Mellanox
TECHNOLOGIES

ConnectX®–3 VPI

Single/Dual-Port Adapters with *Virtual Protocol Interconnect®*

ConnectX-3 adapter cards with Virtual Protocol Interconnect (VPI) supporting InfiniBand and Ethernet connectivity provide the highest performing and most flexible interconnect solution for PCI Express Gen3 servers used in Enterprise Data Centers, High-Performance Computing, and Embedded environments.

ConnectX 3

Clustered data bases, parallel processing, transactional services and high-performance embedded I/O applications will achieve significant performance improvements resulting in reduced completion time and lower cost per operation ConnectX-3 with VPI also simplifies system development by serving multiple fabrics with one hardware design.

Virtual Protocol Interconnect
VPI-enabled adapters enable any standard networking, clustering, storage, and management protocol to seamlessly operate over any converged network leveraging a consolidated software stack. With auto-sense capability, each ConnectX-3 port can identify and operate on InfiniBand, Ethernet, or Data Center Bridging (DCB) fabrics. FlexBoot™ provides additional flexibility by enabling servers to boot from remote InfiniBand or LAN storage targets. ConnectX-3 with VPI and FlexBoot simplifies I/O system design and makes it easier for IT managers to deploy infrastructure that meets the challenges of a dynamic data center.
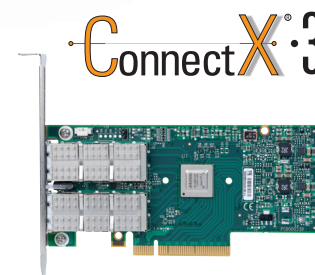
World-Class Performance
InfiniBand —ConnectX-3 delivers low latency, high bandwidth, and computing efficiency for performance-driven server and storage clustering applications. Efficient computing is achieved by offloading from the CPU protocol processing and data movement overhead such as RDMA and

Send/Receive semantics allowing more processor power for the application. CORE-Direct™ brings the next level of performance improvement by offloading application overhead such as data broadcasting and gathering as well as global synchronization communication routines. GPU communication acceleration provides additional efficiencies by eliminating unnecessary internal data copies to significantly reduce application run time. ConnectX-3 advanced acceleration technology enables higher cluster efficiency and large scalability to tens of thousands of nodes.

RDMA over Converged Ethernet — ConnectX-3 utilizing IBTA RoCE technology delivers similar low-latency and high-performance over Ethernet networks. Leveraging Data Center Bridging capabilities, RoCE provides efficient low latency RDMA services over Layer 2 Ethernet. 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 industryleading throughput over InfiniBand or 10 or 40GbE. The hardware-based stateless offload engines in ConnectX-3 reduce the CPU overhead of IP packet transport. Sockets acceleration software further increases performance for latency sensitive applications.

HIGHLIGHTS

BENEFITS
– One adapter for InfiniBand, 10/40/56 Gig Ethernet or Data Center Bridging fabrics
– World-class cluster, network, and storage performance
– Guaranteed bandwidth and low-latency services
– I/O consolidation
– Virtualization acceleration
– Power efficient
– Scales to tens-of-thousands of nodes

KEY FEATURES
– Virtual Protocol Interconnect
– 1us MPI ping latency
– Up to 56Gb/s InfiniBand or 40/56 Gigabit Ethernet per port
– Single- and Dual-Port options available
– PCI Express 3.0 (up to 8GT/s)
– CPU offload of transport operations
– Application offload
– GPU communication acceleration
– Precision Clock Synchronization
– End-to-end QoS and congestion control
– Hardware-based I/O virtualization
– Ethernet encapsulation (EoIB)
– RoHS-R6

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

Storage Accelerated — A consolidated compute and storage network achieves significant cost-performance advantages over multi-fabric networks. Standard block and file access protocols can leverage InfiniBand RDMA for high-performance storage access.

Software Support

All Mellanox adapter cards are supported by a Windows, Linux distributions, VMware, and Citrix XenServer. ConnectX-3 VPI adapters support OpenFabrics-based RDMA protocols and software and are compatible with configuration and management tools from OEMs and operating system vendors.

FEATURE SUMMARY*

INFINIBAND
– IBTA Specification 1.2.1 compliant
– Hardware-based congestion control
– 16 million I/O channels
– 256 to 4Kbyte MTU, 1Gbyte messages

ENHANCED INFINIBAND
– Hardware-based reliable transport
– Collective operations offloads
– GPU communication acceleration
– Hardware-based reliable multicast
– Extended Reliable Connected transport
– Enhanced Atomic operations

ETHERNET
– IEEE Std 802.3ae 10 Gigabit Ethernet
– 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, .1p VLAN tags and priority
– IEEE Std 802.1Qau Congestion Notification
– IEEE P802.1Qaz D0.2 ETS
– IEEE P802.1Qbb D1.0 Priority-based Flow Control

– Jumbo frame support (9600B)

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

ADDITIONAL CPU OFFLOADS
– RDMA over Converged Ethernet
– TCP/UDP/IP stateless offload
– Intelligent interrupt coalescence

FLEXBOOT™ TECHNOLOGY
– Remote boot over InfiniBand
– Remote boot over Ethernet
– Remote boot over iSCSI

PROTOCOL SUPPORT
– Open MPI, OSU MVAPICH, Intel MPI, MS
– MPI, Platform MPI
– TCP/UDP, EoIB, IPoIB, RDS
– SRP, iSER, NFS RDMA
– uDAPL

COMPATIBILITY

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

CONNECTIVITY
– Interoperable with InfiniBand or 10/40 Ethernet switches. Interoperable with 56GbE Mellanox Switches.
– Passive copper cable with ESD protection
– Powered connectors for optical and active

cable support
– QSFP to SFP+ connectivity through QSA module

OPERATING SYSTEMS/DISTRIBUTIONS
– Citrix XenServer 6.1
– Novell SLES, Red Hat Enterprise Linux (RHEL), and other Linux distributions
– Microsoft Windows Server 2008/2012/2012 R2
– OpenFabrics Enterprise Distribution (OFED)
– Ubuntu 12.04
– VMware ESXi 4.x and 5.x

Ordering Part Number	VPI Ports	Dimensions w/o Brackets
MCX353A-QCBT	Single QDR 40Gb/s or 10GbE	14.2cm x 5.2cm
MCX354A-QCBT	Dual QDR 40Gb/s or 10GbE	14.2cm x 6.9cm
MCX353A-FCBT	Single FDR 56Gb/s or 40/56GbE	14.2cm x 5.2cm
MCX354A-FCBT	Dual FDR 56Gb/s or 40/56GbE	14.2cm x 6.9cm

*This product brief describes hardware features and capabilities. Please refer to the driver release notes on mellanox.com for feature availability or contact your local sales representative.

**Product images may not include heat sync assembly; actual product may differ.

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