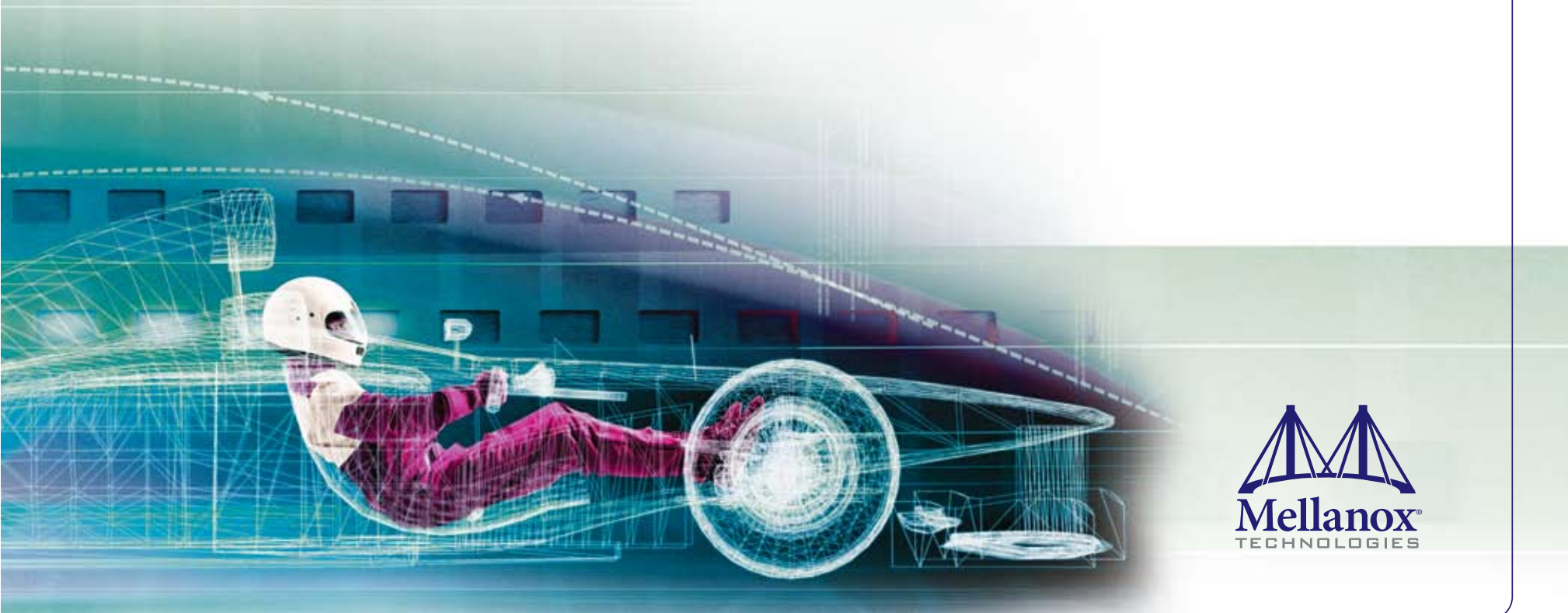


# PERFORMANCE ACCELERATED

Mellanox InfiniBand Adapters Provide Advanced Levels of Data Center IT Performance, Productivity and Efficiency



Mellanox continues its leadership  
providing **InfiniBand Host Channel Adapters (HCA)** —  
the highest performing interconnect solution for Enterprise Data Centers,  
Cloud Computing, High-Performance Computing,  
and embedded environments.

### **VALUE PROPOSITIONS**

- High Performance Computing needs high bandwidth, low latency, and CPU offloads to get the highest server efficiency and application productivity. Mellanox HCAs deliver the the I/O performance that meets these requirements.
- Data centers and cloud computing require I/O services such as bandwidth, consolidation and unification, and flexibility. Mellanox's HCAs support LAN and SAN traffic consolidation and provides hardware acceleration for server virtualization.
- Virtual Protocol Interconnect™ (VPI) flexibility offers InfiniBand, Ethernet, Data Center Ethernet, FCoIB and FCoE connectivity.



<b>Ports</b>	1 x 10Gb/s	1 x 10Gb/s 1 x 20Gb/s	2 x 10Gb/s 2 x 20Gb/s	1 x 20Gb/s 1 x 40Gb/s	2 x 20Gb/s 2 x 40Gb/s	1 x 20Gb/s 1 x 40Gb/s	2 x 20Gb/s 2 x 40Gb/s
<b>ASIC</b>	InfiniHost III Lx	InfiniHost III Lx	InfiniHost III Ex	ConnectX-2	ConnectX-2	ConnectX-2	ConnectX-2
<b>Connector</b>	microGiGaCN	microGiGaCN	microGiGaCN	microGiGaCN	microGiGaCN	QSFP	QSFP
<b>Host Bus</b>	PCIe 1.1	PCIe 1.1	PCIe 1.1	PCIe 2.0	PCIe 2.0	PCIe 2.0	PCIe 2.0
<b>Speed</b>	2.5GT/s	2.5GT/s	2.5GT/s	5.0GT/s	5.0GT/s	5.0GT/s	5.0GT/s
<b>Lanes</b>	x4	x8	x8	x8	x8	x8	x8
<b>Features</b>	Hardware-based Transport, RDMA, I/O Virtualization			VPI, Hardware-based Transport and Collectives Offloads, RDMA, I/O Virtualization, QoS and Congestion Control; IP Stateless Offload			
<b>OS Support</b>	RHEL, SLES, Windows, HPUX, ESX3.5	RHEL, SLES, Windows, HPUX, ESX3.5	RHEL, SLES, Windows, HPUX, ESX3.5	RHEL, SLES, Windows, ESX3.5	RHEL, SLES, Windows, ESX3.5	RHEL, SLES, Windows, ESX3.5	RHEL, SLES, Windows, ESX3.5
<b>RoHS</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Ordering Part</b>	MHES14-XTC	MHES18-XTC MHGS18-XTC	MHEA28-XTC MHGA28-XTC	MHGH19B-XTR MHJH19B-XTR	MHGH29B-XTR MHJH29B-XTR	MHRH19B-XTR MHQH19B-XTR	MHRH29B-XTR MHQH29B-XTR

**Mellanox InfiniBand Host Channel Adapters (HCA)** provide the highest performing interconnect solution for Enterprise Data Centers, Cloud Computing, 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. Virtualized servers will achieve higher performance with reduced power consumption and fewer cables.

### **World-Class Performance**

Mellanox InfiniBand adapters deliver industry-leading 40Gb/s bandwidth with ultra low-latency for performance-driven server and storage clustering applications. CPU overhead is kept to a minimum with hardware-based transport offload and data movement acceleration such as RDMA and Send/Receive semantics to maximize server productivity. Mellanox InfiniBand adapters support from one to 64 processor cores with zero impact to latency and can scale to 10's of thousands of nodes.

### **I/O Virtualization**

Mellanox adapters 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 on InfiniBand gives data center managers better server 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. Mellanox adapters support SCSI, iSCSI and NFS protocols.

### **Software Support**

All Mellanox InfiniBand 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 have drivers for all major operating system distributions.

## ConnectX-2 with Virtual Protocol Interconnect

Mellanox's industry-leading ConnectX-2 InfiniBand adapters provides the highest performing and most flexible interconnect solution. ConnectX-2 delivers up to 40Gb/s throughput across the PCI Express 2.0 host bus , enables the fastest transaction latency, as low as 1usec, and can deliver up to 50M MPI messages per second making it the most scalable and suitable solution for current and future transaction-demanding applications. In addition to the InfiniBand features mentioned before, ConnectX-2 supports advanced QoS, hardware offloads and congestion management to maximize the network efficiency making it ideal for HPC or converged data centers operating a wide range of applications.

VPI flexibility makes it possible for any standard networking, clustering, storage, and management protocol to seamlessly operate over any converged network leveraging a consolidated software stack. Each ConnectX-2 port can operate on InfiniBand, Ethernet, or Data Center Bridging (DCB) fabrics, and supports Fibre Channel over InfiniBand (FCoIB) or Ethernet (FCoE). 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.

## Complete End-to-End 40Gb/s InfiniBand Networking

ConnectX-2 adapters are part of Mellanox's full 40Gb/s end-to-end portfolio for data centers and high-performance computing systems, which includes switches and cables. Mellanox's IS5000 family of 40Gb/s InfiniBand switches incorporate advanced tools that simplify networking management and installation, and provide the needed capabilities for the highest scalability and future growth. Mellanox's line of 40Gb/s copper and fiber cables ensure the highest interconnect performance. With Mellanox end to end, IT managers can be assured of the highest performance, most efficient network fabric.

## BENEFITS

- *World-class cluster performance*
- *High-performance networking and storage access*
- *Efficient use of compute resources*
- *Guaranteed bandwidth and low-latency services*
- *Reliable transport*
- *I/O unification*
- *Virtualization acceleration*
- *Scales to tens-of-thousands of nodes*

## TARGET APPLICATIONS

- *High-performance parallelized computing*
- *Data center virtualization using VMware® ESX Server*
- *Clustered database applications, parallel RDBMS queries, high-throughput data warehousing*
- *Latency sensitive applications such as financial analysis and trading*
- *Cloud and grid computing data centers*
- *Performance storage applications such as backup, restore, mirroring, etc.*

## FEATURE SUMMARY

### INFINIBAND

- IBTA Specification 1.2.1 compliant
- 10, 20, or 40Gb/s per port
- RDMA, Send/Receive semantics
- Hardware-based congestion control
- Atomic operations
- 16 million I/O channels
- 9 virtual lanes: 8 data + 1 management

### ENHANCED INFINIBAND (ConnectX-2)

- Hardware-based reliable transport
- Collective operations offloads
- Hardware-based reliable multicast
- Extended Reliable Connected transport
- Enhanced Atomic operations
- Fine grained end-to-end QoS

### HARDWARE-BASED I/O VIRTUALIZATION (ConnectX-2)

- Single Root IOV
- Address translation and protection
- Multiple queues per virtual machine
- VMware NetQueue support

### ADDITIONAL CPU OFFLOADS (ConnectX-2)

- TCP/UDP/IP stateless offload
- Intelligent interrupt coalescence
- Compliant to Microsoft RSS and NetDMA

### STORAGE SUPPORT (ConnectX-2)

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

## COMPLIANCE

### SAFETY

- USA/Canada: cTUVus UL
- EU: IEC60950
- Germany: TUV/GS
- International: CB Scheme

### EMC (EMISSIONS)

- USA: FCC, Class A
- Canada: ICES, Class A
- EU: EN55022, Class A
- EU: EN55024, Class A
- EU: EN61000-3-2, Class A
- EU: EN61000-3-3, Class A
- Japan: VCCI, Class A
- Taiwan: BSMI, Class A

### ENVIRONMENTAL

- EU: IEC 60068-2-64: Random Vibration
- EU: IEC 60068-2-29: Shocks, Type I / II
- EU: IEC 60068-2-32: Fall Test

### OPERATING CONDITIONS

- Operating temperature: 0 to 55° C
- Air flow: 200LFM @ 55° C
- Requires 3.3V, 12V supplies

## COMPATIBILITY

### CONNECTIVITY

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

### 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 MVAPICH, HP MPI, Intel MPI, MS MPI, Scalix MPI
- TCP/UDP, IPoIB, SDP, RDS
- SRP, iSER, NFS RDMA, FCoIB, FCoE
- uDAPL

