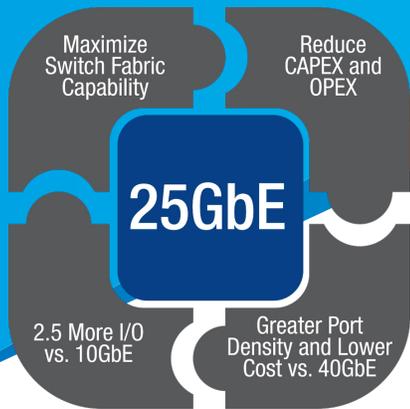


# QLogic FastLinQ 25GbE Intelligent Ethernet Adapters vs. Mellanox Adapters



QLogic® FastLinQ™ QL45000 25GbE adapters provide maximum performance and flexible bandwidth management to optimize virtualized servers and networks

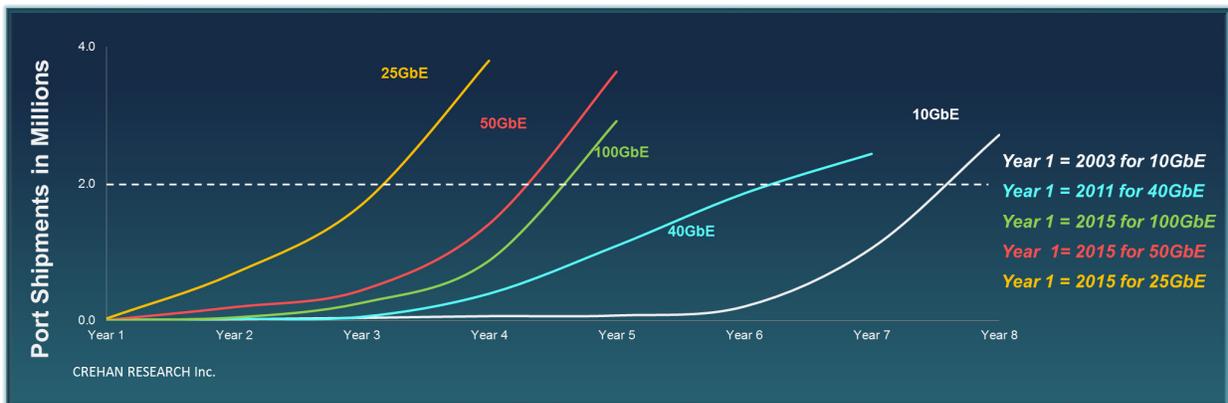
## QLOGIC ADVANTAGES

- Optimize 25GbE ports with switch-independent NPAR and concurrent SR-IOV – partition 25GbE links and allocate network bandwidth to deliver QoS for virtual machines and applications
- Best performance for multi-tenant deployments – 42% higher bidirectional throughput and 37% better CPU efficiency
- Optimize network performance with more RDMA options – RoCE v1, RoCE v2 and iWARP capability
- Reduce OPEX with multi-adapter management – robust platform management across the length and breadth of the data center

## INTRODUCTION

The evolution to new and more powerful servers continues and server virtualization is well established as the way to fully utilize CPU resources. As new servers support higher virtualization ratios, I/O capacity has become one of the critical resources and this is especially the case for private cloud, telco and managed service provider (MSP) deployments.

The transition to 25 Gigabit Ethernet (25GbE) will provide a 2.5X increase in bandwidth when compared to 10GbE and more than twice the port density when compared to 40GbE, without requiring a change in network topology. As shown below, Crehan Research forecasts two million 25GbE adapter ports to be shipped within the next three years. This would be the fastest ramp of any of the recent generations of Ethernet speeds.



Ethernet Adapter/LOM Adoption Curves: Years to Surpass Two Million Ports<sup>1</sup>

<sup>1</sup>Source: Crehan Research, Server-class Adapter and LOM Controller Long-range Forecast, January 2016  
 Note: 10GbE shipment trend estimated from 2003 to 2007 (Year 1 to Year 5)

In addition to increased bandwidth, QLogic FastLinQ QL45000 25GbE adapters can provide many key features that affect both server and network performance. This includes stateless offloads for network virtualization, bandwidth allocation for applications that are running in virtual machines (VMs), and the capability to support multiple RDMA options. This competitive brief highlights important benefits for QLogic FastLinQ QL45000 25GbE adapters when compared to Mellanox® ConnectX-4 Lx EN 25GbE adapters.

## OPTIMIZE 25GBE PORTS WITH SWITCH-INDEPENDENT NPAR AND CONCURRENT SR-IOV

Data centers that use virtualized servers and support private clouds will obviously benefit from increased bandwidth when migrating to 25GbE. However, having more bandwidth is only part of the story. The key is to optimize bandwidth provided to VMs in a way that fully utilizes increased capacity while providing required quality of service (QoS) to critical applications and users. This allows data centers to save capital expenditures (CAPEX) and operating expenditures (OPEX) by reducing the number of servers, network adapters, and network ports.

QLogic FastLinQ QL45000 25GbE adapters support switch-independent NIC partitioning (NPAR), which is a hardware-based method for partitioning an Ethernet port into multiple PCI Express® (PCIe®) physical functions (PFs). Each PF looks like a unique physical port to the host and can be used to allocate bandwidth to individual VMs and optimize live VM migration.

QLogic FastLinQ Ethernet adapters enable switch-independent NIC partitioning that is operating system (OS) agnostic. Many tier-1 server OEMs have adopted QLogic's NPAR technology and added their own differentiation to create OEM-specific versions of NPAR that are tightly integrated with server management applications. This is a powerful endorsement of the value-added benefit that QLogic NPAR provides.

The QLogic implementation of NIC partitioning can also be used concurrently with single root I/O virtualization (SR-IOV) to reduce the number of adapter ports needed to support failover and load balancing on a virtualized host that is using SR-IOV.

The capability to use NPAR to optimize bandwidth utilization and satisfy QoS requirements with QLogic FastLinQ QL45000 25GbE adapters is a critical advantage for virtualized data centers. In comparison, Mellanox ConnectX-4 Lx EN adapters do not support NIC partitioning.

## BEST PERFORMANCE FOR MULTI-TENANT DEPLOYMENTS

The scale of large enterprise and cloud-based, multi-tenant deployments has pushed the limitations of traditional virtual LANs (VLANs), which are restricted to 4096 network IDs. The solution has been the development of network virtualization/tunneling that can support up to 16 million IDs. These technologies include Virtual Extensible LAN (VXLAN), Network Virtualization using Generic Routing Encapsulation (NVGRE) and Generic Network Virtualization Encapsulation (GENEVE)

QLogic FastLinQ QL45000 adapters fully support VXLAN and NVGRE with stateless offloads. This includes the capability to provide complete encapsulation and de-encapsulation for tunneled traffic when supported by hypervisors. QLogic FastLinQ QL45000 adapters are also provisioned to support the OS-agnostic GENEVE standard as it is adopted in 2016.

QLogic conducted a series of benchmark tests to evaluate the relative performance of QLogic FastLinQ QL45000 adapters and Mellanox ConnectX-4 Lx EN adapters using VXLAN on VMware ESX 6.0. These tests measured throughput and CPU efficiency for transmit, receive, and bidirectional traffic across a wide range of message sizes. As shown in the following charts, QLogic FastLinQ QL45000 had better performance in five of the six tests.

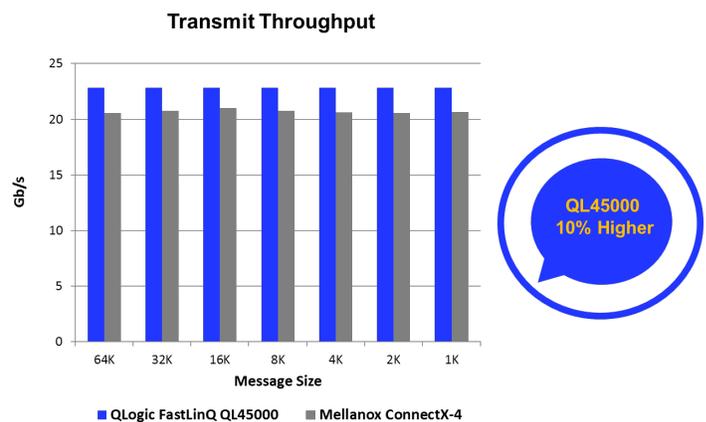


Chart 1: VXLAN Offload with VMware ESX 6.0 One Port – Transmit Throughput

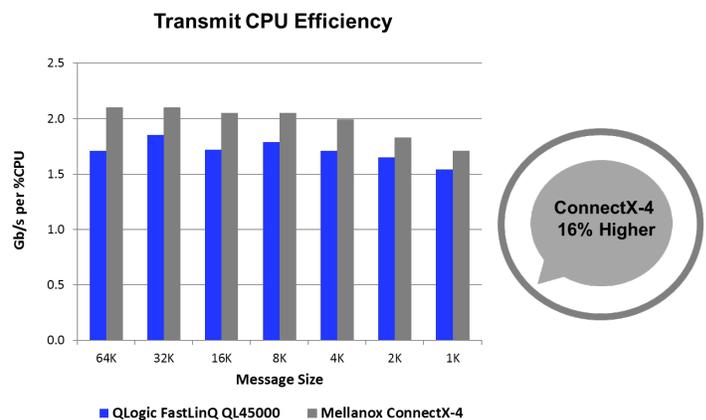


Chart 2: VXLAN Offload with VMware ESX 6.0 One Port – Transmit CPU Efficiency

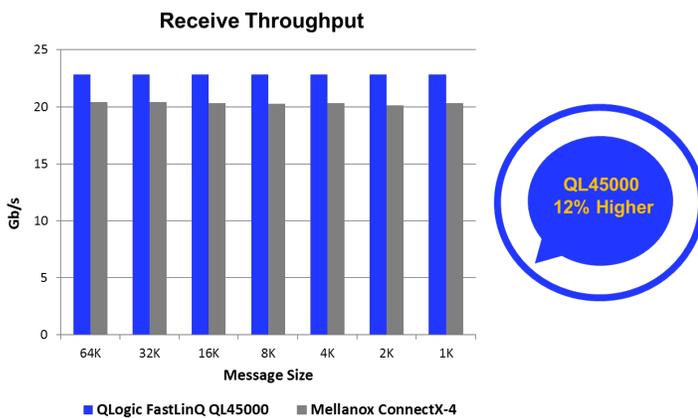


Chart 3: VXLAN Offload with VMware ESX 6.0 One Port – Receive Throughput

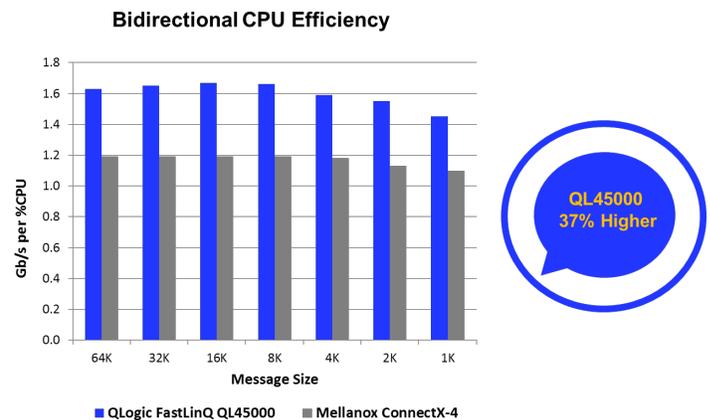


Chart 6: VXLAN Offload with VMware ESX 6.0 One Port – Bidirectional CPU Efficiency

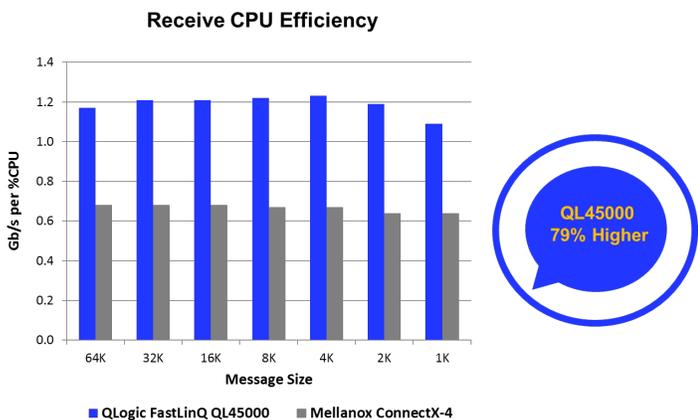


Chart 4: VXLAN Offload with VMware ESX 6.0 One Port – Receive CPU Efficiency

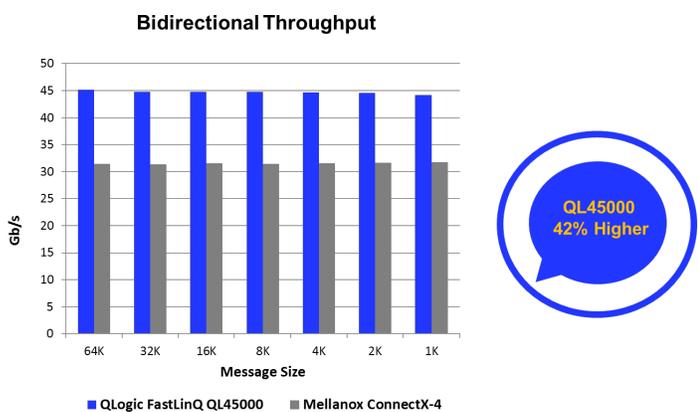


Chart 5: VXLAN Offload with VMware ESX 6.0 (One Port)One Port - Bidirectional Throughput

### OPTIMIZE NETWORK PERFORMANCE WITH MORE RDMA OPTIONS

RDMA is a key technology to enable data transfer with low latency and low CPU utilization and is supported with protocols that include:

- RDMA over Converged Ethernet (RoCE) – requires Ethernet adapters and switches that support data center bridging (DCB), supported with RoCE v1 and RoCE v2 protocols
- Internet Wide Area RDMA Protocol (iWARP) – supported with standard Ethernet switches and based on Transmission Control Protocol (TCP) standards
- iSCSI Extensions for RDMA (iSER) - uses RDMA to avoid unnecessary data copying between storage targets and initiators

As data centers consider RDMA options, the best scenario is the flexibility to have more options available and avoid being locked into a single technology that has been chosen by their adapter provider. QLogic FastLinQ QL45000 adapters provide investment protection with a future-proofed option that has the capability to support all of these RDMA protocols. This includes iSER with iSCSI over RoCE and iSCSI over iWARP. In contrast, Mellanox has no commitment to iWARP support for their adapters.

## REDUCE OPEX WITH MULTI-ADAPTER MANAGEMENT

It is well known that ongoing data center OPEX can be a much greater cost factor than the original CAPEX investment. With that in mind, network managers for enterprise-class data centers want the option to remotely manage adapters from a centralized console. This helps reduce management cost and is also critical to insure network consistency.

As a starting point, QLogic FastLinQ QL45000 adapters are fully supported with baseline OS network management utilities. That capability is greatly enhanced with the powerful management tools that include the QLogic Control Suite (QCS) command line interface (CLI) and the QLogic QConvergeConsole® (QCC) graphical user interface (GUI) that is shown below. There is also a fully integrated QCC vCenter® Plug-in (VCPI) module that is ideal for VMware deployments. These options provide a robust management platform that can be used across the length and breadth of the data center.

In contrast, Mellanox adapters can only be managed with baseline OS utilities. There is no option for remote multi-adapter management.

**Note:** All advertised QLogic features are enabled in the hardware. Actual feature availability is dependent on software driver releases. See the release notes.

## CONCLUSION

The transition to 25GbE will be the fastest ramp of any of the recent generations of Ethernet speeds. Data center planners should evaluate how to fully leverage the increased bandwidth that 25GbE will provide. QLogic FastLinQ QL45000 adapters provide key benefits in flexibility, performance and management that are not available with Mellanox adapters.

The following white papers have additional information on key benefits that are provided with QLogic FastLinQ QL45000 adapters:

- [25Gb Ethernet](#)
- [Enhancing Scalability Through NIC Switch Independent Partitioning](#)
- [Visualize I/O Connectivity for VMware vSphere](#)
- [Accelerating Network Virtualization Overlays - Windows Server 2012 R2 Hyper-V NVGRE](#)
- [Scale Virtual Machine Density Through Accelerating Network Virtualization](#)
- [Unified Adapter Management Across the Data Center](#)
- [Network Function Virtualization Using Data Plane Developer's Kit](#)

The screenshot displays the QConvergeConsole interface. At the top, there is a 'Host Selection' dropdown and a 'CONNECT' button. Below this, there are checkboxes for 'FC/FCoE', 'Ethernet', 'iSCSI', and 'FabricCache'. The main area is divided into a left sidebar and a right pane. The sidebar shows a tree view of hosts and adapters, with the selected host being '172.27.2.110:Linux - Red Hat Enterprise Linux Server release 6.5 x86\_64'. The right pane shows the 'Info' tab for the selected adapter, displaying a table of attributes and their values.

| Attribute Name       | Attribute Value                               |
|----------------------|---|
| Title                | FastLinQ QL45212H 25GbE Adapter rev 10 (p5p1) |
| Description          | FastLinQ QL45212H 25GbE Adapter               |
| Manufacturer         | QLogic Corporation                            |
| Vendor ID            | 0x1077  |
| Device ID            | 0x1656  |
| Subsystem Vendor ID  | 0x1077  |
| Subsystem Device ID  | 0xe4f7  |
| Serial Number        | N/A   |
| Bus type             | PCIe (8x)                                     |
| Slot Number          | 5   |
| PCIe Speed           | 8 GT/s  |
| ASIC Version         | 57980SS B0                                    |
| Boot Code Version    | Unknown                                       |
| iSCSI Boot Version   | Unknown                                       |
| FCoE Boot Version    | Unknown                                       |
| PXE Boot/MBA Version | EFI x64 6.0.1.0                               |
| CCM Version          | Unknown                                       |
| MBI Version          | 08.07.05                                      |



Follow us:        Share:   

**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

© 2016 QLogic Corporation. Specifications are subject to change without notice. All rights reserved worldwide. QLogic, the QLogic logo, and QConvergeConsole are registered trademarks and FastLinQ is a trademark of QLogic Corporation. Mellanox is a registered trademark of Mellanox Technologies, Ltd. PCI Express and PCIe are registered trademarks of PCI-SIG. VMware and vCenter are registered trademarks of VMware, Inc. All other brand and product names are trademarks or registered trademarks of their respective owners.

This document is provided for informational purposes only and may contain errors. QLogic reserves the right, without notice, to make changes to this document or in product design or specifications. QLogic disclaims any warranty of any kind, expressed or implied, and does not guarantee that any results or performance described in the document will be achieved by you. All statements regarding QLogic's future direction and intent are subject to change or withdrawal without notice and represent goals and objectives only.