QLogic Adapters with NPAR Enable Drastic Data Center Consolidation

QLogic® IT implements QLogic Converged Network Adapters (CNAs) in a data center with Dell® blade servers and switches to increase server virtualization by 28% and decrease rack server footprint by 80%.

EXECUTIVE SUMMARY
QLogic IT used QLogic Converged Network Adapters (CNAs) to increase server virtualization by 28% and decrease rack server footprint by 80%. QLogic CNAs facilitated an installation of two times fewer network cards and six times fewer switch ports in the virtualized environment alone. This implementation decreased data center cabling complexity and drastically reduced data center power and cooling requirements while yielding significant savings on network infrastructure.

Challenge
- The data center was reaching capacity with limited rack space, limited power capacity, and excessive cabling complexity.
- Existing servers were under-utilized and multiple virtual infrastructures were maintained to isolate test and development from critical applications and services.
- Legacy networks were dysfunctional and maintaining separate Ethernet and Storage networks had become unsustainable.

Solution
QLogic IT used QLogic CNAs with NIC partitioning (NPAR) and Dell blade centers to migrate their infrastructure from a conventional rack server data center to a blade or virtual server dichotomy running on a converged network. QLogic 10GbE CNAs with NPAR allow for up to 8 port functions with maximum bandwidth controls and Quality of Service (QoS) on each port at the hardware level.

Results
Using the Dell blade server platform and QLogic CNAs with NPAR produced these results:

- Decreased the data center footprint from 185 to 36 rack servers while adding only 21 Dell blade servers
- Decreased rack server footprint by 80%
- Reduced virtual infrastructure by 20%
- Increased VM server density by 40%
- Decreased overall port consumption by 94%
- Increased server virtualization by 28%
- Installed 2x fewer network cards and 6x fewer switch ports in a virtualized environment
- Eliminated Fibre Channel infrastructure using FCoE
- Consolidated VMware test, development, and production environments using NPAR and Quality of Service (QoS) for network segregation
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**Drastic Data Center Consolidation**

**QLogic IT LEADS INNOVATIVE CHANGE**

QLogic is a global leader and technology innovator in high performance server and storage networking connectivity products. Leading OEMs and channel partners worldwide rely on QLogic for their server and storage networking solutions.

QLogic IT was at a crossroads. With almost 200 physical servers, the data center racks were crowded and the cabling was nearly unmanageable. The IT administrators were driven to increase the server virtualization rate from 52% to 60%, even though many core applications weren’t candidates for virtualization. As QLogic made 10Gb Ethernet and FCoE products available, IT was in a unique position to change their approach.

**The Solution – QLogic Adapters with Dell Blade Servers**

Initially, QLogic IT installed internally sourced QLogic QLE8142-SR Converged Network Adapters into the existing Dell rack-mounted servers. This allowed them to decommission the existing Fibre Channel network infrastructure and decrease the data center footprint immediately. The new CNAs could present Ethernet, Fibre Channel, or iSCSI ports to the servers, allowing better use of the 10GbE stream and leveraging a single set of Cisco® Nexus® 5100 switches rather than separating Ethernet and Fibre Channel networks.

Next, QLogic IT evaluated the blade server architecture as a way to decrease the data center footprint while still maintaining a physical server infrastructure for applications that were not virtualization candidates: Microsoft Exchange®, Microsoft® SQL, and Windows® File Servers.

QLogic IT chose to continue using Dell blade solutions based on Dell’s management tools, pricing, and the recent release of a QLogic Network Daughter Card, instead of using LoM technologies. This choice eliminated the need for redundant Ethernet fabrics for 1GbE and 10GbE.

Using the Dell PowerEdge® M620 server with the QLogic QMD8262-k adapter, QLogic IT administrators configured the initial Dell M1000e blade chassis with a single switch fabric, avoiding the additional cost of maintaining multiple fabrics at the server, switch, and upstream layers. They used the Dell PowerConnect M8024-k switch and a recent update to allow FIP-snooping to implement a single path of network I/O traffic for Ethernet and storage using FCoE.

Seven Dell PowerEdge M620 servers were configured for new SQL, Exchange, and EV clusters, each with a single QMD8262-k adapter partitioned for port-redundant Ethernet and FCoE. This allowed them to use a small portion of the 10Gb network for standard Ethernet server management, and a larger portion for FCoE storage traffic, presented as a LUN for the Microsoft applications.

The next step in consolidating the data center required configuring the virtual environment. QLogic IT’s legacy cluster occupied an entire rack of Dell PowerEdge R900/R910 4U servers. Even after adding QLogic QLE8142-SR CNAs, the environment required six network drops per server, and four 10Gb ports on the Cisco Nexus 5100 switches. The switches were reaching capacity and expansion was costly.

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**Figure 1. NPAR and QoS facilitate network segregation using a single fabric.**
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Consolidating on as few network fabrics as possible, the new Dell M1000e blade chassis was provisioned with a Dell Force10 MXL 10/40Gb switch in fabric A to support Ethernet and storage connectivity and a Dell PowerConnect 10Gb pass-through switch in fabric B to support QLogic’s DMZ (perimeter) network connectivity. Deploying eight Dell PowerEdge M820 full-height blades drastically increased QLogic’s resource availability and density.

Using NPAR on the QLogic CNA to provide network segregation and QoS on production, test, development, management, and Vmotion port functions, QLogic IT effectively matched the functionality of a server with four independent PCIe NICs with a single network daughter card in fabric A. They used VMware Distributed Switches to further segregate network traffic while using only four switch ports compared with the thirty-two ports previously used.

Results – Significant Infrastructure Savings
QLogic IT successfully increased server virtualization by 28% while decreasing their rack server footprint by 80%. Using Dell blades with QLogic CNAs facilitated the installation of two times fewer network cards and six times fewer switch ports in QLogic’s virtualized environment alone, which decreased data center cabling complexity and drastically reduced data center power and cooling requirements while gaining significant savings on network infrastructure.

Dell and QLogic server and network products truly are better together.

![Diagram of NPAR and QoS](image-url)

Figure 2. Four distinct port functions using NPAR and QoS provide hardware level network segregation.