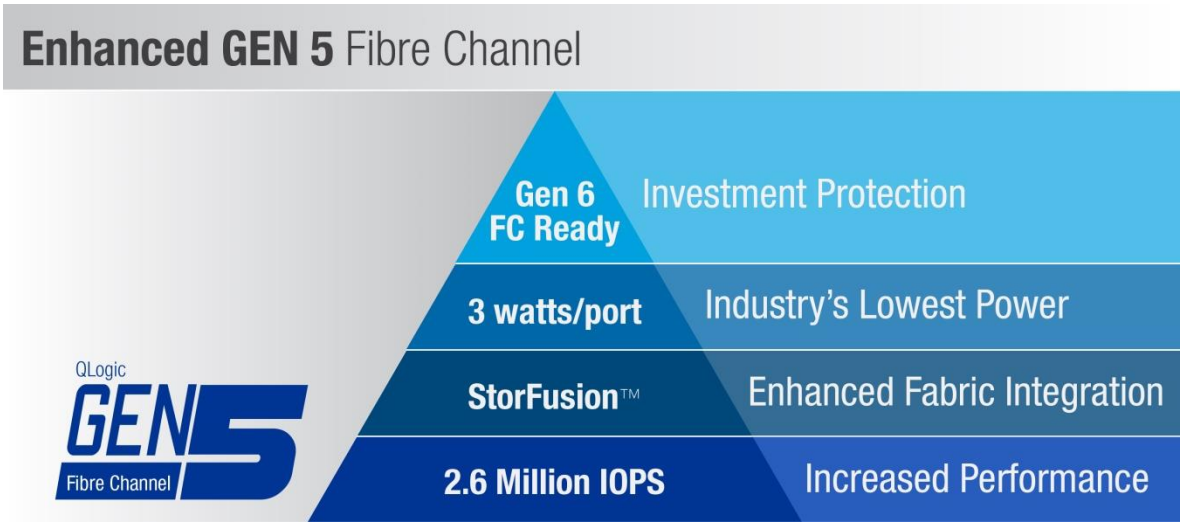
QLogic Enhanced Gen 5 Fibre Channel Solution Brief

Evaluation report prepared under contract with QLogic

Executive Summary

The IT industry is experiencing escalating demands on its storage infrastructure due to increases in application requirements and virtual machine (VM) density, faster processors, adoption of solid-state storage and continual data growth. Fibre Channel (FC) storage area networks (SANs) have been the workhorse of storage networking infrastructure in enterprise datacenters because of their reliable and consistent performance.

FC technology has progressed through five generations of speeds and features and has provided datacenters with a robust, enterprise-grade storage interconnect. Today's enterprise datacenters typically demand proven technology and need high-bandwidth storage solutions to satisfy the increasing demands of high density virtual server deployments, database workloads and other I/O-intensive applications. To get ready for the next generation, QLogic is releasing its **Enhanced Gen 5 (16Gb)** FC Adapters.



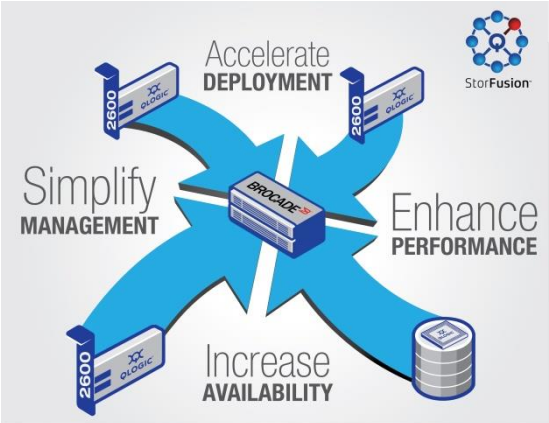
QLogic Enhanced Gen 5 FC

The QLogic family of Enhanced Gen 5 FC Adapters are ideal for enterprise data centers that require the ultimate in unsurpassed FC performance, reliability, power utilization, and investment protection. Leveraging a new I/O ASIC, the QLE2690 series of adapters provide the following benefits.

- New levels of performance and scalability: double the VM density, up to 2.6 million IOPS, and full line rate with more than 12000 MB/sec across 16 PCIe 3.0 lanes.
- QLogic StorFusion™ is the result of a joint development effort by Brocade and QLogic to streamline SAN fabric management and performance. It includes:
  - Improved total cost of ownership and reliability with advanced link diagnostics suite
  - Rapid server deployment and orchestration with software-defined dynamic fabric provisioning
  - Performance SLA enforcement with virtual machine-level quality of service
  - Higher resiliency and performance by automatically recovering from errors
- Up to 75% lower power requirements and dynamic power management with QLogic StarPower™ technology
- Field-upgradeable to Gen 6 FC to support full 32 Gbps FC performance (QLE2694U only)

QLogic StorFusion™ Functionality

QLogic Enhanced Gen 5 FC Adapters include QLogic StorFusion that takes advantage of advanced features that improve reliability, accelerate deployment and enhance virtual workload performance.



Fabric Assigned WWN

Before Gen 5 FC, storage administrators had the rather tedious task of maintaining a detailed list of FC World-Wide Names (WWNs) of adapters and the details of WWN membership in the FC zones. A key feature of Enhanced Gen 5 FC adapters is support for the QLogic StorFusion feature Fabric Assigned Port World Wide Name (FA-WWN), whereby an FC fabric can assign the WWN to the adapters rather than having to manually provide adapter FC WWN information. This is especially helpful in deploying large SANs and in the event that an adapter needs to be replaced or upgraded.

Similarly, the FC switch can remember the WWN of the adapter and simply re-use the same WWN when a QLogic Gen 5 FC, Enhanced Gen 5 FC or Gen 6 FC Adapter is replaced or upgraded.

Adapter and Cable Diagnostics

Another feature of QLogic StorFusion and the QLogic Enhanced Gen 5 FC Adapters is support for Brocade ClearLink™ (D_port) diagnostic features available on Brocade FC switches using Remote Diagnostics Protocol (RDP). This cooperation between the FC switch and the FC adapter can automate tests of the ports and cables to help find errors and identify faulty optics.

Another advanced diagnostic capability that participates with Brocade FC switch features is Link Cable Beaconing (LCB). By beaconing the ports on both ends of a physical link, cable identification and management becomes simpler, especially in large SAN environments.

Per Frame Priority

The QLogic Enhanced Gen 5 FC Adapters and QLogic StorFusion support per frame priority and other quality of service (QoS) features. Specifically, supporting the QoS features that are available with Brocade FC switches.

Forward Error Correction

Forward error correction (FEC) improves the reliability of QLogic Enhanced Gen 5 FC Adapters through automatic detection and recovery from bit errors at higher speeds. FEC inserts additional error checking into the data stream that is needed at 16 Gbps and higher speeds to maintain the very low bit error rates required for reliable connections. FEC requires cooperation between the FC adapter and the FC switch.

VM Visibility

N_Port ID Virtualization (NPIV) provides a way to pass virtual WWNs to the guest virtual machines so that these VMs can have their own virtual FC adapter. Because the NPIV WWNs are defined by the administrator, the ranges of WWNs can be planned well in advance of the hardware arrival. Because these are virtual WWNs assigned to the VM, these WWNs move with the VM when the VM is migrated to another physical host. This provides greater flexibility for managing VMs that need access to the FC SAN.

Energy Efficiency

Enhanced Gen 5 FC Adapters incorporate protocol features that have the ability to lower the power consumption of the ports when idle. The QLogic Enhanced Gen 5 FC Adapters operate at approximately 3 watts per port, lowest in the industry.

Performance

Today's storage arrays include solid-state storage, either in a hybrid configuration with hard disk drives or all-flash arrays. The next generation of storage arrays is incorporating faster technologies such as NVM Express (NVMe) and others to drive latency lower than any previous generation of storage and increase the transactional performance. This technology along with new applications such as 4K video, increasing numbers of virtual machines and more are driving the need for higher performance from FC adapters.

The QLE2690 Series of Enhanced Gen 5 Fibre Channel Adapters

The QLE2690 Series is a complete portfolio of single-port, dual-port, and quad-port Enhanced Gen 5 FC adapters:

Model Number	Description
QLE2690	Single-port PCIe 3.0 x8 to 16Gb Fibre Channel Adapter – SFP+
QLE2692	Dual-port PCIe 3.0 x8 to 16Gb Fibre Channel Adapter – SFP+
QLE2694	Quad-port PCIe 3.0 x8 to 16Gb Fibre Channel Adapter – SFP+
QLE2694U	Quad-port PCIe 3.0 x16 to 16Gb Fibre Channel Adapter SFP+ – Gen 6 Fibre Channel Ready
QLE2694L	Quad-port PCIe 3.0 x8 to 16Gb Fibre Channel Adapter – SFF - Low Profile

Gen 6 FC Investment Protection

Investment protection is critical as I/O demands shift. The QLE2694U Quad-Port Enhanced Gen 5 Adapter is uniquely targeted at the storage appliances market because it meets the dynamic needs of high-performance storage arrays today, and can extend the lifetime of the solution with a field-upgrade to 32Gb FC transfer speeds. This allows you to deploy the new technology now and protect your investment over time.

Summary

QLogic Enhanced Gen 5 FC Adapters open up new performance possibilities that can maximize application performance in terms of IOPS, throughput and lower latency, while improvements in management and deployment features make it easier for administrators to implement and scale. Adopting Enhanced Gen 5 FC Adapters today strategically positions IT departments to embrace the future with minimal disruption.

The original version of this document is available at
http://www.demartek.com/Demartek_QLogic_Enhanced_Gen_5_Fibre_Channel_Solution_Brief_2016-03.html
on the Demartek website.