

InfiniBand Product Guide

End-to-end InfiniBand Solutions at FDR / EDR / HDR Speeds

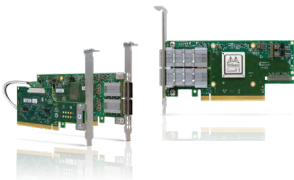
Mellanox Technologies is the world-leading provider of InfiniBand high-speed interconnect technology solutions, accelerating the world's top supercomputers. Mellanox offers a complete InfiniBand portfolio of network adapters, switches, cables & transceivers and fabric management and Mellanox ScalableHPC[®] software suite, for High Performance Computing, Machine Learning, Cloud and Storage. Mellanox solutions are backward and future compatible, optimizing data center efficiency, while providing the best ROI.

InfiniBand Switches



From Switch-IB[®] -2 100Gb/s EDR to Mellanox Quantum[™] 200Gb/s HDR InfiniBand, featuring in-network computing Scalable Hierarchical Aggregation and Reduction Protocol (SHARP)[™] technology, the Mellanox family of 1RU and modular switches delivers the highest density and performance. This enables compute clusters to operate at any scale, while reducing operational costs and infrastructure complexity. InfiniBand switches also leverage Mellanox's SHIELD[™] (Self-Healing Interconnect Enhancement for Intelligent Datacenters) to overcome link failures, enabling network recovery 5000x faster than any other software-based solution.

InfiniBand Smart Adapters



Mellanox's award-winning 40/56/100/200 Gb/s InfiniBand Adapters deliver the highest throughput and message rate in the industry. Providing best-in-class network performance, scale and efficiency, enabling low-latency, and advanced offload for HPC, Machine Learning, Cloud, Storage, Databases and Embedded applications, reducing cost per operation and increasing ROI. Mellanox smart adapters deliver connectivity for x86, Power, Arm, FPGAs and GPU-based compute and storage platforms.

InfiniBand Interconnect



Mellanox LinkX[®] InfiniBand cables and transceivers are designed to maximize the performance of High-Performance Computing (HPC) networks, requiring high-bandwidth, low-latency connections between compute and switch nodes. To ensure superior system performance, Mellanox ensures highest quality for all LinkX products.

InfiniBand Fabric Management Software



Mellanox's comprehensive suite of management software provides an innovative application-centric approach to bridge the gap between servers, applications and fabric elements. Mellanox's UFM[®] (Unified Fabric Management) software includes fabric diagnostics, monitoring, alerting, provisioning and advanced features such as congestion monitoring and fabric segmentation and isolation. Users can manage small to extremely large fabrics as a set of inter-related business entities while also performing fabric monitoring and optimizing performance at the application-logical level rather than only at the individual port or device level.

Mellanox ScalableHPC[®] Software



For scientific research and engineering simulations, the Mellanox HPC-X[®] software toolkit provides enhancements to significantly increase the scalability and performance of message communications in the network. HPC-X enables the rapid deployment and delivery of maximum application performance without the complexity and costs of licensed third-party tools and libraries.

InfiniBand Switches

Switch	Performance	Advanced Features	Size
QM8700 Series	<ul style="list-style-type: none"> 40 X HDR (200Gb/s) ports 80 X HDR100 (100Gb/s) ports 16Tb/s aggregate switch throughput Up to 15.8 billion messages-per-second 	<ul style="list-style-type: none"> Mellanox Quantum switch Managed and unmanaged flavors SHIELD™– Fabric with self-healing autonomy SHARP™v2 – Collective offloads supporting streaming for Machine Learning Adaptive Routing, congestion control and QoS 	IU
CS8500 Series	<ul style="list-style-type: none"> Up-to 800 HDR (200Gb/s) ports Up-to 1600 HDR100 (100Gb/s) ports Up-to 320Tb/s switching capacity Ultra-low switch latency 	<ul style="list-style-type: none"> Mellanox Quantum director switch SHIELD™– Fabric with self-healing autonomy SHARP™v2 – Collective offloads supporting streaming for Machine Learning Adaptive Routing, congestion control and QoS Liquid-cooled system 7" Tablet LCD for best LED visibility 	29U
SB7800 Series	<ul style="list-style-type: none"> 36 X EDR (100Gb/s) ports 7.2Tb/s aggregate switch throughput Up to 7.02 billion messages-per-second 90ns switch latency 136W typical power consumption 	<ul style="list-style-type: none"> Switch-IB® 2 switch Managed and unmanaged flavors Adaptive routing and QoS SHARP™ – In-network collective offloads 	1U
CS7500 Series	<ul style="list-style-type: none"> Up-to 648 EDR (100Gb/s) Up-to 130Tb/s switching capacity Ultra-low latency 	<ul style="list-style-type: none"> Switch-IB® 2 director switch 648 ports, 324 ports and 216 ports flavors Adaptive routing and QoS SHARP™ – In-network collective offloads N+N power supply 	648 ports - 28U 324 ports - 16U 216 ports - 12U

Third-Party Tools and Libraries: HPC-X provides a compressive and high performance MPI and SHMEM communication libraries, including the support of Mellanox In-Network Computing hardware acceleration engines

InfiniBand Smart Adapters & SmartNICs

Adapters	Speeds	Connectors	Bus	RDMA Message Rate (mmps)	Features	Form Factors
ConnectX®-6	<ul style="list-style-type: none"> HDR HDR100 EDR FDR 	<ul style="list-style-type: none"> QSFP56 	PCIe Gen3/4 x16 2x PCIe Gen3 x16	215	0.6usec latency, enhanced Congestion Control, MPI tag matching offload, Block-level XTS-AES hardware encryption, Hairpin (Host chaining), host management, Mellanox Multi-Host®, NVMe-of Target Offload, Erasure Coding (RAID Offload), T-10 Dif/Signature Handover	<ul style="list-style-type: none"> PCIe stand-up PCIe Socket Direct OCP 3.0
ConnectX®-5	<ul style="list-style-type: none"> EDR FDR 	<ul style="list-style-type: none"> QSFP28 	PCIe Gen 3/4 x16	200 (ConnectX-5 Ex, Gen4 server) 165 (Gen3 server)	0.6usec latency, MPI tag matching offload, host management, Mellanox Multi-Host, Erasure Coding (RAID Offload), T-10 DIF/Signature Handover	<ul style="list-style-type: none"> PCIe stand-up PCIe Socket Direct OCP 2.0
BlueField® -2	<ul style="list-style-type: none"> HDR EDR 	<ul style="list-style-type: none"> QSFP56 	PCIe Gen3/4 x16	Contact Mellanox	<ul style="list-style-type: none"> Secure hardware, isolation, cryptography ConnectX-6 hardware offloads NVMe SNAP™ 1GbE out-of-band management port for the Arm subsystem 	<ul style="list-style-type: none"> PCIe stand-up

Cables & Transceivers

Direct Attach Cables (DAC)	Active Optical Cables (AOC)	Optical Transceivers
<ul style="list-style-type: none"> Cost-effective FDR/EDR/HDR cables Reach: ½ - 2m (HDR), ½ –5m (EDR) Zero power consumption Near zero latency delays 	<ul style="list-style-type: none"> Cost-effective FDR/EDR/HDR optical link Reach: up to 100m Lowest power consumption: 2.2W (EDR) Low latency delays Low Smoke, Zero Halogen jacket (EDR and HDR) BER less than 1E-15 	<ul style="list-style-type: none"> Full line of FDR/EDR/HDR 100m –2Km, 10Km (EDR) 100m (HDR) SR4 lowest power consumption - 2.2W (EDR) Multi-mode + single-mode