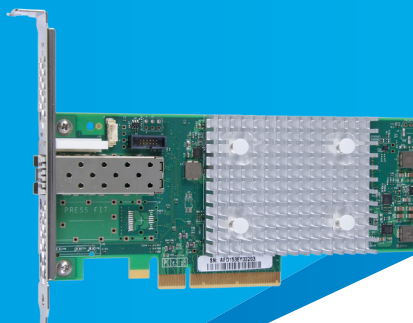


QLE2690/2690L-DEL and QLE2692/2692L-DEL

Single and Dual-port 16Gb Fibre Channel Adapters



- The latest and most advanced 16Gb Fibre Channel HBA from QLogic, available in single and dual-port versions
- Up to 1.3 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 deterministic and scalable performance on each port

OVERVIEW

The QLogic® QLE269x/269xL-DEL Single and Dual-port 16Gb Fibre Channel (FC) Host Bus Adapters (HBAs) boast industry leading native FC performance with extremely low CPU usage with full hardware offloads.

16Gb FC TECHNOLOGY

The QLogic solution offers higher per-port performance (up to 650K IOPS) with low power consumption compared to the older generation of FC products. In addition, QLogic StorFusion™ technology delivers streamlined provisioning, guaranteed quality of service (QoS), and improved resiliency while addressing the needs of IT organizations that require reliability, integrated management, and guaranteed network performance.

The 16Gb FC technology resolves data center complexities by enabling a storage network infrastructure that supports powerful virtualization features, application-aware services, and simplified management. The QLE269x/269xL-DEL Adapters provide advanced storage networking features capable of supporting the most demanding virtualized and private cloud environments while fully leveraging the capabilities of high-performance 16Gb FC 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 QLE269x/269xL-DEL Adapters can accelerate mission-critical enterprise applications by delivering up to 1.3 million IOPS for physical, virtual, and private cloud environments. QLogic adapters deliver the best storage application performance in virtualized and non-virtualized environments with support for up to 650K I/O transactions per-second per-port.

VIRTUALIZATION OPTIMIZED

The QLE269x/269xL-DEL Adapters support standards-based virtualization features. Support for N_Port ID virtualization (NPIV) enables a single FC adapter port to provide multiple virtual ports for increased network scalability. In addition, the 16Gbps line rate per physical port delivers unmatched storage performance to maximize the number of virtual machines (VMs) per physical server.

QLOGIC STORFUSION TECHNOLOGY

QLogic FC Adapters, powered by StorFusion technology, include advanced capabilities that are enabled when deployed with supported Brocade® switches. By combining these industry-leading solutions, 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 QLE269x/269xL-DEL Adapters support link cable beacon (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 detailed port, media, and optics 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.

The extensive suite of diagnostic tools maximize uptime and performance, allowing organizations to address problems before they impact operations.

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 the 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 QoS

Network performance can be dramatically improved by implementing the industry-standard class-specific control (CS_CTL)-based frame prioritization QoS, which helps alleviate network congestion. When QLogic adapters with StorFusion technology are connected to supported SAN fabrics, traffic is classified 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 without re-sending the frames. FEC automatically detects and recovers from bit errors, which results in higher availability and performance.

SIMPLIFIED MANAGEMENT

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

HIGH AVAILABILITY AND RELIABILITY

QLogic FC Adapters continue the tradition of providing complete port-level isolation across their FC controller architecture. This architecture, unlike other vendor solutions, provides independent function, transmit and 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 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, all 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 FC network.

The QLE269x/269xL-DEL Adapters also provide 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 QLE269x/269xL-DEL Adapters are compatible with the same FC software driver stack that has been tested and validated across all major hardware platforms and all major hypervisors and OSes. The adapters are backward compatible with existing 4Gb FC (4GFC) and 8GFC infrastructure, leveraging existing SAN investments.

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

Host Bus Interface Specifications

Bus Interface

- QLE2690/2690L-DEL and QLE2692/2692L-DEL: PCI Express® (PCIe®) 3.0 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

Port Virtualization

- N_Port ID 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 FC Adapters
 - VMware vCenter Server Plug-in
 - VMware vSphere™ Web Client Plug-in

Boot Support

- BIOS, Unified Extensible Firmware Interface (UEFI)

APIs

- SNIA HBA API V2
- SMI-S

Operating Systems

- For the latest applicable operating system information, see <http://support.dell.com/>.

End-to-End Provisioning and Management Features

The following features require a supported Brocade switch running Fabric OS version 7.3.0a or later.

Performance

- QoS CS_CTL
- FEC

Diagnostics

- ClearLink D_Port
- LCB
- RDP

Deployment and Management

- FA-WWN
- F-BLD
- FC Ping
- FC Traceroute
- Fabric device management interface (FDMI) enhancements

Physical Specifications

Ports

- QLE2690-DEL and QLE2690L-DEL: single-port FC
- QLE2692-DEL and QLE2692L-DEL: dual-port FC

Form Factor

- Low-profile PCIe card (6.6 inches × 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

- UL 60950-1; CSA C22.2

Europe

- TUV EN60950-1; TUV IEC 60950-1; CB Certified

Agency Approvals—EMI and EMC (Class A)

US/Canada

- FCC Rules, CFR Title 47, Part 15, Subpart Class A; Industry Canada, ICES-003: Class A

Europe

- EN55022; EN55024; EN61000-3-2; EN61000-3-3

Japan

- VCCI: Class A

New Zealand/Australia

- AS/NZS: Class A

Korea

- KC-RRA Class A

Taiwan

- BSMI CNS 13438

Ordering Information**QLE2690-DEL-BK (403-BBMP)**

- Single-port 16Gb FC HBA
- Ships in a bulk packed box with standard-height bracket installed
- Ships with SR optical transceivers installed

QLE2690L-DEL-BK (403-BBMW)

- Single-port 16Gb FC HBA, low profile
- Ships in a bulk packed box with low-profile bracket installed
- Ships with SR optical transceivers installed

QLE2692-DEL-BK (403-BBMQ)

- Dual-port 16Gb FC HBA
- Ships in a bulk packed box with standard-height bracket installed
- Ships with SR optical transceivers installed

QLE2692L-DEL-BK (403-BBMS)

- Dual-port 16Gb FC HBA, low profile
- Ships in a bulk packed box with low-profile bracket installed
- Ships with SR optical transceivers installed



Corporate Headquarters QLogic Corporation 26650 Aliso Viejo Parkway Aliso Viejo, CA 92656 949-389-6000

International Offices UK | Ireland | Germany | France | India | Japan | China | Hong Kong | Singapore | Taiwan | Israel

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