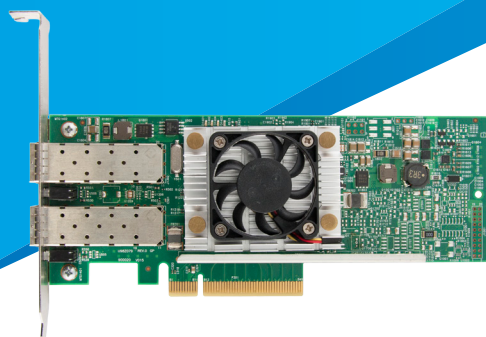


QLogic 10GbE High-Performance Adapters for Dell PowerEdge Servers

Proven Ethernet Technology for Rack, Tower, and Blade Servers



The family of QLogic 10GbE Converged Network Adapters extends Ethernet's proven value set and economics to public and private cloud-based data centers, providing the highest performance combined with the lowest processor utilization.

OVERVIEW

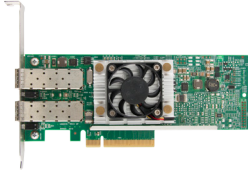
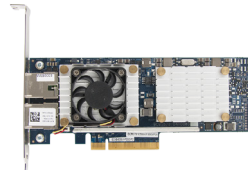
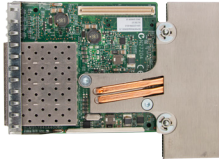
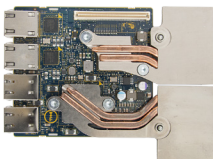
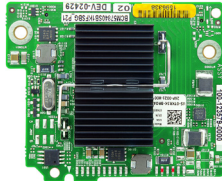
As the deployment of bandwidth-intensive applications such as public and private cloud computing continues to increase, IT administrators are turning to 10-Gigabit Ethernet (10GbE) technology for cost-effective and flexible methods of addressing growing network and storage traffic demands. A key component of the 10GbE network is the network adapter with network protocol processing offload capabilities for greater host processor utilization.

QLogic's 10GbE adapters allow servers to fully leverage the performance attributes of 10GbE, while also improving processor utilization, extending the life of existing switch investments and effectively using the 10GbE bandwidth. As a result, 10GbE end-to-end performance is comparable to more specialized and costlier cloud-based data center server to fabric interconnects. With 10GbE, organizations can expand application capabilities, consolidate network and storage traffic onto a common infrastructure, increase scalability, and improve responsiveness to address dynamic business environments.

HIGHEST PERFORMANCE AND SUPERIOR FLEXIBILITY

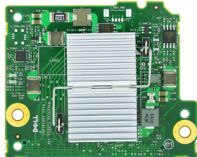
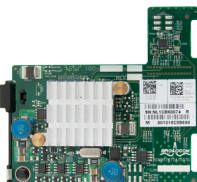
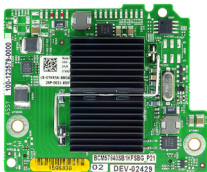
As a leading provider of high-performance Ethernet solutions, QLogic is offering the world's fastest 10GbE networking solution for the 13th generation of PowerEdge blade, rack, and tower servers. The QLogic 57840S, 57810S and 57800S controllers provide the highest throughput, lowest processor utilization, and the highest small packet performance for Ethernet connectivity. The QLogic adapters for Dell® PowerEdge™ Servers are listed in Table 1.

Table 1. QLogic 10GbE Adapters for PowerEdge Server Platforms

Server Type	Photo	Description	Details
Rack and Tower Servers (NICs)		QLogic 57810S Dual-Port 10GbE SFP+ Converged Network Adapter	• 10GbE/Two Ports • L2 Networking, iSCSI • Host Bus Adapter, FCoE¹ • Factory Install: – 12G: 430-4421 (FH1); 430-4422 (LP2) – 13G: 540-BBCV (FH); 540-BBBJ (LP) • Customer Kit: – 12G: 430-4415 (FH); 430-4414 (LP) – 13G: 540-BBGS(FH); 540-BBDX (LP)
		QLogic 57810S Dual-Port 10GBASE-T Converged Network Adapter	• 10GbE/Two Ports • L2 Networking, iSCSI • Host Bus Adapter, FCoE¹ • Factory Install: – 12G: 430-4419 (FH); 430-4420 (LP) – 13G: 540-BBBN (FH); 540-BBBI (LP) • Customer Kit: – 12G: 430-4413 (FH); 430-4412 (LP) – 13G: 540-BBGU (FH); 540-BBIU (LP)
Rack Servers (Rack NDC)		QLogic 57800S Quad-Port SFP+ Rack Converged Network Daughter Card	• 10GbE/Two Ports + 1GbE/Two Ports • L2 Networking, iSCSI Host Bus Adapter, FCoE¹ • Factory Install: – 430-4428 – 540-BBBY • Customer Kit: – 430-4410 – 540-BBFH
		QLogic 57800S Quad-Port BASE-T Rack Converged Network Daughter Card	• 10GbE/Two Ports + 1GbE/Two Ports • L2 Networking, iSCSI Host Bus Adapter, FCoE¹ • Factory Install: – 430-4427 – 540-BBBZ • Customer Kit: – 430-4409 – 540-BBFI
		QLogic 57840S Quad-Port 10GbE SFP+ Rack Converged Network Daughter Card	• 10GbE/Four Ports • L2 Networking, iSCSI Host Bus Adapter, FCoE¹ • Factory Install: – 12G & 13G: 540-BBCN • Customer Kit: – 12G: 430-5141 – 13G: 540-BBEV

1. To provide FCoE features, QLogic Converged Network Adapters with 10GBASE-T connectivity require MFW 7.10.11 or later and matching drivers for the operating system in which the adapters are installed.

Table 1 (Continued). QLogic 10GbE Adapters for PowerEdge Server Platforms

Server Type	Photo	Description	Details
Blade Servers (Blade NDC and Mezzanine Cards)		QLogic 57810S Dual-Port 10GbE KR Blade Converged Network Daughter Card	• 10GbE/Two Ports • L2 Networking, iSCSI Host Bus Adapter, FCoE¹ • Factory Install: – 12G: 430-4398 – 13G: 542-BBBN • Customer Kit: – 12G & 13G: 430-4458
		QLogic 57810S Dual-Port 10GbE KR Blade Converged Mezzanine Card	• 10GbE/Two Ports • L2 Networking, iSCSI Host Bus Adapter, FCoE¹ • Factory Install: – 12G: 430-4401 – 13G: 543-BBCE • Customer Kit: – 12G: 430-4457 – 13G: 543-BBCP
		QLogic 57840S Quad-Port 10GbE KR Blade Converged Network Daughter Card	• 10GbE/Four Ports • L2 Networking, iSCSI Host Bus Adapter, FCoE¹ • Factory Install: – 12G & 13G: 540-BBCQ • Customer Kit: – 12G & 13G: 407-0021

1. To provide FCoE features, QLogic Converged Network Adapters with 10GBASE-T connectivity require MFW 7.10.11 or later and matching drivers for the operating system in which the adapters are installed.

Table 2. QLogic 10GbE Adapters Key Advantages

Performance Criteria	Description	Benchmark	Benefit
Maximum Throughput	Line-rate throughput across both ports (up to 37,000 Mbps)	Linux® Chariot	Support for more data streams. Reduces content quality degradation.
CPU Utilization	Superior CPU utilization (less than 15%). Linux	Linux Chariot	Increases asset utilization. Reduces energy costs. Improves business productivity.
Small Packet Performance	Simultaneously send and receive 5.7 million packets per second	Linux Multi-Threaded Packet Routing	Support for more concurrent requests. Services more requests per second. Reduces network congestion.

HIGHER LARGE BLOCK I/O PERFORMANCE (THROUGHPUT)

Applications that require maximum throughput for cloud computing include streaming video and audio, large data transfers between servers, load-balancing and failover, high resolution graphics, database, and backup. However, data centers designed using a traditional three-layer hierarchical structure are not well-suited for cloud environments. In a hierarchical structure, when performance improvements are required, more servers are added. Even though the inherent limitations of this architecture (scalability, cost, and complexity) are evident, organizations reluctantly continue to use this approach. Economics often dictate the level of performance optimization, which can be implemented using the traditional architecture, which translates into less than optimal performance and scalability enhancements. While the three-layer architecture may have been sufficient with past computing models, it can no longer effectively or efficiently support emerging public and private cloud computing models without creating operational, performance, and scaling challenges.

As a result, there has been an emerging shift in data center design, moving away from the traditional vertically oriented multi-tier architecture. Data center design is shifting from a north-south data traffic design toward a new, simpler, flatter, and meshed architecture model. This architecture is suited for server-to-server (east-west) communication within the data center itself. The result is the ratio of local traffic between servers within the data centers to incoming/outgoing traffic is projected to reach 4 to 1 by 2015 (reference: Cisco® Cloud Index). Simply put, with an east-west architecture (see Figure 1), the intra-data center (server-to-server) communication will significantly increase. Therefore, deployment of a high-performance network infrastructure is critical. For greater resource allocation agility and cost effectiveness, data centers will allocate resources dynamically across large server pools where any server could be assigned to any service at any time. A key requirement to enable deployment of this new data center architecture is network availability, bandwidth, and performance. Deploying the right hardware to provide sufficient network capacity on the server edge is critical. The greater the server's data throughput capability, the better the network will perform.

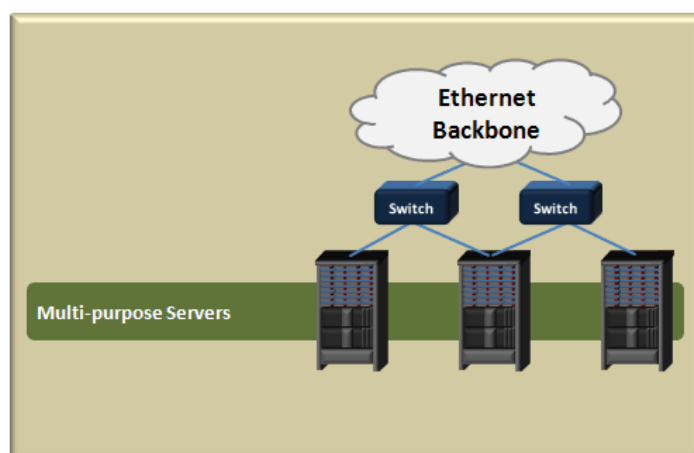


Figure 1. Flat (East/West) Architecture for the Public and Private Cloud Data Center

This is where QLogic 10GbE adapters for Dell PowerEdge 13G servers come into play. The 57810S and 57800S have demonstrated greater large block I/O networking performance, delivering line-rate performance of up to 37,000 Mbps (see Figure 2).

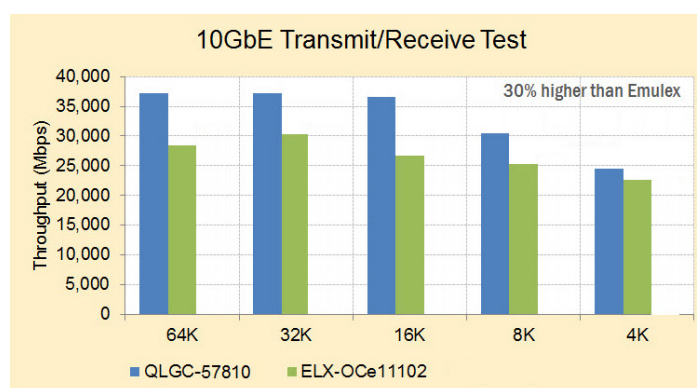


Figure 2. Standard Linux Throughput (Mbps) vs. I/O Size (Bytes)
(Source: Demartek® Labs, 2014)

LOWER CPU UTILIZATION FOR PROCESSING NETWORKING LOAD

Data center operational costs have a significant impact on businesses. IT administrators are consistently tasked to reduce costs and increase asset utilization. Traditionally, data center servers were dedicated, which meant they were over-provisioned and under-utilized. QLogic 10GbE adapters for Dell PowerEdge 13G servers improve processor utilization (to less than 15%) through a combination of hardware and stateless offloads features (see Figure 3).

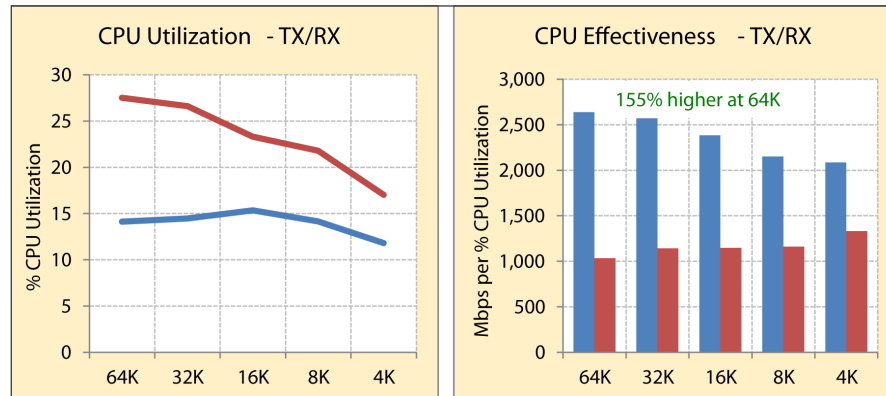


Figure 3. Linux L2 Processor Utilization (%) vs. I/O Size (Bytes) (Source: Demartek Labs, 2014)

However, the benefits of QLogic's offload features go beyond just improving performance and workload processing. These features also help reduce energy consumption. It is well known that data center power and cooling costs are increasing rapidly. Even if cost is not an issue, sourcing of energy is becoming an issue as the data center's insatiable appetite for energy continues to grow. This is especially true for data centers of cloud computing providers. Therefore, businesses are looking into all avenues to mitigate and curb growing energy costs. The energy required by the server pools is the biggest component of the energy and cost equation. This is once again where the QLogic's family of 10GbE adapters for Dell PowerEdge 13G servers can play an important role in helping to keep energy costs in check. By offloading network related processes from the CPU, the adapters enable additional server CPU cycles for other tasks. This, in turn, allows more applications to be supported by a fewer number of servers and processors.

HIGHER SMALL PACKET PERFORMANCE (FRAMES PER SECOND)

Applications that require high small packet performance for cloud computing include internode messaging traffic, database with small fields and small packet updates, voice over IP (VoIP), routing application, financial services trading, game servers, and web servers with small messaging services. QLogic's portfolio of 10GbE adapters has demonstrated and delivered superior small packet performance of up to 5.7 million packets per second (see Figure 4 and Figure 5). Dell PowerEdge 13G servers configured with QLogic adapters enable IT administrators to optimize server small packet performance.

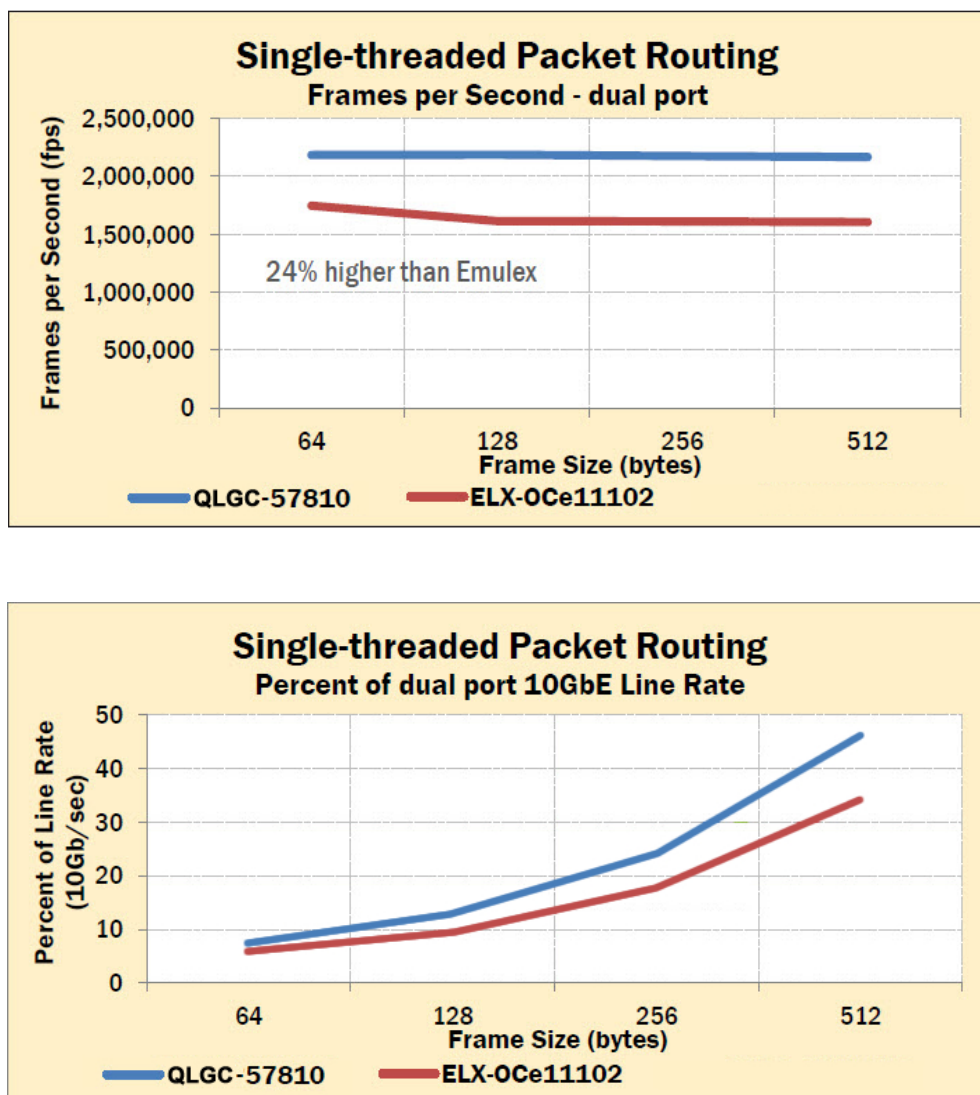


Figure 4. Single-Threaded Packet Routing (Source: Demartek Labs, 2014)

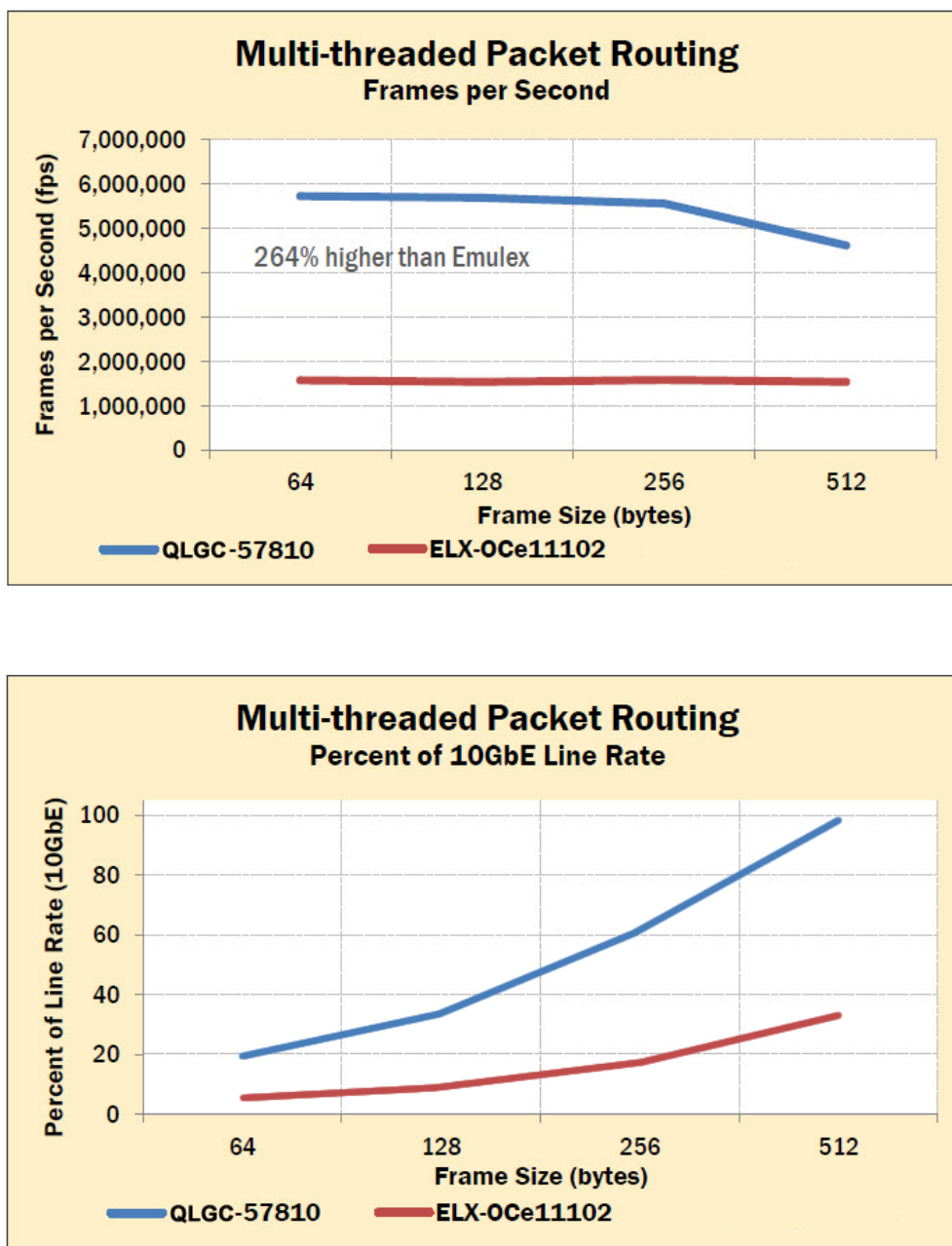


Figure 5. Multi-threaded Packet Routing (Source: Demartek Labs, 2014)

CONCLUSION

As cloud services transform long-standing business models and global economies, Ethernet's usage will undoubtedly increase dramatically. Today, IT professionals who are deploying public and private cloud infrastructure and are looking for higher capacity and higher performance solutions can rely on Dell PowerEdge 13th generation servers with QLogic 10GbE adapters to deliver the highest level of performance.

The portfolio of QLogic 10GbE converged network adapters extends Ethernet's proven value set and economics to public and private cloud-based data centers providing:

- The highest performance combined with lowest processor utilization.
- Consolidation of traditional network and storage traffic over common infrastructure.
- The lowest total cost of ownership (infrastructure/operational/human capital).
- A seamless migration from 1 GbE to higher performance 10GbE server to fabric connectivity.
- Streamlined network management.
- Market-proven Ethernet architecture.

For more information on QLogic adapters for Dell PowerEdge 13G servers, visit <http://www.qlogic.com/go/dell>.

For more information about Demartek reports, visit <http://www.demartek.com>



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Corporate Headquarters Cavium, Inc. 2315 N. First Street San Jose, CA 95131 408-943-7100

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