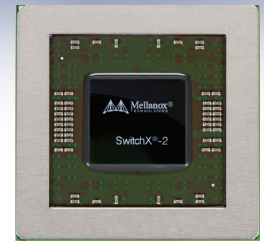




# SwitchX<sup>®</sup>-2 Virtual Protocol Interconnect<sup>®</sup> Optimized for SDN

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<sup>®</sup>-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<sup>®</sup> (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<sup>®</sup> 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

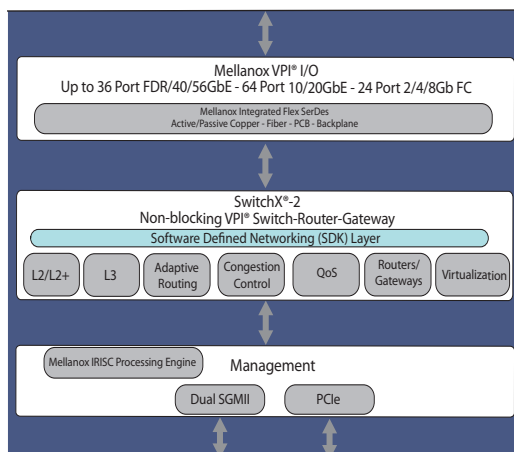


Figure 1: Mellanox SwitchX-2 Architecture

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.

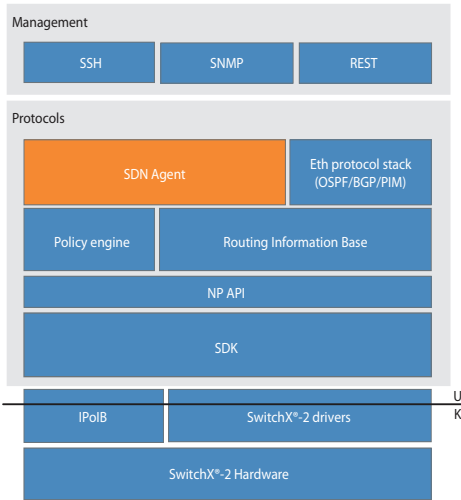


Figure 2: Optimized SDN Support

**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, I<sup>2</sup>C
- IEEE 1149.1 boundary-scan JTAG
- Link status LED indicators
- General purpose I/O
- 45 x 45mm FCBGA

Ordering Part Number	Description	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

NOTE: 56GbE operation requires an additional license.



350 Oakmead Parkway, Suite 100, Sunnyvale, CA 94085  
 Tel: 408-970-3400 • Fax: 408-970-3403  
[www.mellanox.com](http://www.mellanox.com)