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Emulex 16G Fibre Channel HBAs Enhance Data Protection Strategies

New HBAs offer increased performance, lower power usage, full offload for T10-P1 data integrity, more virtual ports, streamlined management and industry-leading reliability

At a Glance

Shrinking to non-existent backup windows have led to new data protection technologies. At the same time, existing storage area network (SAN) deployments require upgrades to be faster, more secure and to support ever-increasing numbers of virtual machines (VMs) as well as larger cloud deployments and mission-critical applications. Emulex's expertise in delivering fast, reliable, scalable and manageable Fibre Channel connectivity, along with its leadership in virtualization and security, places the Emulex LightPulse® 16Gbps Fibre Channel (16GFC) host bus adapter (HBA) squarely in the middle of data protection initiatives.

Product

- Emulex LightPulse 16GFC HBA (LPe16000 and LPe16002)
- Emulex OneCommand™ Manager
- Emulex OneCommand Vision

Solution Benefits

- Higher link speed allows for faster data replication and migration
- Increased N_Port ID Virtualization (NPIV) virtual ports and the highest number of simultaneous exchanges (XRI) in the industry support scalable servers and prepare customer technology transition
- Backward compatibility with 8GFC and 4GFC infrastructure, with single driver and management solution, ensures highest return on investment (ROI) and flexibility, and minimizes qualification overhead
- GreenState™ power efficiency delivers reduced power footprint to lower operational expense (OpEx)—up to 3x the Input/Output Operations per Second (IOPS) per watt (IOPS/W)
- End-to-end data integrity with BlockGuard™ offload support for the T10 Protection Information (T10-PI) standard, protecting against silent data corruption, without the 30-40% performance tax incurred by other firmware-based T10-PI solutions

Data Protection

Traditional data protection solutions, such as time-honored backup and recovery, no longer meet the most pressing needs of diverse data center ecosystems. Other technologies, such as data replication and data migration, offer alternatives, but in general, protecting data that resides in a heterogeneous mix of servers hosting multiple applications across many sites that operate 24x7 is not an easy thing to do. Virtualization and cloud architectures have added a new dimension to the problem. As data protection strategies evolve, they need to deliver faster data protection, reliable performance, better data integrity and increased ROI.

Higher performance

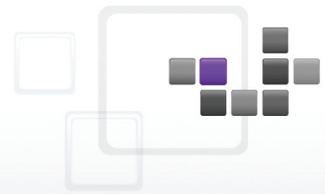
Emulex has long-delivered superior performance with its LightPulse Fibre Channel HBAs. To meet the needs of data centers with virtualized servers, shrinking to non-existent backup windows and extremely sensitive data, the Emulex LightPulse Fibre Channel 16GFC HBA is the proven HBA of choice, delivering significantly higher IOPS—over 1 million IOPS on a single port for greatly enhanced data migration and replication. In fact, migrating from 8GFC to 16GFC HBAs delivers many other significant performance advantages.

Emulex lab tests comparing 8GFC HBAs with the LightPulse16GFC HBAs reveal substantial benefits for data protection initiatives, including data that shows the LPe16000 delivers a maximum of:

- Up to five times IOPS improvement over 8GFC HBAs
- Twice the data throughput (MB/s) compared to 8GFC HBAs
- Half the application response time compared to 8GFC HBAs

Emulex is the preferred HBA for high performance database environments—eight of the top ten Transaction Processing Performance Council-C (TPC-C) world records have been reached with Emulex! The high performance of 16GFC can minimize backup windows significantly.

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Emulex proven reliability

In survey after survey, the number one concern of end users is *reliability*. Emulex is synonymous with quality. With over 11 million ports installed worldwide and partnerships with all the leading server and storage vendors, Emulex is the clear choice for data protection. In a recent survey of 710 Fibre Channel customers*, greater than 97% of the IT organizations stated that they were either satisfied or very satisfied with the initial product quality and the long-term reliability of Emulex HBAs. Emulex was the first company to deliver a Fibre Channel HBA, is the choice of large enterprise organizations worldwide and has a solid adapter architecture, software stack and industry-leading management application.

End-to-end data integrity

Businesses use remote replication as part of their disaster recovery plan. Storage-based remote replication is commonly used because it is simple to set up and relatively easy to administer. However, if silent data corruption occurs, the same corruption can be replicated to the remote site. Therefore, it is very important for businesses to make sure that their replication configuration is free of silent data corruption.

Designed to prevent silent data corruption through end-to-end check sums, the full ecosystem of T10-PI enabled storage, HBAs, operating systems/hypervisors and applications is quickly emerging. Emulex has implemented the T10-PI standard on its LightPulse 16GFC HBA with its BlockGuard feature. With unique hardware-offload support for T10-PI, Emulex HBAs provide data integrity without the 30-40% performance tax that current firmware-based solutions provide today. With Emulex, data centers are future-proofed for the time when they may choose to enable data integrity.

Increased ROI with Emulex

Because each LPe16000 delivers two times the performance compared to 8GFC adapters, fewer HBAs are required to handle the same workload, significantly increasing ROI. Furthermore, cable and device management is much easier. Fewer cables are required to support an increased number of applications and VMs. With structured cabling costs up to \$300/port, each cable reduction saves money and reduces OpEx and the amount of infrastructure to manage.

Emulex OneCommand Manager further increases ROI by reducing the overhead of managing multiple generations of HBAs as well as OneConnect™ Universal Converged Network Adapters (UCNAs) running different protocols (FC, Fibre Channel over Ethernet [FCoE], iSCSI, and Ethernet network interface card [NIC]). Through a single console, OneCommand Manager controls all Emulex HBAs and UCNAs within the data center. In the recent Emulex

customer satisfaction survey, 60% of the end users who use OneCommand Manager use it at least once a month, if not daily. It is no wonder that OneCommand Manager is so popular, as customers can get twice as much done in half the time compared to other adapter management applications.

Lower power consumption

Power efficiency is an integral part of all Emulex Fibre Channel HBA designs. Emulex has embraced maximum performance through efficient cooling by designing its high performance LightPulse 16GFC HBAs with passive cooling devices for optimum performance in a broad range of server environments. By upgrading to the Emulex 16GFC HBA, data center managers see up to three times improvement in application throughput per watt (IOPS/W). Moreover, 16GFC reduces the number of switch ports required which can also reduce the overall fabric size for greater power savings.

Emulex delivers:

Superior historical HBA performance¹ for faster data protection processing, including minimizing backup windows

- 37% better dual-port scalability, delivering the highest data throughput on both channels for optimum server performance, as well as power and cooling efficiency
- Advanced CPU utilization for better application and system performance—chosen to power the #1 fastest database system in latest TPC-C²

Higher availability for reliable application uptime

- Industry's most reliable HBA based on actual field return data
- 30% higher reliability over nearest competitor
- More than 10 million hours mean time between failure (MTBF) with over 11 million ports shipped

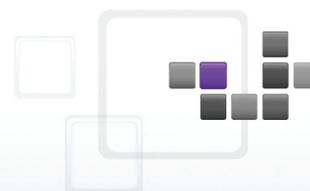
Extensive knowledge of security for piece of mind

- End-to-end data integrity with support for the T10-PI standard, protecting against silent data corruption as data traverses the system from the OS all the way to the disk array

¹ Based on competitive tests with the 8GFC HBA. 16GFC HBA testing is underway.
² TPC-C Benchmark Report, December 2010

* Emulex Customer Satisfaction Survey, September, 2011, with participation by 710 companies with Fibre Channel environments.

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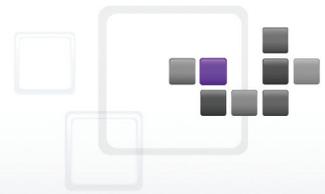


Key HBA Features

Table 1 provides a summary of the key features of the Emulex 16GFC HBA and how data protection initiatives take advantage of the feature.

| LPe16000 Feature | Data Protection Benefit |
|-----------------------------|--|
| Focus on speed | High performance —By managing performance, storage traffic can flow at optimum levels, giving any high-speed storage environment, such as cloud storage, maximum system performance. |
| Reduced latency | High performance —16GFC reduces the time it takes to get data in and out of the storage device, thus helping the computer spend more time on processing data, which, in turn, helps the overall transactions per second just due to lower latency of the length of storage. |
| GreenState power efficiency | High availability and reliability —There is a direct correlation between heat and device longevity. Overheated parts generally exhibit a shorter lifespan and lower system performance. The 16GFC HBA enables low power breakthroughs, including GreenState power management, allowing selective dynamic hibernation, advanced thermal and power instrumentation, and a configuration with less than 3 watts per port. Reduced OpEx —Cooling costs are reduced. |
| Scalable | Investment protection —SAN and network storage environments are dynamic. To that end, Emulex Fibre Channel HBAs, management tools, device drivers and firmware are designed to provide the greatest degree of scalability and flexibility. Increases in the numbers of virtual HBAs and simultaneous transaction contexts (XRIs) provide a safe growth environment for organic growth and cloud transition. |
| Common driver model | Investment protection and reduced OpEx —A single driver binary works with all supported generations of Emulex LightPulse Fibre Channel HBAs for a given OS platform. This approach simplifies management, requiring IT administrators to only deploy a single driver across Emulex 4GFC, 8GFC and 16GFC HBAs. |
| Single management console | Reduced OpEx —Through a single console, SAN administrators can manage all Emulex Fibre Channel HBAs, leveraging either in-band (over the Fibre Channel link, an exclusive feature of Emulex) or out-of-band (over the LAN) options and a host of automation features. With support for iSCSI, FCoE and NIC protocols, OneCommand Manager also manages Emulex OneConnect UCNAs for the converged network environment. |
| Fast deployment | Reduced OpEx —Historical testing on the 8GFC HBAs show that administrators can get twice the adapter management functionality, deploying HBAs in half the time compared to other management solutions. In enterprise settings with hundreds, or even thousands, of adapters, this productivity advantage is significant. |
| BlockGuard offload support | High performance data integrity —Emulex’s exclusive BlockGuard technology provides end-to-end data integrity with 40% higher performance than typical firmware implementations of T10-P1 due to hardware offload capability. |
| SSD support | High performance —For SSDs attached to a SAN, Emulex delivers reliable and high performance connectivity to enable fast and reliable storage tiering and burst caching with its LightPulse 16GFC HBA. |
| Certified stack | Investment protection —With certification with all the leading data protection vendors, users are assured of a no-risk, high availability and supported solution. |

Emulex 16GFC HBAs Enhance Data Protection Strategies



Increase I/O Performance and Availability

The award-winning Emulex OneCommand Vision I/O Management application helps data protection initiatives maintain the highest level of application performance and availability while maximizing utilization of existing resources. I/O Performance and Availability Service (IPAS) takes OneCommand Vision to the next level—essential for the best data protection.



Summary

The LightPulse 16GFC HBA continues Emulex's tradition of delivering reliable, high performance, scalable and manageable connectivity for all data protection initiatives. Having won virtually every 16GFC design win at OEMs across the world, data centers will take advantage of the Emulex LPe16000 series Fibre Channel HBAs on any platform in any country for their data protection needs. As data centers migrate business critical applications, like databases, into virtualized environments, Emulex will ensure maximum performance and reliability. And as cloud environments become mainstream across the globe, Emulex will be powering them.



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