

E-Lab: EMC's Secret Weapon

August 2010



In the past several years, a long established storage industry has grown into a multi-billion dollar market, 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 30 plus years that EMC has been in the industry, it has taken more than the manufacture of enterprise-class 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 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 today's complex data centers.

EMC and the Leading Edge

Since their entry into the market over 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.

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 services organization with annual revenue over \$5 billion in 2009. This organization today stands ready to deliver on EMC’s entire 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 recognize the challenges a large vendor faces 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 has multiplied, going from SCSI, IDE, ESCON, FC and NAS to iSCSI, Ethernet, SATA, SAS, faster FC, InfiniBand, FCoE, FICON, de-duplication, 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

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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, and 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.

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.

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 in Singapore. These facilities house over a hundred engineers and equipment from EMC’s cumulative three billion dollar investment for the primary purpose of the interoperability of its products with the rest of the industry offerings. However, EMC’s E-Lab is more than a facility, and as we’ve said before, it is a state of mind revolving around constant, deep reaching development and testing that not only qualifies solutions, but also leverages each experience to enhance EMC support and services as well. Recently, the Hopkinton facility was moved to a more central location on the same Hopkinton campus. This decision was driven by two factors: Virtualization and an increased emphasis on green technologies. The data center

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infrastructure is under assault today with virtualization layers being applied to compute, networks and storage at every level. This requires a new layout of equipment and an approach towards testing for interoperability, diagnosability and performance. Power and cooling considerations and methodology are entirely different today. A new E-lab allows these new technologies to be integrated from a centralized solution focus in the most comprehensive manner while providing a customer friendly location that lends itself to customer tours and demos. The Singapore facility continues to increase in importance not only to conduct tests across long distances but also to welcome Asia Pacific customers to the site.

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.

E-lab Navigator simplifies getting answers to simple interoperability questions, and is available to EMC customers and partners via EMCOne. 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 the ESM an industry-wide tool and is often used to provide feedback to competitive solution requests and as consulting guidelines for best practices and implementation optimization. EMC leverages E-Lab for

their expertise to provide technical direction and support 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 in three areas of computing that will instantly illustrate the importance of E-Lab to EMC and more importantly, to its customers and partners.

1. The Journey to the Private Cloud

The march to cloud computing has begun in earnest in the industry. EMC has already made it clear that it intends to play a significant role in the transformation of the data center to the cloud computing model. Think about the magnitude of that statement. Cloud computing involves infinite (practically) scalability. It demands federation of storage resources not only in the data center but across them, possibly across continents. The VPLEX products announced recently are designed precisely for such purposes. So how do you test such mammoth infrastructures without a testing facility that is geared for it from the start? Cloud Computing. Cloud computing also entails private/public combinations where data is partially located in the private cloud and partially in the public cloud where data is moved via policy from one location to another. These are non-trivial configurations that require large resources for testing to assure compatibility and interoperability. The new E-Lab facility is designed to accommodate such cloud infrastructures.

2. Converged Networks

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 10Gb Ethernet and FCoE-capable switch technology from Brocade and Cisco, Converged Network Adapters (CNAs) from Brocade, Emulex and QLogic, and traditional SAN fabrics. These 10 GbE /FCoE solutions 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 FCoE solutions 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.

Why is EMC's qualification of FCoE remarkable? FCoE depends upon a

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.

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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. 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.

3. The Journey towards VCE

EMC has collaborated with Cisco and VMware to deliver tightly integrated, thoroughly tested solutions for the data center under the banner of VCE. VCE ties directly to how EMC is working with partners to deliver products which enable the deployment of cloud computing today. Customers working with the coalition have a pre-built set of hardware and software that is instantly a virtual environment. E-Lab has qualified each building block of this environment to ensure it's integrated effectively. The knowledge stems from familiarity with both companies; having worked with Cisco from an early stage to test new features and functionality designed specifically for server-virtualized environments, and with years of teaming with VMware even before EMC acquired the company. Beyond providing the building

blocks of a cloud environment, EMC has invested in resources to provide customers with technology services to fully enable the deployments. The Vblock solutions that result from this effort will have an even higher degree of integration than currently achieved via interoperability testing. This effort also requires a testing facility that can deal with the massive configurations that mirror what the customer will build. A newly minted E-Lab that recognizes the new world of virtualization will certainly go a long way to assure customers that they can place their trust in EMC for the next generation data center.

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 a tremendous edge over its competition as it embarks on implementing

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technologies for the next generation data center. These includes the VCE initiative, the move towards unified 10Gb-based Ethernet along with FCoE and all products and technologies associated with the move to private and public clouds. The bets were pretty high all along and EMC has proven time and again its ability to deliver transformative technologies seamlessly to the market. But now the bar has been raised many times over with fundamental changes taking place in the data center. If E-Lab was an important weapon in EMC's arsenal before, it is about to become an order of magnitude more powerful.

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. If the customer were the only entity that came out the winner, E-Lab would be a worthwhile investment for EMC. The fact that the customer, EMC and the industry wins is a rare combination that you only see once in a while.

<http://www.emc.com/products/interoperability/index.htm> .

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