



Emulex LPe12002 8Gb/s PCIe 2.0 Fibre Channel HBAs Superior Dual-channel Performance for Business-critical Applications

At a Glance

Emulex 8Gb/s dual-channel Host Bus Adapters (HBAs) boast better throughput, 37% better transaction rates, 33% more effective central processing unit (CPU) utilization and 127% greater second-channel I/O transaction performance versus the competition. This paper describes the data characteristics associated with business-critical applications and the advantages of Emulex LightPulse® dual-channel 8Gb/s Fibre Channel HBAs for those applications.

Products

- Emulex LightPulse LPe12002

Applications

- Online transaction processing, database and backup environments

Introduction

When a territory manager runs a query on today's sales or a factory manager plans tomorrow's production flow, they expect an instantaneous response from their information systems. When a CEO reviews his or her IT spending for the year, he or she wants to see lower capital and operating costs (CapEx and OpEx), improved utilization and a more agile, consolidated IT infrastructure.

For all these reasons, every component in the modern data center must work at full capacity, all the time. Today's enterprise cannot afford down time or products that deliver anything but the highest performance in real business conditions.

Among the applications that have the highest need for data throughput are online transaction processing, database applications and server virtualization. Server virtualization in particular greatly reduces IT CapEx and data center space requirements. The Fibre Channel HBA that links servers to storage networks is a critical link in the flow of data. Determining which HBAs deliver this performance is critical, especially in a world of high-density blade servers and virtualized server deployments. To most accurately evaluate HBA performance, it is important to understand the actual workloads the HBA will handle, as well as those elements of HBA design that determine its real-world performance.

Dual-channel Popularity

Dual-channel Fibre Channel HBAs are increasingly popular, representing nearly 50% of the market for Fibre Channel connectivity. Drivers of dual-channel adoption include increased performance of the PCI Express I/O bus, applications that either require or facilitate multiple ports and the fact that I/O slots are limited. I/O buses are getting faster and PCI Express bus performance can drive I/O activity to meet the capacity of two Fibre Channel ports.

Customers are leveraging multipathing I/O software, creating one or more physical paths between the system and storage. When using dual Fibre Channel ports with multipathing software, should one path fail, the software can transparently reroute I/O through the second port. Multipathing software layers can leverage the redundant paths to increase performance and availability for VMware, Oracle and disaster recovery applications.

With application requirements for multiple Fibre Channel ports and PCI slots at a premium, especially in blade servers, data centers are choosing to deploy dual-channel HBAs. Many of today's business-critical enterprise applications demand the performance that can only be provided by the latest 8Gb/s dual-channel Fibre Channel HBA technology.



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Emulex LightPulse dual-channel Fibre Channel HBAs are the clear leaders when it comes to real-world performance and scalability. Emulex 8Gb/s dual-channel Fibre Channel HBAs boast better throughput and transaction rates compared to the nearest competitor. Combined with Emulex’s superior quality, reliability, and manageability, it’s no wonder that Emulex HBAs remain the deployment leader in the world’s largest enterprises.

Measuring Actual Performance

The performance of a Fibre Channel HBA is often measured using two common metrics. One is the number of I/O transactions that can be performed per second, referred to as IOPS. The second way to measure performance is the number of bytes of data that can be moved per second, which is measured in MB/s.

When considering the performance of a Fibre Channel HBA, it really makes the most sense to understand its performance characteristics at the working data size used by the applications it will need to support.

Consider, for example, databases such as Oracle and Microsoft SQL Server, which support enterprise applications such as SAP or the transactional applications that make sales possible. Or consider the datastore used by Microsoft Exchange, the backbone of many companies’ e-mail and messaging systems. The Emulex LPe12002 delivers up to 37% more IOPS in the data range most used by these applications compared to the competition (Chart 1).

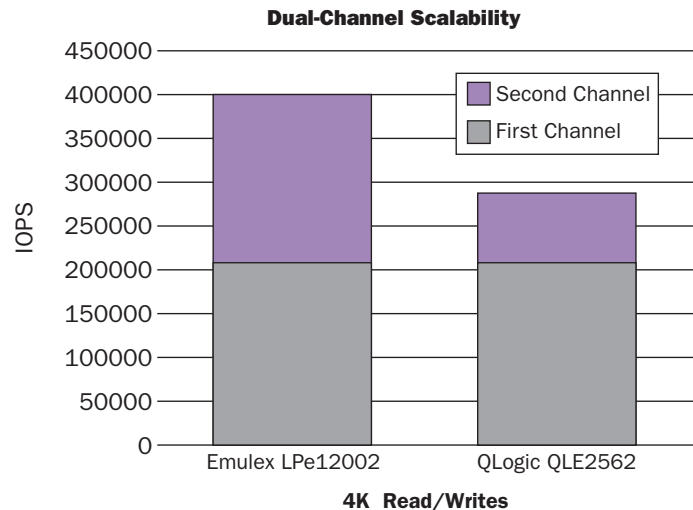


Chart 1 Scalable I/O transaction demonstrates that Emulex delivers up to 127% greater IOPS on the second channel and 37% overall.

(Benchmarks were performed on an HP DL380G5 server running Windows Server 2003 Release 2 [32 bit].)

CPU Efficiency

HBAs can offload the server CPU from managing I/O, thereby increasing the number of server CPU cycles available for application processing. The Emulex LPe12002 excels at offloading transactional I/O workloads (typified by Microsoft Exchange) by providing 33% greater CPU efficiency over the competition. This CPU efficiency advantage translates into increased CPU cycles for server applications and cost savings on server configurations (Chart 2).

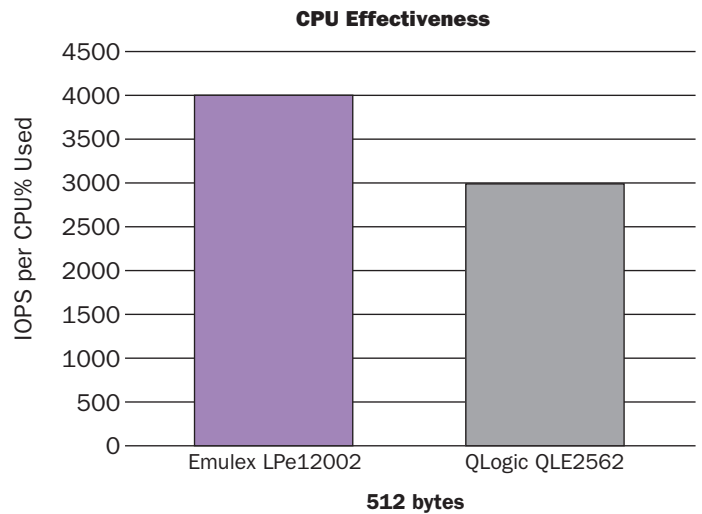


Chart 2 CPU effectiveness shows Emulex LPe12002 HBA with 33% greater efficiency.

(Benchmarks were performed on a Dell R805 server running Windows Server 2003 Release 2 [32 bit].)

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Making Every Port Count

When customers purchase a dual-channel HBA, they expect that they will get the advertised throughput through both ports. Some competing 8Gb/s Fibre Channel HBAs deliver optimum throughput through only one port, with performance degrading significantly through the second port. This cripples the performance of the server in which they are placed, as well as wasting space, electrical power and cooling capacity. The performance difference can be clearly seen in the following charts.

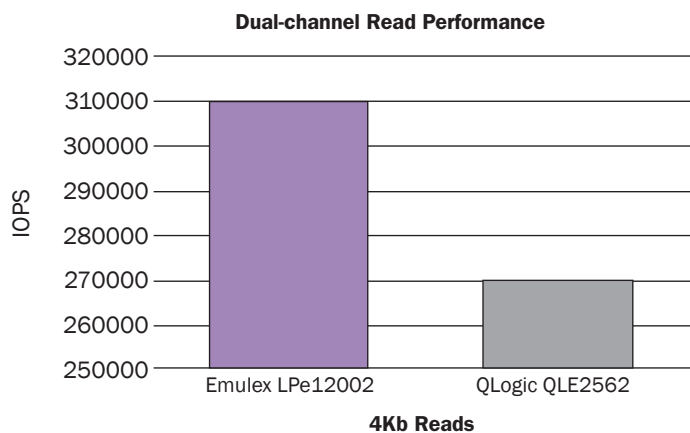


Chart 3 4Kb read I/O tests show 15% greater transaction performance.

(Benchmarks were performed on an HP DL380G5 server running Windows Server 2003 Release 2 [32 bit].)

These performance charts* show that the Emulex LPe12002 provides throughput that most closely utilizes the full performance of 8Gb/s Fibre Channel and the PCI Express bus. In fact, it exceeds the competition by over 140K IOPS in read transactions (Chart 3), and by 115MB/s in full-duplex operations (Chart 4), when measured at the data sizes most often used by business applications. The Emulex full-duplex performance in Chart 4 is significant since it is accomplished at 256Kb data block size, the large block data size used frequently by data backup applications. When required to perform full duplexing, in fact, the competitor's 8Gb/s HBA delivers no full duplex throughput advantage over a single-channel HBA. The Emulex dual-channel LPe12002 8Gb/s HBA offers the highest data throughput performance available for high-performance Fibre Channel storage computing needs.

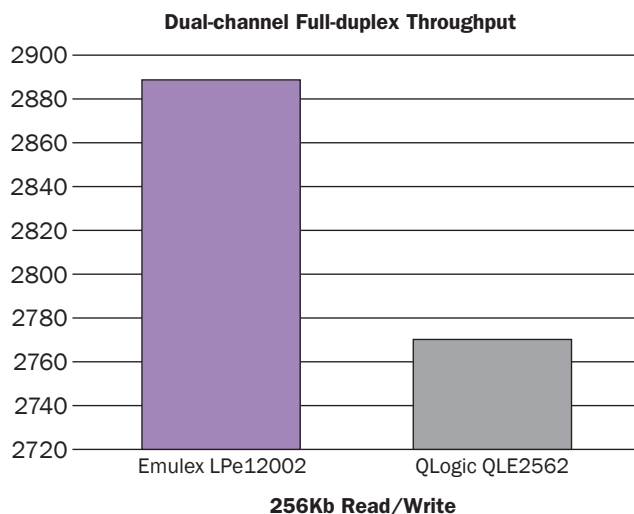


Chart 4 Concurrent full-duplex throughput of 8Gb/s dual-channel HBAs shows 115MB/s more bandwidth. (Benchmarks were performed on an HP DL380G5 server running Windows Server 2003 Release 2 [32 bit].)

Conclusion

When evaluating HBAs for a demanding data center environment, customers need to carefully examine how the HBAs will perform under business conditions, running actual business applications. Customers should carefully evaluate the conditions under which performance tests are run, as well as the design characteristics of the HBA, to ensure the HBA delivers the throughput needed for their applications.

The Emulex LPe12002 provides greater bandwidth, significant transactional performance advantages, superior second-channel scalability and better CPU efficiency compared to the competition. The Emulex dual-channel LPe12002 8Gb/s HBA offers the highest data throughput performance required for today's high-performance Fibre Channel storage computing needs.

Key Messages

Emulex LPe12002 8Gb/s PCIe 2.0 Fibre Channel HBAs offer the highest performance for critical business applications over the QLogic QLE2562:

- 127% better second channel scalability as measured in IOPS
- 37% greater total IOPS when saturating both channels
- 33% more effective CPU utilization
- 15% greater transaction performance
- 115MB/s more bandwidth

* All performance results used in these comparisons were made on commonly available server and storage hardware. The Emulex LPe12002 HBA used the latest HBA driver and firmware available to OEM customers. HBA drivers for competitor's HBAs were the latest publicly available as of March 15, 2008, and all parameters are set to factory defaults.

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