



ADAPTER CARDS

ConnectX®-2 VPI

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

ConnectX-2 adapter cards with *Virtual Protocol Interconnect* (VPI) supporting InfiniBand and Ethernet connectivity provide the highest performing and most flexible interconnect solution for Enterprise Data Centers, High-Performance Computing, and Embedded environments. Clustered data bases, parallelized applications, 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-2 with VPI also simplifies network deployment by consolidating cables and enhancing performance in virtualized server environments.

Virtual Protocol Interconnect

VPI-enabled adapters make it possible for 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-2 port can identify and operate on InfiniBand, Ethernet, or Data Center Bridging (DCB) fabrics. ConnectX-2 with VPI simplifies I/O system design and makes it easier for IT managers to deploy infrastructure that meets the challenges of a dynamic data center.

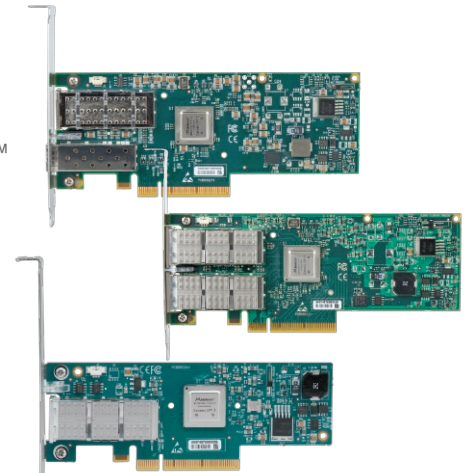
World-Class Performance

InfiniBand — ConnectX-2 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 routine activities which allows more processor power for the application. Network protocol processing and data movement overhead such as InfiniBand RDMA and Send/Receive semantics are completed in the adapter without CPU intervention. Application overhead, such as data broadcasting and gathering and global synchronization communication routines (e.g. MPI collective operations) executed in hardware brings the next level of performance improvements. ConnectX-2 advanced offloading technology enables higher cluster efficiency and large scalability to tens of thousands of nodes.

Data Center Bridging — ConnectX-2 delivers similar low-latency and high-bandwidth performance leveraging Ethernet with DCB support. Low Latency Ethernet (LLE) provides efficient RDMA transport over Layer 2 Ethernet utilizing DCB's enhancements to IEEE 802.1 bridging. The LLE software stack maintains existing and future compatibility for bandwidth and latency sensitive clustering applications. With link-level interoperability in existing Ethernet infrastructure, Network Administrators can leverage existing data center fabric management solutions.

TCP/UDP/IP Acceleration — Applications utilizing TCP/UDP/IP transport can achieve industry-leading throughput over InfiniBand or 10GigE. The hardware-based stateless offload engines in ConnectX-2 reduce the CPU overhead of IP packet transport, freeing more processor cycles to work on the application.

I/O Virtualization — ConnectX-2 support for hardware-based I/O virtualization provides dedicated adapter resources and guaranteed isolation and protection for virtual machines (VM) within the server. I/O virtualization with ConnectX-2 gives data center managers better server



ConnectX-2 VPI Adapter Cards

ConnectX®-2

BENEFITS

- One adapter for InfiniBand, 10 Gigabit Ethernet or Data Center Bridging fabrics
- World-class cluster performance
- High-performance networking and storage access
- Guaranteed bandwidth and low-latency services
- Reliable transport
- I/O consolidation
- Virtualization acceleration
- Scales to tens-of-thousands of nodes

KEY FEATURES

- Virtual Protocol Interconnect
- 1us MPI ping latency
- Selectable 10, 20, or 40Gb/s InfiniBand or 10 Gigabit Ethernet per port
- Single- and Dual-Port options available
- PCI Express 2.0 (up to 5GT/s)
- CPU offload of transport operations
- Collective operations offloads
- End-to-end QoS and congestion control
- Hardware-based I/O virtualization
- TCP/UDP/IP stateless offload
- Fibre Channel encapsulation (FCoIB or FCoE)
- RoHS-R6

utilization and LAN and SAN unification 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 leveraging InfiniBand RDMA result in high-performance storage access. Fibre Channel frame encapsulation (FCoIB or FCoE) and hardware offloads enable simple connectivity to Fibre Channel SANs.

Software Support

All Mellanox adapter cards are compatible with TCP/IP and OpenFabrics-based RDMA protocols and software. They are also compatible with InfiniBand and cluster management software available from Mellanox and OEMs. The adapter cards are compatible with major operating system distributions.



FEATURE SUMMARY

INFINIBAND

- IBTA Specification 1.2.1 compliant
- RDMA, Send/Receive semantics
- Hardware-based congestion control
- Atomic operations
- 16 million I/O channels
- 256 to 4Kbyte MTU, 1Gbyte messages
- 9 virtual lanes: 8 data + 1 management

ENHANCED INFINIBAND

- Hardware-based reliable transport
- Collective operations offloads
- Hardware-based reliable multicast
- Extended Reliable Connected transport
- Enhanced Atomic operations

ETHERNET

- IEEE 802.3ae 10 Gigabit Ethernet
- IEEE 802.3ak 10GBASE-CX4
- IEEE 802.3ad Link Aggregation and Failover
- IEEE 802.1Q, 1p VLAN tags and priority
- IEEE P802.1au D2.0 Congestion Notification
- IEEE P802.1az D0.2 ETS
- IEEE P802.1bb D1.0 Priority-based Flow Control
- Multicast
- Jumbo frame support (10KB)
- 128 MAC/VLAN addresses per port

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

- TCP/UDP/IP stateless offload
- Intelligent interrupt coalescence

STORAGE SUPPORT

- Fibre Channel over InfiniBand or Ethernet
- T11-compliant frame format

COMPATIBILITY

PCI EXPRESS INTERFACE

- PCIe Base 2.0 compliant, 1.1 compatible
- 2.5GT/s or 5.0GT/s link rate x8 (20+20Gb/s or 40+40Gb/s bidirectional bandwidth)
- Auto-negotiates to x8, x4, x2, or x1
- Support for MSI/MSI-X mechanisms

CONNECTIVITY

- Interoperable with InfiniBand or 10GigE switches
- microGiGaCN or QSFP connectors
- 20m+ (10Gb/s), 10m+ (20Gb/s) or 7m+ (40Gb/s) of pasive copper cable
- External optical media adapter and active cable support

MANAGEMENT AND TOOLS

InfiniBand

- OpenSM
- Interoperable with third-party subnet managers
- Firmware and debug tools (MFT, IBDIAG)

Ethernet

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

OPERATING SYSTEMS/DISTRIBUTIONS

- Novell SLES, Red Hat Enterprise Linux (RHEL), Fedora, and other Linux distributions
- Microsoft Windows Server 2003/2008/CCS 2003
- OpenFabrics Enterprise Distribution (OFED)
- OpenFabrics Windows Distribution (WinOF)
- VMware ESX Server 3.5

PROTOCOL SUPPORT

- Open MPI, OSU MAPICH, HP MPI, Intel MPI, MS MPI, Scali MPI
- TCP/UDP, iPoIB, SDP, RDS
- SRP, iSER, NFS RDMA, FCoIB, FCoE
- uDAPL

Adapter Cards

Ordering Part Number	Ports	Host Bus	Power (Typ)	Dimensions w/o Brackets
MHGH29B-XTR	Dual 4X 20Gb/s InfiniBand or 10GigE	PCIe 2.0 5.0GT/s	8.1W	13.6cm x 5.7cm
MHJH29B-XTR	Dual 4X 40Gb/s InfiniBand or 10GigE	PCIe 2.0 5.0GT/s	8.7W	13.6cm x 5.7cm
MHRH29B-XTR	Dual 4X QSFP 20Gb/s InfiniBand	PCIe 2.0 5.0GT/s	8.1W	16.8cm x 5.6cm
MHQH29B-XTR	Dual 4X QSFP 40Gb/s InfiniBand	PCIe 2.0 5.0GT/s	8.7W	16.8cm x 5.6cm
MHZH29-XTR	4X QSFP 40Gb/s InfiniBand, SFP+ 10GigE	PCIe 2.0 5.0GT/s	12W	16.8cm x 5.6cm

Single-port options also available



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