

SwitchX[®]-2 Virtual Protocol Interconnect[®] Optimized for SDN

SDN Optimized 36-port Switch-Router Device Provides Leading FDR 56Gb/s InfiniBand, 10/40/56GbE and Fibre Channel Throughput

Mellanox continues its interconnect leadership by providing the highest performing server and storage system interconnect solution for Enterprise Data Centers, Cloud Computing, High-Performance Computing, and embedded environments.

SwitchX[®]-2, the sixth generation switching IC from Mellanox, further improves the company's tradition of leading bandwidth, low-latency, and scalability by integrating Virtual Protocol Interconnect[®] (VPI) technology - allowing InfiniBand, Ethernet and Fibre Channel traffic to exist on a single 'one-wire' fabric. The industry-leading integration of 144 SerDes which are flexible enough to run 1 Gigabit to 14 Gigabit speeds per lane, independent of network protocol, makes SwitchX-2 an obvious choice for OEMs that must address end-user requirements for faster and more robust applications. Reduced power, footprint and a fully integrated PHY capable of connectivity across PCBs, backplanes as well as passive and active copper/fiber cables allow interconnect fabrics based on SwitchX-2 to be utilized by network architects deploying

leading, fabric-flexible computing and storage systems with the lowest TCO.

FDR

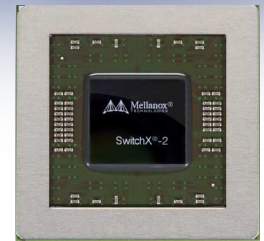
FDR InfiniBand technology moves from 8b10b encoding to more efficient 64/66 encoding while increasing the per lane signaling rate to 14Gb/s. Using FDR 4x ports and Mellanox ConnectX[®] family of InfiniBand adapters, users can increase end-to-end bandwidth up to 85% over previous QDR solutions. Mellanox end-to-end solutions can also take advantage of the efficiency of 64/66 encoding on 4x10Gb/s links using Mellanox FDR-10.

Virtual Protocol Interconnect (VPI)

SwitchX-2 VPI devices enable industry standard networking, clustering, storage, and management protocols to seamlessly operate over a single "one-wire" converged network. With auto-sense capability, each SwitchX-2 port can identify and operate InfiniBand, Ethernet, Data Center Bridging (DCB) or Fibre Channel protocol. Combined with Mellanox's ConnectX family of VPI adapters, on-the-fly fabric repurposing can be enabled for Cloud, Web 2.0, EDC and Embedded environments providing "future proofing" of fabrics independent of protocol.

Optimized SDN Support

SwitchX-2 includes advanced capabilities of remote configurable routing tables, support for overlay networks, efficient control plans, and SDN-optimized software interfaces.



HIGHLIGHTS

- Software Defined Networking VPI Data Center Switch
 - Complete support for OpenFlow and Subnet Management
 - Remote configurable routing tables
- Industry Leading Cut Through Latency
 - 170/220ns latency IB/Ethernet
- I/O Consolidation
 - IB and IP Routing
 - Ethernet and FC Gateways
- Virtualization Support
 - VEB, VEPA (+), Port Extender
- Data Center Bridging (DCB)
 - PFC, DCBX, ETS
- Low Cost Solution
 - Single-Chip Implementation
- Fully Integrated Phy
 - Backplane and cable support
 - 1, 2 and 4 Lane
- Up to 4Tb/s switching capacity
- Flexible Port Configurations
 - Up to 36, 56Gb/s IB, 40/56GbE Ports
 - Up to 64 10GbE Ports
 - Up to 24 2/4/8Gb FC Ports
- Adaptive Routing
- Congestion Control (QCN)
- RoCE Congestion Control
- Quality of Service 802.1p, DIFFSERV
- Switch Partitioning
- InfiniBand to Ethernet gateway
- Multichip Support
 - All ports support stacking
 - Management across multiple devices
- Energy Efficient Ethernet
- IEEE 1588 Clock Synchronization
- Active Power Governor

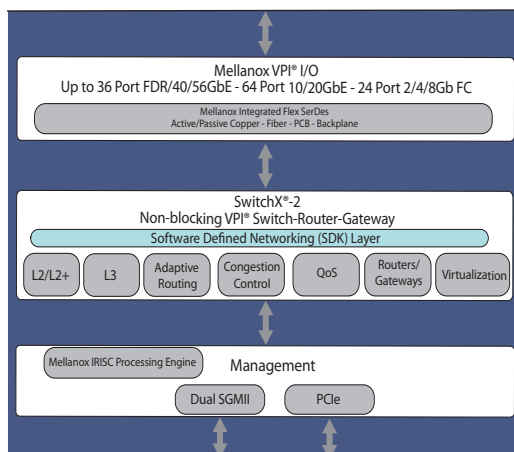


Figure 1: Mellanox SwitchX-2 Architecture

SwitchX-2 enables IT managers to program and centralize their server and storage interconnect management and dramatically reduce their operations expenses by completely virtualizing their data center network.

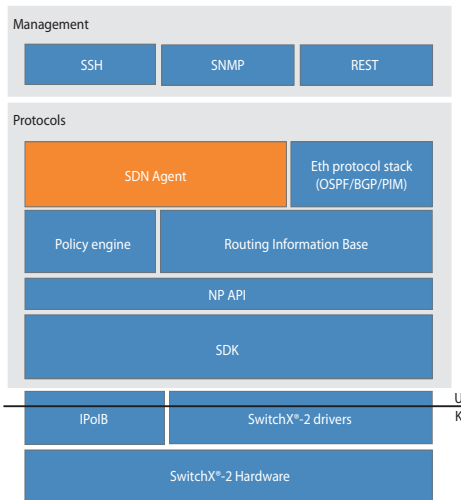


Figure 2: *Optimized SDN Support*

Configurations

SwitchX-2 allows OEMs to deliver:

- 36 Port 1U FDR 56Gb/s IB switch
- 36 Port 40/56 GbE or 64 Port 10GbE L2, L2+ and L3 switch
- 48 Port 10GbE to 12 Port 40GbE Top-of-Rack switch
- Blade switches for converged fabrics
 - (16 - 40GbE to servers, 12 - 10GbE to LAN, 8 - 8G FC to SAN and 2 - 40GbE stacking ports)
- Modular switch chassis up to 648 56Gb/s IB/40/56GbE ports

Switch Product Development Platforms

The SwitchX-2 Evaluation Board (EVB) and Software Development Kit (SDK) are available to accelerate OEMs' time to market and for running benchmark tests. These rack mountable systems are available with a mix of QSFP and SFP+ connectors for verifying InfiniBand, 10GbE, 40/56GbE and Fibre Channel functionality. In addition,

SMA connectors are available for SerDes characterization.

Mellanox Advantage

Mellanox is the leading supplier of industry standard InfiniBand and Ethernet HCA, NIC and switch silicon. Our products have been deployed in clusters scaling to thousands-of nodes and are being deployed end-to-end in data centers and TOP500 systems around the world.

SPECIFICATIONS

INFINIBAND

- IBTA Specification 1.2.1 compliant
- 10, 20, 40 or 56Gb/s per 4x port
- Integrated SMA/GSA
- Hardware-based congestion control
- 256 to 4Kbyte MTU
- 9 virtual lanes: 8 data + 1 management

ENHANCED INFINIBAND

- IB - IB Routing
- Hardware-based adaptive routing
- Up to 8 subnets/switch partitions
- Fine grained end-to-end QoS
- Port mirroring
- Supports Jumbo frame up to 10KB

ETHERNET

- 1, 10, 20, 40 and 56Gb/s
- DCB (PFC, ETS, DCBX)
- FCoE

COMPATIBILITY CPU

- PowerPC, IntelX86, AMDX86 and MIPS

PCI EXPRESS INTERFACE

- PCIe 3.0 compliant, 1.1 compatible
- 2.5GT/s or 5GT/s link rate x4

CONNECTIVITY

- Interoperates with InfiniBand, Ethernet and Fibre Channel adapters and switches
- Drives active/passive copper cables, fiber optics, PCB or backplanes

MANAGEMENT & TOOLS

- Supports Mellanox UFM and IBTA compliant Subnet Managers
- Diagnostic and debug tools

I/O SPECIFICATIONS

- 36 4x SDR/DDR/QDR/ FDR InfiniBand ports, 36 40/56GbE ports, 64 10/20GbE ports, 24 2/4/8Gb FC ports or a combination of port types
- SPI Flash interface, I²C
- IEEE 1149.1 boundary-scan JTAG
- Link status LED indicators
- General purpose I/O
- 45 x 45mm FCBGA

Ordering Part Number	InfiniBand 4X Port Speed	Typical Power
MT51236A2-FCCR-F	SwitchX, 36 Port InfiniBand FDR Switch IC	72W
MT51336A2-FCCR-F	SwitchX, 36 Port InfiniBand FDR/40/56GbE VPI Switch IC	72W
MT51234A2-FCCR-FE	SwitchX, 34 Port InfiniBand FDR Switch IC with up to 2 Port 40GbE or 4 Port 10GbE Gateway	70W
MT51224A2-FCCR-FE	SwitchX, 24 Port InfiniBand FDR Switch IC with up to 12 Port 40GbE or 24 Port 10GbE Gateway	66W
MT51236A2-FCCR-Q	SwitchX, 36 Port InfiniBand QDR Switch IC	72W
MT51234A2-FCCR-QE	SwitchX, 34 Port InfiniBand QDR Switch IC with up to 2 Port 40GbE or 4 Port 10GbE Gateway	70W
MT51224A2-FCCR-QE	SwitchX, 24 Port InfiniBand QDR Switch IC with up to 12 Port 40GbE or 24 Port 10GbE Gateway	66W



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