

QLogic 2500 Series FC HBAs Accelerate Application Performance

QLogic 8Gb HBAs: “Planning for Future Requirements”—8Gb Performance Meets the Needs of Next Generation Data Centers

Key Findings

Support for increased workloads, acceleration of application performance, and meeting critical elements of overall SAN performance is key in the selection and deployment of an 8Gb HBA with the right architecture to scale and support robust databases, mail servers, and secondary storage.

- **Microsoft Exchange seats**

- Driving Microsoft Exchange-like I/O loads in an attempt to saturate the HBAs showed **68 percent higher performance** with the 8Gb HBA over the 4Gb HBA.
- The QLogic 2500 Series 8Gb FC HBA provided a **26 percent higher backup performance** over the 4Gb HBA with 40 threads per storage group using Microsoft Exchange 2007.

- **D2D backup**

- Using NetBackup 6.5, there was a **100 percent higher backup performance** with the 8Gb HBA over the 4Gb HBA.
- Using NetBackup 6.5, it took **half the time (50 percent) to backup** 14GB of data using the 8Gb HBA versus the 4Gb HBA.

- **Oracle Applications**

- Using best-in-class Oracle and Intel® Stoakley Quad Core system, the 8Gb HBA was up to **90 percent faster** than the 4Gb HBA testing Online Transaction Processing (OLTP) with random and small 100 percent reads.
- When testing the Data Warehousing Application workloads, the 8Gb HBA was up to **102 percent faster** than the 4Gb HBA.

Executive Summary

It is imperative to deploy a scalable architecture to meet the ever-growing requirements of Storage Area Networks (SANs). The QLogic 2500 Series 8Gb Fibre Channel (FC) Host Bus Adapter (HBA) meets the need for high performance to support the volume of data or throughput (measured in MBps) and the load of data requests (measured by IOPS). Today's SANs requires increased performance supporting common enterprise applications such as database, mail servers, and secondary storage.

Without adequate performance for applications, productivity will be impacted; the loss of efficiency will directly affect revenue. The QLogic 2500 Series 8Gb FC HBA increases data throughput over the previous

generation 4Gb HBA, providing applications additional performance for future needs. Common enterprise applications must operate perfectly and provide sustained performance when demand peaks.

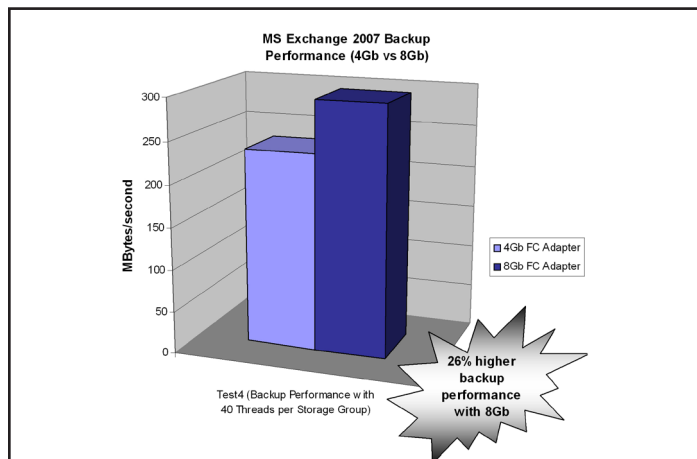
This white paper focuses on the performance benefits of the QLogic 2500 Series 8Gb FC HBA over the 4Gb technology for key applications and its scalability to meet the demands of today's and tomorrow's applications. This paper also shows how QLogic's 8Gb HBA performs with Microsoft® Exchange seats as well as with the high-speed requirements of Disk to Disk (D2D) backup, disaster recovery, and Oracle® applications.

8Gb Exchange Advantages

Microsoft Exchange is one of the business critical applications in small, medium, and large enterprises. It is critical for IT Managers to go to great lengths to ensure delivery on the guaranteed uptimes, scalability, and performance of the Exchange services provided. For most businesses, a messaging system is one of the mission-critical tools for effective and fast communication. As heavier demands occur in the data centers, the SAN must meet minimum business requirements for higher performance.

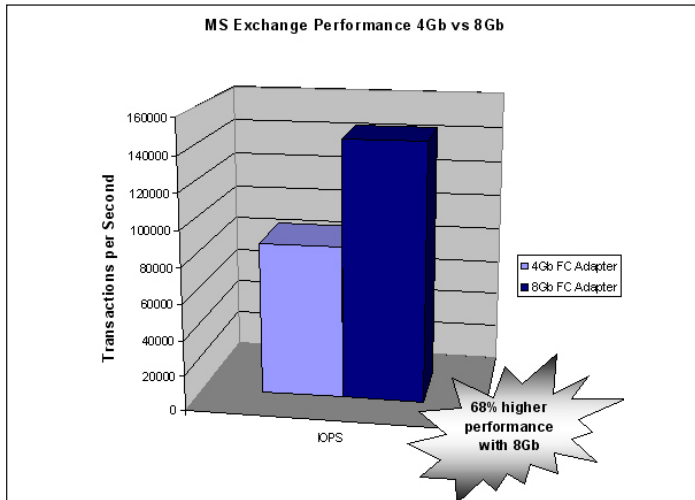
The capabilities of the QLogic 2500 Series 8Gb FC HBA continues the unsurpassed performance provided by QLogic Series HBAs. The 8Gb HBA offers increased performance and higher efficiency over 4Gb, which in turn supports additional Exchange Seats. The improved level of performance offered by 8Gb will become increasingly necessary as the I/O performance required for database backups, restores, and e-mail volumes increase.

QLogic has proved its scalability and performance superiority over its competitors, making it the right choice for exchange administrators. QLogic demonstrates the advantages of the 8Gb infrastructure with Exchange. The tests described in this paper were conducted with Microsoft's Jetstress utility. Jetstress has various options to generate the most commonly used data patterns of Microsoft Exchange. The tests performed were Disk Performance, Mail Box profiling, and Microsoft Exchange database backups. The following figure shows a performance increase of 26 percent using 8Gb HBAs over 4Gb HBAs, utilizing 40 threads per storage group.



Microsoft Exchange Backup

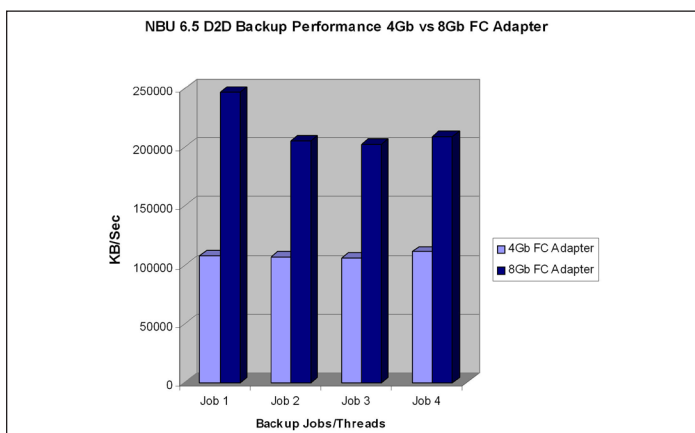
QLogic continues to provide scalability and performance as demonstrated with the Iometer in the following figure, identifying the through-put performance differences between the QLogic 4Gb and 8Gb HBAs. Iometer was configured to place the maximum possible load on the 4Gb and 8Gb HBA. As customers purchase and utilize the 8Gb HBA and integrate into 8Gb SANs and infrastructure, they expect optimum throughput through both channels.



Microsoft Exchange Measured by IOmeter

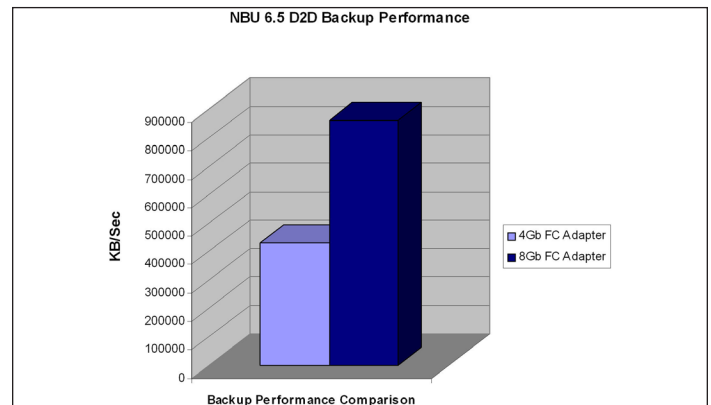
Disk to Disk (D2D) Backup

The introduction of the QLogic 2500 Series 8Gb FC HBA continues to reduce the time required to back up large application databases to secondary storage. Tape continues to be the preferred medium for long-term, off-site archival storage of data, but Virtual Tape Library (VTL) and D2D continue to grow and users continue to look for efficiencies to insure that the data is “backed-up”. The amount of data that organizations need to archive is constantly increasing, due to disaster recovery support, immediate backups, and government regulations requiring stored data. 8Gb provides robust, high speed FC performance that reduces the backup window and disaster recovery time. The following figure shows the performance increase between 8Gb and 4Gb backup performance.



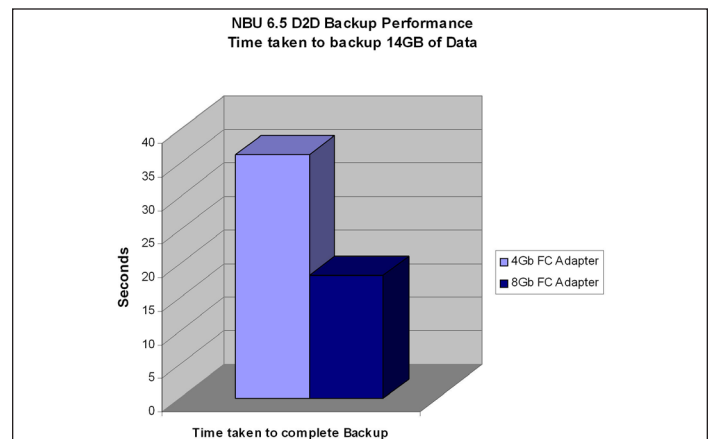
Backup Performance, 4Gb versus 8Gb

Deploying 8Gb Fibre Channel today prepares the data center to take advantage of reduced backup windows and data-migration in D2D and data replication environments. The added throughput also alleviates pressure caused by sustained data growth rates and eliminates bottlenecks in the SAN. The following figure illustrates an increase of 100 percent in backup performance from 4Gb to 8Gb.



D2D Backup Performance

As shown in the following figure, the performance increase results in decreased D2D backup time. The illustration shows how the back-up windows are halved at every technology transition, which reduces the Total Cost of Ownership (TCO) by building higher efficiencies in data centers, decreasing the time it takes for backup.



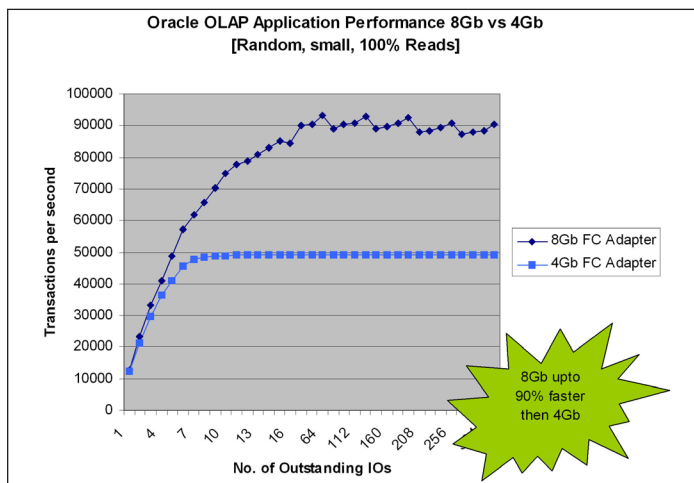
Time to Backup 14GB of Data

8Gb Oracle Advantages

To test the scalability of the QLogic 2500 Series 8Gb FC HBA, the comparison between the 4Gb and 8Gb was tested using OLTP testing, Data Warehousing, and Oracle Web applications. The tests demonstrate 8Gb HBA functionality and its ability to scale to provide greater performance supporting Oracle Applications, in turn demonstrating the advantages of 8Gb SANs.

OLTP applications are high throughput, insert/update-intensive. They are typical for companies that have large transaction processing applications, such as airline ticketing, large order-entry, and banking applications. OLTP is the most common workload in the enterprise, so it provides a good indication of the HBA's scalability in a production setting. The typical applications of Online Analytical Processing (OLAP) are in business reporting for sales, marketing, Business Performance Management (BPM), budgeting and forecasting, financial reporting, and planning.

The following figure shows a 90 percent performance increase in OLAP application performance using 8Gb over 4Gb.

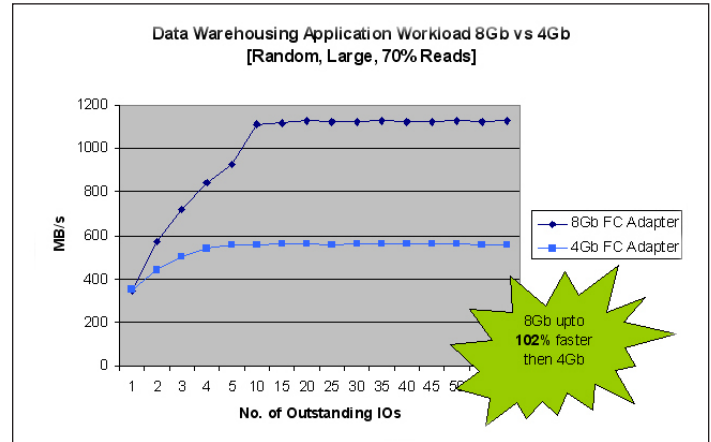


OLAP Application Performance

Performance of the QLogic 2500 Series 8Gb FC HBA versus the QLogic 2400 Series 4Gb FC HBAs was measured using the rate at which I/O requests are serviced (IOPS). Higher IOPS values denote greater throughput and a higher level of performance.

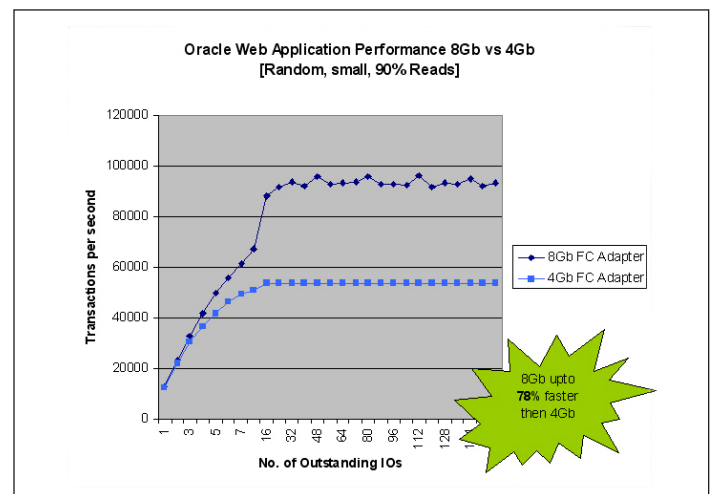
Data Warehousing is critical to maintaining good data warehouse performance with an increase in data volume and change, while maintaining cost control. The QLogic 2500 Series 8Gb FC HBA provides for greater throughput, providing an increase in the volume required. Typically, 30 percent of the data kept in data warehouses is actively used. Maintaining large amounts of inactive data in a data warehouse can significantly compromise performance in terms of query processing and administrative operations such as index reorganization, batch process execution, and

backups. The following figure shows a 100 percent increase from 4Gb to 8Gb supporting high throughput, insert/update-intensive workloads that are typical for companies with large transaction processing applications.



Data Warehousing

Most database-backed Web applications have high throughput requirements and are read-intensive, but not exclusively so. Web workloads mix a variety of content and data-rich applications ranging from e-commerce and banking applications to Customer Relationship Management (CRM) and self-service intranet applications. The following figure shows a 78 percent increase from 4Gb to 8Gb supporting high throughput in support of Oracle Web Applications.

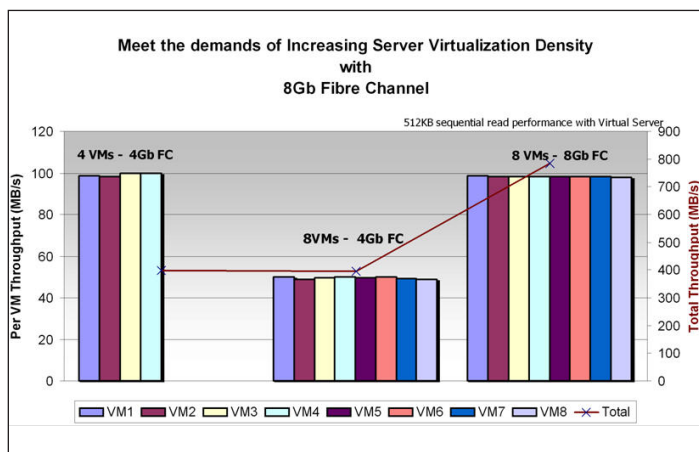


Oracle Web Applications

Oracle Web applications demand the highest levels of performance from their database servers and storage infrastructure. To satisfy this demand, organizations are making the transition to 8Gb Fibre Channel SANs, and IT decision makers are under pressure to select the right components to ensure a cost-effective and scalable solution. The QLogic 2500 Series 2500 8Gb FC HBA provides a critical element of overall SAN performance in the selection and deployment of the right architecture. With the introduction of multi-processor CPUs coupled with virtualization technologies, high performance database solutions need to be complemented with 8Gb high performance and scalable I/O connectivity.

Virtual Server Workloads

QLogic 8Gb FC HBAs meet the demand of increased virtual server density. With the increased throughput in the data center, the virtual server workload capability is also increased. As illustrated by the following chart, there is a two-fold increase in the amount of workload that can be supported with the QLogic 8Gb HBA versus the QLogic 4Gb HBA.



Summary and Conclusion

QLogic continues to be the industry leader in delivering high-performance I/O solutions to data center customers. The performance, IOPS, and throughput of the QLogic 2500 Series 8Gb FC HBA is the best in class and provides an unprecedented level of performance, superior scalability, and enhanced reliability that exceeds the requirements for next generation data centers. As 2Gb and 4Gb transition to 8Gb, increasing performance is required to meet the ever increasing application requirements in SAN environments.

The capability of scaling adequately to handle bandwidth requirements, not only on the server side but also on the storage array interface, is key to the success of next generation data centers: QLogic 2500 Series 8Gb FC HBAs can scale to meet these requirements. The results of this comparative study illustrate that QLogic 2500 Series 8Gb FC HBAs can meet the IT requirements of server virtualization, lower power, and efficiency in the data center.

The changing dynamics of the data center are overwhelming, and the expectations for continuously improving efficiencies (more for less), reduced response times, and enhanced user-experience breed the deployment of killer apps. Infrastructure and economic dynamics drive the need for denser power optimized solutions, but increase the need for higher performance. Data center infrastructure must balance addressing these emerging challenges and protecting the current investments. While enterprises must deploy a scalable architecture to meet future challenges, they must also ensure complete backward compatibility, optimal costs, and manageability.

In conclusion, the QLogic 2500 Series 8Gb FC HBAs increase productivity with:

- **Microsoft Exchange seats**
 - Driving Microsoft Exchange-like I/O loads in an attempt to saturate the HBAs showed **68 percent higher performance** with the 8Gb HBA over the 4Gb HBA.
 - The QLogic 2500 Series HBA provided a **27 percent higher backup performance** with the 8Gb HBA over the 4Gb HBA with 40 threads per storage group using Microsoft Exchange 2007.
- **D2D backup**
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 - Using NetBackup 6.5, there was a **50 percent decrease in time taken to backup** 14Gb of data using the 8Gb HBA versus the 4Gb HBA.
- **Oracle Applications**
 - Using best-in-class Oracle and Intel Stoakley Quad Core system, the 8Gb HBA was up to **90 percent faster** than the 4Gb HBA testing OLTP with random and small 100 percent reads.
 - Testing Data Warehousing Application random and large workloads, the 8Gb HBA was up to **102 percent faster** than the 4Gb HBA.

The superior scalability advantages demonstrated in these tests deliver practical benefits in real-life applications used by enterprise IT users:

- **Lower hardware TCO**, especially with emerging cost saving applications such as server virtualization and servers with multi-core processors. QLogic HBAs provide enough IOPS and throughput to account for the high bandwidth requirements for server virtualization, D2D, and remote mirroring applications.
- **Protect your investment** by upgrading your SAN infrastructure in the data center with 8Gb QLogic HBAs for higher performance and scalability, backward compatibility, and forward compatibility for next generation data centers.
- **Deliver true performance advantages** in enterprise applications such as Microsoft Exchange, Oracle, and D2D. Minimize the increasing requirements of killer apps such as Web 2.0 and video on demand.

When retrieving data from a digital film library, executing large database queries (such as data mining), or for sequential processing of one or more large files, QLogic is the Fibre Channel HBA of choice. QLogic continues to demonstrate and deliver the highest performing HBA product: the QLogic 8Gb 2500 Series FC HBA “Hauls Apps”.

Disclaimer

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