EMULEX®

Case Study

Electronic Components Supplier Keeps Computing Infrastructure Connected with Emulex

About Molex

Molex Incorporated is a 70-year-old global manufacturer of electronic, electrical and fiber optic interconnection systems. Based in Lisle, Illinois, USA, the company operates 59 manufacturing facilities in 19 countries. The Molex website is www.molex.com.

Molex Incorporated Standardizes on Emulex SAN Connectivity for VMware Transition in America's Regional Data Center

With a commitment to innovation based on cutting-edge technology and customer collaboration, Molex Incorporated is recognized as a leading provider of interconnect products, a highly competitive segment of the electronics industry. Keeping close to customers in this fast-moving business is critical, and this means that Molex has 39 offices, product development sites and manufacturing operations in the Americas region. Its regional business applications are supported from a data center in Lisle, Illinois, where a multi-year server virtualization project is addressing the challenges of fulfilling service requirements, while meeting corporate goals for environmental responsibility.

The Molex Americas infrastructure team in Lisle maintains an application server farm and is responsible for specifying and maintaining network equipment and computing systems at 39 separate locations within North and South America. The data center installed a storage area network (SAN) in 2003, and today has several Terabytes of both live and archived data residing on EMC arrays. Emulex host bus adapters (HBAs) were selected as the SAN connectivity solution based on ease of administration, performance and reliability.

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Virtualization Planning

When Molex began planning a server consolidation and virtualization project, evaluation of SAN connectivity requirements was part of the infrastructure team's due diligence. Emulex was asked to demonstrate its capabilities in the planned VMware ESX server environment.

"We appreciated the comprehensive and automated HBA management tools provided by Emulex in the native Windows environment and wanted to see if we could count on the same capability within a virtualized server environment," said Andrew Houlne, Infrastructure Project Leader, Molex Americas. "Overall, we were very happy with what we saw. The out-of-the-box performance is solid, and the new capabilities that Emulex is delivering around virtualization are very interesting."

Molex has now begun implementing VMware ESX on Dell 2900 series servers. "Part of our company's mission statement is to be a good environmental citizen, which is an added bonus for the consolidation project," said Houlne. "Clearly, we recognize that if we do this right, the energy savings will also cut our data center costs."

By the end of 2007, Houlne expects that consolidation of applications on stand-alone servers, combined with virtualization of about two dozen physical servers onto ESX hosts, reduced his server footprint by more than 25 percent, well on the way to the project's goal of transitioning at least 50 percent of systems onto virtual platforms. Concurrently, SAN connectivity is on the rise, as the infrastructure team moves more servers onto the SAN and implements projects such as remote back-up to the SAN for sales offices that do not have on-site IT staff.

A Strong Foundation

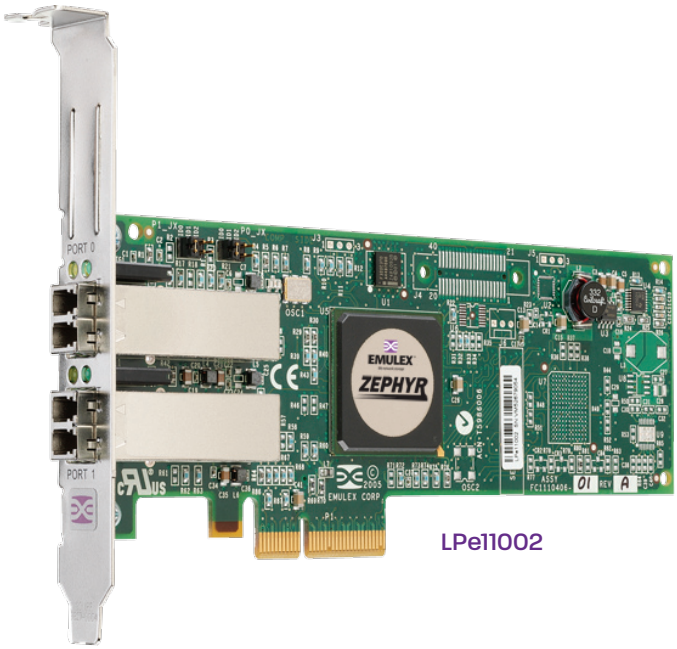
Although the majority of servers in place at Molex today use Emulex 2Gb/s HBAs, the VMware servers are equipped with 4Gb/s LightPulse® Fibre Channel HBAs, which feature enhanced NPIV capabilities that are critical to virtualized server environments. "But as we plan for upgrades to our SAN in 2008, coupled with the enhanced storage capabilities we are gaining for virtualization with the new Emulex HBAs, we can consider moving more applications onto VMware."

In fact, a recent benchmark study conducted by Demartek Labs and approved by VMware found that Emulex HBAs performed exceptionally well in the high I/O usage scenarios that are common to virtual machine operations. Demartek noted: "The Emulex HBAs are up to 9 percent faster in read I/O per second, 31 percent faster in write I/O per second and 31 percent faster in total throughput at these [i.e., 2K, 4K and 8K] block sizes."

High I/O rates associated with mixed application workloads are common in virtualized servers, because multiple applications are running over the same HBA. An evaluation by the Enterprise Strategy Group concluded that the frame-level multiplexing capability of Emulex HBAs plays a large role in optimizing I/O performance in these environments. Other Emulex technology innovations to ensure high I/O rates include out-of-order Frame Reassembly to minimize retransmissions, a larger Buffer Credit pool, and support for multiple concurrent Direct-Memory Access (DMA) reads.

Another contributor to Emulex's role as a strong foundation for SANs in both traditional and virtualized server environments is the company's commitment to a "common driver" model, which supports all generations of Emulex LightPulse HBAs on a given OS platform. This frees data center administrators from the time consuming task of maintaining driver/hardware compatibility matrices and supports ease of upgrade with new firmware releases. Firmware upgrades, often a large support task, are further simplified with Emulex's HBA management tools, which support automated, batch mode propagation of new firmware across the SAN.

Houlne noted that a consulting firm it worked with at the start of the VMware implementation recommended that Molex consider another HBA vendor for the project. After putting Emulex LightPulse 4Gb/s HBAs to the test, Emulex was the clear choice based on performance, reliability and manageability. Commenting on the most recent Emulex upgrade to its management suite, Houlne said: "Our experience in the pilot lab with the latest release of Emulex HBA management tools for VMware ESX environments has been great!"



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Future Capable Connectivity

Emulex also is a pioneer in delivering enhanced SAN connectivity features for virtualized server environments, which broadens the scope and potential impact of the virtual machine concept in the data center. Emulex co-developed N-Port ID Virtualization (NPIV) with IBM, which enables each HBA port to register multiple "virtual ports" in a SAN fabric. NPIV has been adopted as an ANSI T11 standard, and as early as 2005, Emulex and VMware collaborated to demonstrate the technology in a standard implementation for managing the storage interface to multiple virtual machines.

Because the "virtual addresses" provided by Emulex LightPulse Virtual HBA technology with industry-standard NPIV support are not tied to a specific physical HBA, virtual machines can be seamlessly migrated across hardware platforms. This has obvious benefits in disaster recovery and business continuity scenarios, while also providing a high level of flexibility in terms of allocation of resources and flexibility of every day deployments in the data center.

"The ability to give a virtual machine its own direct connection to a SAN is very intriguing for us," said Houlne. "That capability on VMware will make it much easier to recover hardware, and while our current project does not include a disaster recovery element, we are definitely incorporating it into our planning."

Houlne notes that Molex, which has been at the forefront of innovation to meet the needs of electrical and electronic system manufacturers for 70 years, has a customer-focused approach to its information technology requirements. "We have a mix of different clients, with different needs, that we support across the organization. At the end of the day, our job is to ensure that data and applications are available. With Emulex, we know that we have reliability, performance and ease of manageability for our SAN connectivity."

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08-1062 · 5/08

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