its active participation in industry standard committees) in the midst of debate, vacillation, and contention over emerging FCoE standards to give the customer a fully qualified, fully vetted, future-looking solution today.

FCoE – Demonstrating the Strength of E-Lab

Recently – in October of 2008 – EMC broke down the barriers to the deployment of an emerging class of FCoE solutions by being the first vendor to announce a qualified solution for immediate deployment of FCoE in the data center. This solution currently consists of an EMC Connectrix-branded 10Gb Ethernet and FCoE-capable switch, Converged Network Adapters (CNAs) from Emulex and QLogic, and traditional SAN fabrics. The EMC Connectrix NEX-5000¹ switches are sold and serviced by EMC. The

¹ EMC sells and services the Cisco Nexus 5000 series switches under the EMC Connectrix brand.

CNAs are available through EMC Select which is EMC's reseller program.

FCoE-capable switches take consolidated Ethernet and Fibre Channel IO from CNAs located in servers and direct that traffic to the appropriate Ethernet LAN or FC SAN infrastructure. This enables more servers to benefit from the value of the SAN and consolidated storage infrastructure while, providing efficiencies for server connectivity through reduced cables, reduced power consumption, and centralized management.

To say that a major vendor has qualified FCoE interoperability is no small matter, and in the case of EMC in particular, it is a larger matter than ever. Typical EMC qualification involves testing across dozens of operating systems with a multitude of patch variations, more than dozens of HBAs and drivers, switches, directors, and all manner of storage systems. Adding FCoE to the mix ensures that this new technology will be qualified with the same rigor that E-Lab applies to everything that enters their labs.

EMC has leveraged the capabilities of E-Lab to qualify the Connectrix FCoE solution against the available technologies as identified in the EMC Support Matrix. In turn, EMC customers have their reassurance that there is a well defined, evolving support envelope, and that the impact of FCoE is understood with anything on the ESM, and EMC will provide "buck stops here" support when it comes to resolving issues.

FCoE in a nutshell

FCoE and the technologies that support it reach deep into the traditional network to fine tune Ethernet technology, and in fact the protocol stack itself, to address issues of latency, guaranteed bandwidth, congestion management, and more. These changes in the network infrastructure make it appropriate for carrying mission critical storage traffic such as with little change in performance versus traditional Fibre Channel.

With FCoE in tow, the data center stands poised to experience an explosive growth in SAN attach rates. EMC expects FCoE to be a SAN expander by providing a whole new, more flexible, and less expensive way to connect clients to high performance SANs. Using FCoE, any server that is attached to a 10Gb Ethernet network can be attached to SAN storage as well, without additional HBAs, cabling, or Fibre Channel switch ports. This is driving customer excitement today, and may drastically alter the data center architecture in the future.

Why is EMC's qualification of FCoE remarkable? For two reasons. First, FCoE depends upon a complex set of infrastructure technology (10Gb Converged Enhanced Ethernet (CEE) in EMC's solution) that has potential impact upon a broader number of infrastructure systems than ever before, and this in fact is a deterrent to many vendors bringing well qualified solutions to market. Second, while vendors are clamoring for attention, and FCoE standardization work is well

underway, the standards are not in fact here yet, and customers are faced with a compelling technology, with no assurances around how it will work, or where to deploy it. EMC has recognized the customer need, and responded with leadership and solution guidance that only a cross-domain vendor with qualification assets like E-Lab could provide. Moreover, with support services and consulting services in tow, EMC is making FCoE a realistically deployable solution for customers. Altogether, EMC's qualification of FCoE demonstrates how EMC often leads the field as new technologies emerge.

Taneja Group Opinion

While its importance is often under recognized by the typical EMC customer, E-Lab is at the heart of EMC's broader capabilities, and is behind the scenes in EMC's competence in technology, support, and services. The value of E-Lab to the EMC organization really rests in sustaining the culture of technology innovation and adaptation within EMC. By operating a billion dollar qualification facility, EMC has immersed itself in operational challenges that are as daunting as those of the largest enterprises. This in turn has given EMC the operational insight with which to lead the industry into the right emerging technologies, at the right time, while simultaneously giving them the technological muscle to make sure such solutions operate as planned.

From our vantage point, we suspect EMC will have tremendous success with the

Connectrix platform and solution qualification, and set the course for FCoE adoption in the enterprise. But this story involves much more than just the FCoE technology discussed as an example. EMC's recent qualification of an FCoE solution is really a story about how EMC often shows the way to next generation computing with their introduction and/or endorsement of transformative technologies. Historically, this is the same story we've heard before of EMC as a leader for storage, infrastructure, information, and data center transformation – a role that can only be supported by the breadth and capabilities of product support and consultative services born of organization-wide innovation programs like E-Lab.

No other vendor we know of today can match the capabilities of E-Lab in size of technology, breadth of services supported in the organization, and importance as a key component of a vendor's ability to deliver solutions, innovation, and services. The bigger picture payoff is that E-Lab isn't relative to just EMC. As we've mentioned, partner and competitor equipment is just as often at the heart of activities in E-Lab. This makes E-Lab a service for industry-wide qualification, and everyone wins. Moreover, the intersection of industry-wide technologies in a practice the size of E-Lab can move the whole industry forward. The more times that stories like EMC's support of FCoE emerge, the more obvious it becomes that EMC and E-Lab helps everyone win.



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