QLOGIC®

QLE2694 and QLE2694L

Enhanced Gen 5, Quad-Port, 16Gbps Fibre Channel-to-PCIe Adapter

- Industry's first native quad-port solution supporting 16Gbps Enhanced Gen 5 Fibre Channel technology

- Four ports of 16Gbps delivers 64Gbps aggregate bandwidth

- Up to 2.6 million IOPS fuel high performance in AFAs and high-density virtualized environments

- Enhanced reliability, diagnostics and accelerated deployment powered by QLogic StorFusion™ technology

- Port isolation design offers consistent and reliable performance on each port

OVERVIEW

The QLE2694 Adapter is the industry's first Enhanced Gen 5, Quad-Port, 16Gbps Fibre Channel Adapter, boasting industry-leading native Fibre Channel performance with extremely low CPU usage with full hardware offloads.

ENHANCED GEN 5

QLogic®'s unique Enhanced Gen 5 Fibre Channel technology provides the industry's first native quad-port 16Gbps adapter, available in both low-profile (QLE2694L) and standard height (QLE2694) form factors. QLogic's Enhanced Gen 5 solution offers higher per-port performance (up to 650K IOPS) with lower power consumption (3W per port). In addition, QLogic StorFusion technology delivers streamline provisioning, guaranteed Quality of Service (QoS), improved resiliency while addressing the needs of IT organizations that require reliability, integrated management and guaranteed network performance.

Enhanced Gen 5 technology resolves data center complexities by enabling a storage network infrastructure that supports powerful virtualization features, application-aware services, and simplified management. The QLE2694 Adapter provides advanced storage networking features capable of supporting the most demanding virtualized and private cloud environments while fully leveraging the capabilities of high-performance 16Gbps Fibre Channel and all-flash arrays (AFAs). Powerful management

tools automate and simplify SAN provisioning to help reduce cost and complexity, while the unmatched 16Gbps performance eliminates potential I/O bottlenecks in today's powerful multiprocessor, multicore servers.

SUPERIOR PERFORMANCE

The QLE2694 Adapter provides industry-leading application performance by up to 2.6 million I/O transactions per second for physical, virtual, and private cloud environments. QLogic adapters deliver the best throughput performance in virtualized and non-virtualized environments with 64Gbps of aggregate throughput, per-second. Integrated QLogic StarPower™ technology delivers dynamic power management, which ensures that the PCIe® host bus link uses the minimum number of PCIe lanes to meet the required bandwidth.

VIRTUALIZATION OPTIMIZED

The QLE2694 Adapter supports standards-based virtualization features. Support for N_Port ID virtualization (NPIV) enables a single Fibre Channel adapter port to provide multiple virtual ports for increased network scalability. NPIV allows a single Fibre Channel adapter port to participate in multiple virtual fabric domains for improved availability. In addition, the 16Gbps line rate per physical port delivers unmatched storage performance to maximize the number of virtual machines per physical server.

QLOGIC STORFUSION TECHNOLOGY

QLogic's 16Gbps, Enhanced Gen 5 Fibre Channel adapters powered by StorFusion Technology, include advanced capabilities that are enabled when deployed with supported Brocade® switches. By implementing these industry-leading solutions together, SAN administrators can take advantage of enhanced features that improve availability, accelerate deployment, and increase network performance.

Improved Total Cost of Ownership and Reliability

StorFusion technology delivers advanced link diagnostics, which improve availability and support for high performance fabrics. Using the ClearLink diagnostic port (D_Port), administrators can quickly run a battery of automated diagnostic tests to assess the health of links and fabric components.

The QLE2694 Adapter supports link cable beaconing (LCB), which enables administrators to visually identify both ends of a physical link. In a large data center with hundreds of ports and cables to manage, a simple command turns on port LED beacons on both ends of a link cable connection. Administrators can use LCB to quickly identify connection peer ports without tracing the cable.

QLogic technology includes the read diagnostic parameters (RDP) feature, which provides optics and media diagnostics. From any point in the fabric, an administrator can use RDP to easily discover and diagnose link related errors and degrading conditions on any N_Port-to-F_Port link.

With ClearLink diagnostics, LCB, and RDP, fabric deployment time is reduced. Tedious manual troubleshooting methods are eliminated, thus saving thousands of man-hours in enterprise environments.

Rapid Server Deployment and Orchestration

StorFusion technology includes fabric pre-provisioning services that enable servers to be quickly deployed, replaced, and moved across the SAN. By leveraging fabric-assigned port world wide name (FA-WWN) and fabric-based boot LUN discovery (F-BLD) capabilities, the creation of zones, LUNs, and other services can be completed before the servers arrive on site—eliminating time consuming, manual tasks that typically delay server deployment.

Performance SLA Enforcement with VM-level Quality of Service

Network performance can be dramatically improved by implementing the industry standard class-specific control (CS_CTL) based frame prioritization quality of service (QoS), which helps to alleviate network congestion. QLogic adapters with StorFusion technology, when connected to supported SAN fabrics, and targets, enable the classification of traffic as it arrives at the switch, and is then processed on the basis of configured priorities. Traffic can be prioritized for delivery or subjected to limited delivery options. As a result, mission critical workloads can be assigned a higher priority than less time-sensitive network traffic for optimized performance.

Higher Resiliency and Performance with Automatic Error Recovery

Forward error correction (FEC) improves performance and link integrity to support higher end-to-end data rates by automatically recovering from transmission errors. FEC automatically detects and recovers from bit errors, which results in higher availability and performance.

SIMPLIFIED MANAGEMENT

QLogic's unified management application, QConvergeConsole® (QCC), provides single-pane-of-glass management across generations of QLogic Fibre Channel adapters. In addition, QLogic supports all major APIs for deployment flexibility and integration with third-party management tools, including VMware® vCenter™ and Brocade Network Advisor.

HIGH AVAILABILITY AND RELIABILITY

QLogic Enhanced Gen 5 adapters continue the tradition of providing complete port-level isolation across its Fibre Channel ASIC controller architecture. This architecture, unlike other vendor solutions, provides independent function, transmit/receive buffers, an on-chip CPU, DMA channels, and a firmware image for each port. These features enable complete port-level isolation, prevent errors and firmware crashes from propagating across all four ports, and provide predictable and scalable performance across all ports. The QLogic architecture delivers ultimate reliability to meet the needs of mission-critical enterprise applications, with lower power and fewer CPU cycles while maintaining peak performance.

In addition, overlapping protection domains (OPDs) ensure the highest level of reliability as data moves to and from the PCI bus and Fibre Channel network.

The QLE2694 Adapter also provides end-to-end data integrity with support for T10 Protection Information (T10 PI), which prevents the risk of silent data corruption in environments running Oracle® Linux® with the Unbreakable Enterprise Kernel.

LEADERSHIP, CONFIDENCE, AND TRUST

The QLE2694 Adapter is compatible with the same Fibre Channel software driver stack that has been tested and validated across all major hardware platforms, all major hypervisors and operating systems. The adapters are backward compatible with existing 4Gbps and 8Gbps Fibre Channel infrastructure, leveraging existing SAN investments.

QLogic is the undisputed leader in Fibre Channel adapters, with over 20 years of experience and multiple generations of Fibre Channel products that have been qualified by all major server OEMs in multiple form factors. QLogic owns the most established, proven Fibre Channel stack in the industry with more Fibre Channel ports shipped than any other vendor.

Host Bus Interface Specifications

Bus Interface
- QLE2694: PCI Express Gen3 x8
- QLE2694L: PCI Express Gen 3 x8

Host Interrupts
- INTx and MSI-X

Compliance
- *PCI Express Base Specification*, Rev. 3.1
- *PCI Express Card Electromechanical Specification*, Rev. 3.0
- *PCI Bus Power Management Interface Specification*, Rev. 1.2

Fibre Channel Specifications

Throughput
- 16Gbps line rate per port (maximum)

Logins
- Support for 2,048 concurrent logins and 2,048 active exchanges
- Expandable to 32K concurrent logins and 32K active exchanges (with DDR3 or host memory)

Port Virtualization
- NPIV

Compliance
- *SCSI-3 Fibre Channel Protocol (SCSI-FCP)*
- *Fibre Channel Tape (FC-TAPE) Profile*
- *SCSI Fibre Channel Protocol-2 (FCP-2)*
- *Second Generation Fibre Channel Generic Services (FC-GS-2)*
- *Third Generation Fibre Channel Generic Services (FC-GS-3)*
- *Fibre Channel Physical Interface 5 (FC-PI5)*

Tools and Utilities

Management Tools and Device Utilities
- QConvergeConsole: a unified management tool (GUI and CLI) that spans generations of QLogic Fibre Channel adapters
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  - QConvergeConsole VMware vCenter Server Plug-in and VMware vSphere™ Web Client Plug-in

Boot Support
- BIOS, UEFI, FCode

APIs
- SNIA HBA API V2
- SMI-S

Operating Systems
- For the latest applicable operating system information, see http://driverdownloads.qlogic.com.

End-to-End Provisioning and Management Features

The following features require a supported Brocade switch running Fabric OS version 7.4.0a or later.

Performance
- QoS CS_CTL
- FEC

Diagnostics
- ClearLink D_Port
- LCB
- RDP

Deployment and Management
- FA-WWN
- F-BLD
- Fibre Channel Ping
- Fibre Channel Trace Route
- FDMI Enhancements

Physical Specifications

Ports
- Quad-port, 16Gbps Fibre Channel

Form Factor
- QLE2694: Standard-height PCIe card (6.6 inches x 4.381 inches)
- QLE2694L: Low-profile PCIe card (6.6 inches x 2.731 inches)

Environment and Equipment Specifications

Temperature
- Operating: 0°C to 55°C (32°F to 131°F)
- Storage: –20°C to 70°C (–4°F to 158°F)

Humidity
- Operating: 10% to 90%
- Storage: 5% to 95%

Maximum Cable Distances

Rate	Multi-Mode Optic			
	Cable and Distance (m)			
	OM1	OM2	OM3	OM4
4Gbps	70	150	380	400
8Gbps	21	50	150	190
16Gbps	*	35	100	125

* Not supported

Agency Approvals

Safety
- US
- Canada
- Europe

EMI and EMC (Class A)
- US
- Canada
- Europe
- Australia/New Zealand
- Japan
- Korea

Ordering Information

QLE2694-SR-CK (Quad Port)
- Ships in an individually packed box with a standard-height bracket installed
- Ships with SR optical transceivers installed

QLE2694L-CK (Quad Port)
- Ships in an individually packed box with a low-profile bracket installed
- Ships with soldered small form factor (SFF) optical transceivers installed

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