SwitchX®-2 Software Development Kit

The SwitchX®-2 Software Development Kit (SDK) based on Mellanox’s fifth-generation switch silicon, SwitchX-2, allows switch and server OEMs to bring to market cost-effective solutions allowing LAN, SAN and IPC traffic to co-exist across a single fabric.

There is a growing demand for low cost, low power and high density interconnect convergence in the Enterprise Data Center (EDC), High-Performance Computing (HPC), Cloud and Web 2.0 markets.

SwitchX-2 Virtual Protocol Interconnect (VPI) provides the flexibility to implement InfiniBand, Ethernet and Fibre Channel connectivity using a single switch device while offering gateway and routing capabilities between protocols. Utilizing SwitchX-2 InfiniBand Link Level Flow control or Data Center Bridging (DCB) functionality, OEMs can deliver robust storage connectivity implementing industry standard Fibre Channel over InfiniBand (FCoIB) and Fibre Channel over Ethernet (FCoE) protocols.

Easy Portability with Fast Time-to-Market
Mellanox SwitchX-2 SDK includes a robust and portable device driver with two levels of APIs so the user can choose their level of integration. A minimal set of code is implemented in the kernel to allow for easy porting to various CPU architectures and operating systems. The SDK runs on top of x86 and PowerPC architectures utilizing the Linux operating system. Within the SDK, the device driver and API libraries are written in standard ANSI “C” language for easy porting to additional processor architectures and operating systems.

Figure 1. Mellanox Software Development Kit (SDK) Stack

- **BENEFITS**
  - Easily portable code base for fast time-to-market
  - Linux development environment
  - API Library written in ANSI “C”
  - Flexible development environment
  - Seamless integration with SwitchX Development Kit enabling development on CPU and OS of choice
  - Reduced development cycles with TestX development acceleration tool

- **KEY FEATURES**
  - 4Tb/s Unified Switching/Routing
  - Up to 36-ports SDR/DDR/QDR/FDR10/FDR InfiniBand, 36-ports 40/56GbE, 64-ports 10/20 GbE, 24-ports 2/4/8G FC
  - Low-latency Ethernet and InfiniBand gateways and routers between protocols*
  - Multiple API levels for flexibility
  - Support for VPI, virtualized and multichip implementations
  - Support for Adaptive Routing/ Congestion Control/QoS*

* Available in future software releases
Advanced Features
The SwitchX-2 SDK provides an interface to support multichip implementations. Arbitrary topologies are supported (Stack, Ring, Fat Tree) with any port capable of being a Stacking Port (SP). Policies such as QoS and ACLs can be implemented across the multichip fabric. The SwitchX-2 SDK also provides access to hardware resources locally and fabric wide to implement multiple switch partitions, virtual routers and port virtualization (VEB, VEPA, VEPA+) with features such as Hairpin Mode. When multiple switch partitions are implemented, a single switch device can have independent management planes; another feature exposed by the SwitchX-2 APIs. The SwitchX-2 SDK is topology aware for multipath implementations such as Adaptive Routing.

Applications
SwitchX-2 SDK is designed for managed SwitchX-2 single and multichip implementations in blade switches, top-of-rack (TOR) switches and large port count modular chassis aggregation switches providing Web 2.0 and Cloud scale-out, FCoIB and FCoE fabric convergence as well as Virtual I/O switching.

Multi-Protocol Gateways
The SwitchX-2 SDK provides APIs to make use of stateless gateways to provide an efficient but simple packet relay function with Fibre Channel sessions initiated and terminated at the end-points, resulting in high performance, low power and ultra low-latency. SwitchX-2 implements T-11.3 FC-BB-5 compliant FCoE and FCoB functionality.

Port Configuration
The SwitchX-2 SDK provisions the SwitchX-2 VPI ports for SDR/DDR/QDR/FDR10/FDR InfiniBand, 1/10/20/40/56Gb/s Ethernet and 2/4/8Gb FC. This ease of provisioning via VPI provides flexibility in repurposing the L2 protocol of any switch port making on-the-fly reproposing for multi-tenant cloud environments a reality.

To support efficient, lossless traffic, SwitchX-2 SDK includes facilities to set priorities per port, per virtual port and even per traffic flow. In doing so, management and protocol stack software running on top of SwitchX-2 SDK can moderate traffic efficiently for latency and bandwidth, instantiate gateways and virtual routers and manage Link Aggregation (LAG) and QoS resources.

TestX™
The SwitchX-2 SDK is complemented by the TestX™ development acceleration tool, which is designed to reduce development and porting time. TestX provides a Command Line Interface (CLI) to test SwitchX-2 application interface (API) and functionality without writing a single line of code.

TestX can be used as a debug tool or as an easy way to test the software and hardware capabilities before development starts. TestX syntax is straightforward, similar to the SDK API and help information is available with every command. TestX is provided as source code in the SDK package.