

Mellanox Ethernet Overview

WORLD-CLASS ETHERNET PERFORMANCE

- Maximize workloads with highest industry bandwidth
- I/O virtualization maximizes performance in VMs
- Address latency sensitivity with Intelligent offloads

SUPERIOR PRODUCTIVITY

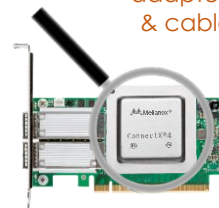
- Optimized for efficient packet processing
- RoCE offloads CPU with sub 1usec latencies
- Scale virtual and physical resources on demand for greater data center ability

Advanced Ethernet Capabilities

MELLANOX: OUR DIFFERENCE IS NETWORK ACCELERATORS

- Founded as a state-of-the-art silicon chip (ASIC) manufacturer
- Intelligence hardware offloads to reduce CPU utilization;
 - RDMA, RoCE, iSER, NVMeoF, Erasure Coding, T10-DIF
- Scale & automate with stateless overlay networks;
 - VXLAN, NVGRE, GENEVE
- Hardware and packet processing accelerators;
 - LRO, LSO, SR-IOV, NetQueue, Virtual-IQ, DPDK

Mellanox designs & builds intelligent ASICs that power switches, adapters, & cables



Key Differentiators



PERFORMANCE

- Direct data transfer to memory without CPU intervention
- Hardware-based offload and flow steering engines free CPU cycles (**RoCE <1%**)
- Proven to accelerate: **Windows Storage Spaces, Red Hat Ceph and VMware VSAN**



VIRTUALIZATION

- Accelerate virtualized networks with **VXLAN, GENEVE & NVGRE**
- Extend hardware resources to 64 PF, 512 VF w/ SR-IOV & ROCE
- Stateless offloads enable near-native performance for VMs
- Align network services with compute services for multitenant network support



STORAGE

- Achieve full potential of flash with 25/40/50/100GbE support
- Future-proof with 10/40 & easily upgrade to 25/50/100 GbE
- Leverage within scale-out storage to simplify networking
- Alleviate storage network bottlenecks with **RDMA, RoCE and NVMe over Fabric support**



VALUE & FUTURE PROOF

- Ethernet connectivity leader: **10/25/40/50/100Gb/s**
- Open FPGA platform for application customization
- Offload **IPsec encryption**
- Deliver 2.5X the performance of 10GbE
- Future Proof 10GbE w/ 25/40/50 and 100GbE capability

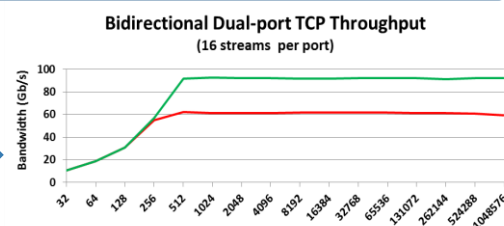
Mellanox Key Advantages for Dell Solutions

- Mellanox offers multiple adapters format to meet each of Dell's server requirements: PCIe (full and half) and rNDC
- Mellanox adapters are recommended for deployment in Windows 2016, VMware, SAP Hana, Cloud, OpenStack, Big Data and Hyperconvergence environments
- Mellanox has the most certifications across all Storage environments : Microsoft Storage Space, Ceph, GPFS, Scality, RozeFS and many others
- Mellanox RDMA latency advantages over QLogic help eliminate storage bottlenecks and increase efficiencies in Bid Data, Hadoop, SMB Direct, VDI and other deployments
- Mellanox deploys full hardware offload to reduce CPU overhead and achieve maximum performance increases, unlike competitive offerings that utilize imbedded processors and only provide a small performance boost
- Support for advanced networking technologies to remove inefficiencies and increase performance including RDMA, stateless offloads, and tunneling protocol headers

Dell 25 GbE Adapter Performance Comparison: Mellanox vs QLogic

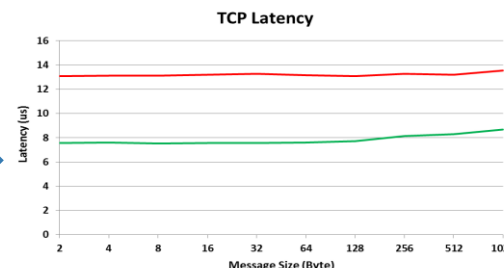
Mellanox Advantage

50% Higher Throughput



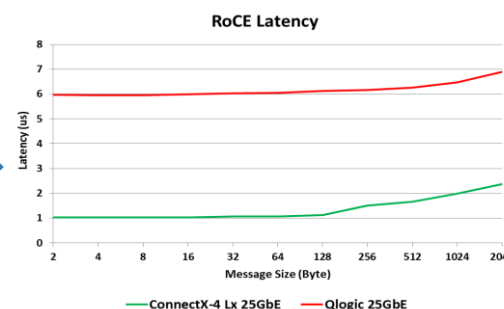
Mellanox Advantage

42% Lower Latency



Mellanox Advantage

83% Lower RoCE Latency



			
Silicon	ConnectX-4	ConnectX-4 Lx	FastLinkQ 45000 series
Form Factors	PCIe Full-height PCIe Low-profile	PCIe Low-profile rNDC	PCIe Full-height PCIe Low-profile
Speed Rates	1/10/25/40/50/ 100 GbE	1/10/25/40/ 50 GbE	10/25 GbE only
True Hardware Offload	✓		✗ Based on RISC-processor inside silicon – results in lower performance
RDMA	RoCE		RoCE
Virtualization	SR-IOV, VMq (NPAR roadmap)		SR-IOV, NIC Partitioning (NPAR)
Stateless Offloads for Tunneling Protocols	VXLAN, NVGRE, GENEVE , L2/L3 GRE, MPLS , QinQ , IPinIP		VXLAN, NVGRE, L2/L3 GRE
Tunneling Protocol Headers	Hardware Encap / Decap for VXLAN and NVGRE		✗
OVS Offload	✓		✓
TCP Stateless Offload	✓		✓
Storage	iSCSI, iSER , T10-DIF , Erasure Coding offload , NVMoF		iSCSI, FCoE, T10-PI, NVMe-Direct

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