

# ConnectX<sup>®</sup>-3 EN



Dual-Port 10 and 40 Gigabit Ethernet Controllers with PCI Express 3.0

Mellanox ConnectX-3 EN 10 and 40 Gigabit Ethernet Media Access Controllers (MAC) with PCI Express 3.0 deliver high-bandwidth and industry-leading Ethernet connectivity for performance-driven server and storage applications in Enterprise Data Centers, High-Performance Computing, and Embedded environments.

Clustered databases, web infrastructure, and high frequency trading are just a few applications that will achieve significant throughput and latency improvements resulting in faster access, real-time response and more users per server. ConnectX-3 EN improves network performance by increasing available bandwidth while decreasing the associated transport load on the CPU especially in virtualized server environments.

ConnectX-3 is well suited for Blade Server and LAN on Motherboard (LOM) designs. Its 17x17mm package, integrated PHYs, and minimal additional external component requirements were designed for a small PCB footprint. It also has an array of power saving features with real-time monitors that lower total system power usage.

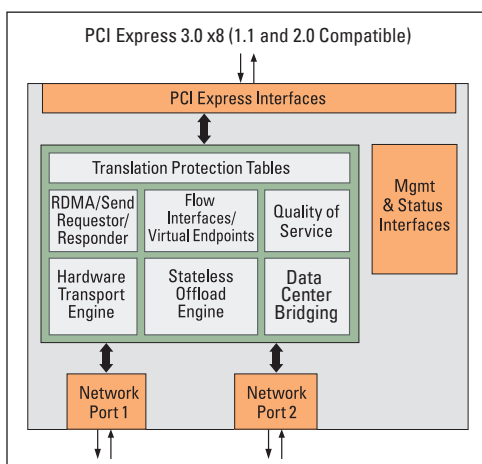


Figure 1. ConnectX-3 EN Block Diagram

### World-Class Ethernet Performance RDMA over Converged Ethernet—

ConnectX-3 utilizing IBTA RoCE technology provides efficient RDMA services, delivering low-latency and high-performance to bandwidth and latency sensitive applications. With link-level interoperability in existing Ethernet infrastructure, Network Administrators can leverage existing data center fabric management solutions.

**Sockets Acceleration** — Applications utilizing TCP/UDP/IP transport can achieve industry-leading throughput over 10 or 40GbE. The hardware-based stateless offload and flow steering engines in ConnectX-3 reduce the CPU overhead of IP packet transport, freeing more processor cycles to work on the application. Sockets acceleration software further increases performance for latency sensitive applications.

**I/O Virtualization** — ConnectX-3 EN with SR-IOV provides dedicated adapter resources and guaranteed isolation and protection for virtual machines (VM) within the server. ConnectX-3 EN gives data center managers better server utilization and LAN and SAN unification while reducing costs, power, and complexity.

**Precision Data Centers** — ConnectX-3 EN IEEE 1588 precision time protocol circuitry synchronizes the host clock to the data center master clock for accurate data delivery time stamping and data center SLA measurements.



## HIGHLIGHTS

### BENEFITS

- 10 or 40Gb/s connectivity for servers and storage
- Industry-leading throughput and latency performance
- I/O consolidation
- Virtualization acceleration
- Software compatible with standard TCP/UDP/IP and iSCSI stacks
- Small PCB footprint

### KEY FEATURES

- Single chip architecture, low power
- Dual 10 or 40 Gigabit Ethernet ports
- PCI Express 3.0 (up to 8GT/s)
- Low Latency RDMA over Ethernet
- Data Center Bridging support
- T11.3 FC-BB-5 FCoE
- TCP/IP stateless offload in hardware
- Traffic steering across multiple cores
- Hardware-based I/O virtualization
- Intelligent interrupt coalescence
- Advanced Quality of Service
- 17mm x 17mm RoHS-R6

The hardware-based mechanisms ensure high accuracy and low jitter.

**Storage Acceleration** —A consolidated compute and storage network achieves significant cost-performance advantages over multi-fabric networks. Standard block and file access protocols can leverage RDMA for high-performance storage access. T11 compliant encapsulation (FCoE) with full hardware offloads simplifies the storage network while keeping existing Fibre Channel targets.

**Quality of Service** —Resource allocation per application or per VM is provided and protected by the advanced QoS supported by ConnectX-3 EN. Service levels for multiple traffic types can be based on IETF DiffServ or IEEE 802.1p/Q allowing system administrators to prioritize traffic by application, virtual machine, or protocol. This powerful combination of QoS and prioritization provides the ultimate fine-grained control of traffic – ensuring that applications run smoothly in today's complex environments.

### Software Support

ConnectX-3 EN is supported by a full suite of software drivers for Microsoft Windows, Linux distributions, VMware and Citrix XENServer. ConnectX-3 EN supports stateless offload and is fully interoperable with standard TCP/UDP/IP stacks. ConnectX-3 EN supports various management interfaces and has a rich set of configuring and management tools across operating systems.

## FEATURE SUMMARY

### ETHERNET

- IEEE Std 802.3ae 10 Gigabit Ethernet
- IEEE Std 802.3ap Backplanes, including FEC
- IEEE Std 802.3ba 40 Gigabit Ethernet
- IEEE Std 802.3ad Link Aggregation and Failover
- IEEE Std 802.3az Energy Efficient Ethernet
- IEEE Std 802.1Q VLAN tags, .1p Priorities
- IEEE Std 802.3Qau Congestion Notification
- IEEE P802.1Qaz D0.2 ETS
- IEEE P802.1Qbb D1.0 Priority-based Flow Control
- IEEE 1588 Precision Clock Synchronization
- Jumbo frame support (10KB)
- 128 MAC/VLAN addresses per port

### TCP/UDP/IP STATELESS OFFLOAD

- TCP/UDP/IP checksum offload
- TCP Large Send (< 64KB) or Giant Send (64KB-16MB) Offload for segmentation
- Receive Side Scaling (RSS) up to 32 queues
- Line rate packet filtering

### ADDITIONAL CPU OFFLOADS

- RDMA over Converged Ethernet support
- Traffic steering across multiple cores
- Intelligent interrupt coalescence
- Compliant to Microsoft RSS and NetDMA

### HARDWARE-BASED I/O VIRTUALIZATION

- Single-Root IOV
- Address translation and protection
- Dedicated adapter resources
- Multiple queues per virtual machine
- Enhanced QoS for vNICs
- VMware NetQueue Support

### STORAGE SUPPORT

- T11.3 FC-BB-5 FCoE

### FLEXBOOT™ TECHNOLOGY

- Remote boot over Ethernet
- Remote boot over iSCSI

## COMPATIBILITY

### PCI EXPRESS INTERFACE

- PCIe Base 3.0 compliant, 2.0 and 1.1 compatible
- 2.5, 5.0, or 8.0GT/s link rate
- Auto-negotiates to x8, x4, x2, or x1
- Support for MSI/MSI-X mechanisms

### CONNECTIVITY

- Interoperable with 10 and 40GbE switches and routers
- 40GbE ports backward compatible with 10GbE
- Integrated 10GbE PHYs
  - XAUI, CX4, KR, KX4, XFI/SFI
- Integrated 40GbE PHYs
  - XLAUI, KR4

### OPERATING SYSTEMS/DISTRIBUTIONS

- Novell SuSE Linux Enterprise Server (SLES), Red Hat Enterprise Linux (RHEL), and other Linux distributions
- Microsoft Windows, Server 2003 / 2008, CCS 2003
- OpenFabrics Enterprise Distribution (OFED)
- VMware ESX Server 3.5, vSphere 4.0/4.1
- Citrix XenServer 4.1, 5.0, 5.5

### MANAGEMENT

- MIB, MIB-II, MIB-II Extensions, RMON, RMON 2
- Configuration and diagnostic tools
- NC-SI

\*This product brief describes all of the hardware features and capabilities. Please refer to the driver release notes on [www.mellanox.com](http://www.mellanox.com) for feature availability.



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