



Mellanox Spectrum® Network Operating System (NOS) Porting Tools

ALIGN MELLANOX PORTING TOOLS TO YOUR NEEDS

The entire Mellanox® Spectrum switch silicon family supports advanced software defined networking and real-time telemetry, along with high bandwidth cut-through performance, making it the ideal choice for building web scale IT, cloud, Edge, hyperconverged storage and data analytics applications infrastructures.

Mellanox offers a wide selection of NOS porting tools that can be used with all generations of Mellanox Spectrum switch asics:

- Software Development Kit (SDK) for classic NOS porting
- Switchdev native Linux driver to be used with standard Linux APIs, libraries and tooling
- Switch Abstraction Interface (SAI) API to be used with SONiC, an open NOS.

All three NOS porting options support Mellanox What Just Happened™ (WJH) advanced streaming telemetry. WJH goes beyond conventional telemetry solutions by providing actionable details on abnormal network behavior using the WJHlib, and also enabling easy configuration and management.

HIGHLIGHTS

SDK

- Single consistent API model across all Mellanox Spectrum switch asics
- Reliable, proven and battle-hardened (10+ years in production)
- Multiple CPU architectures supported
- Enhanced support and debug model
- Open Source API headers

SAI

- Open industry-standard API
- Proven & key component of SONiC
- Significant Mellanox contribution

Switchdev

- Pristine open source Linux as NOS
- Standard Linux interfaces and APIs
- Hardware independent abstraction layer
- Upstreamed and supported with all major Linux distributions

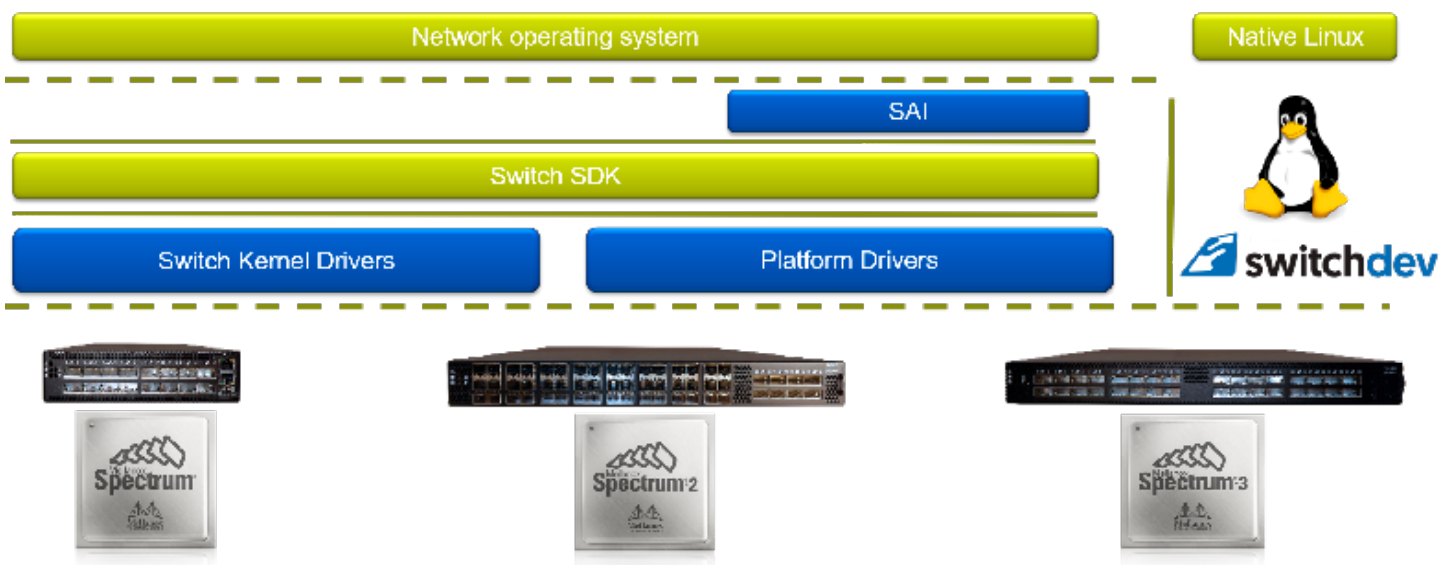


Figure 1. A wide selection of NOS porting tools

SDK

- Single consistent API model across all Mellanox Spectrum switch ASICs
- Reliable, proven and battle-hardened (10+ years in production)
- Multiple CPU architectures supported
- Enhanced support and debug model
- Open Source API headers

Implementation of the SDK process is OS-agnostic. A minimal set of code is implemented in the Linux kernel to allow for easy porting to various CPU architectures and real-time operating systems. Mellanox SDK exposes the ASIC's capabilities using a consistent and open API model to the NOS. This provides additional flexibility to implement features in the NOS while maintaining a consistent user experience across product generations and platforms.

The switch SDK supports a direct interface between multiple application processes and the switch Linux kernel driver. Applications connect to the hardware interfaces via both the SDK host interface library and the Linux kernel TCP/IP stack. The SDK Multi-threaded host interface creates and manages the multiple switch-to-CPU interfaces, registered events/control traffic, and the policers' resources for policy flows and traffic to the CPU. Moreover, The SDK host interface acts as a server and handles real-time operating system obstacles such as: mutual exclusion and priority inversion.

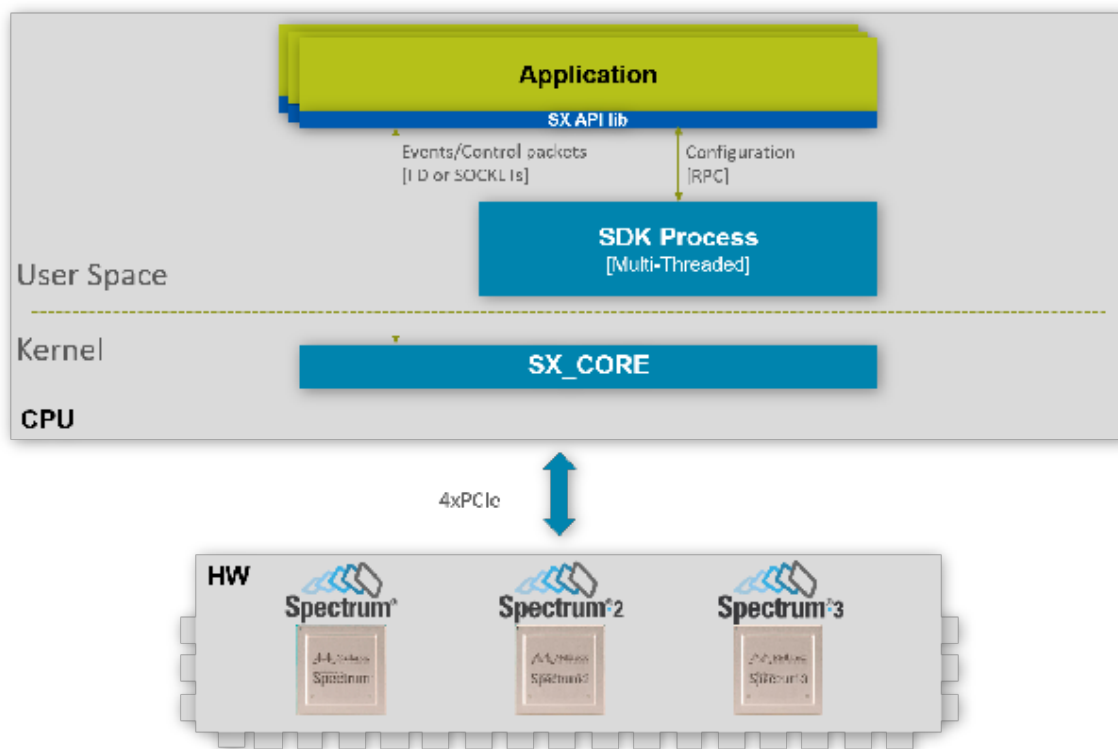


Figure 2. Mellanox SDK uses consistent and open API to the NOS, providing additional flexibility while maintaining a consistent user experience.

To support efficient, lossless traffic, Mellanox Spectrum 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 Mellanox Spectrum SDK can moderate traffic efficiently for latency and bandwidth, instantiate gateways and virtual routers and manage Link Aggregation (LAG) and QoS resources. In addition, SDK and FW ISSU enables zero downtime of the data plane.

Mellanox Spectrum SDK development envelope is comprised of a dedicated core support team throughout the porting process and various development design guides and debug processes.

SAI

- Open industry-standard API
- Proven & key component of SONiC
- Significant Mellanox contribution

Mellanox has pioneered the Open Ethernet approach to network disaggregation. Mellanox has made significant contributions to SAI – an open, industry-standard switch hardware abstraction API, built as an abstraction level on top of Mellanox SDK. SAI frees network operators from vendor lock-in, provides architectural flexibility, making it a core component in SoniC, a leading open-source NOS.

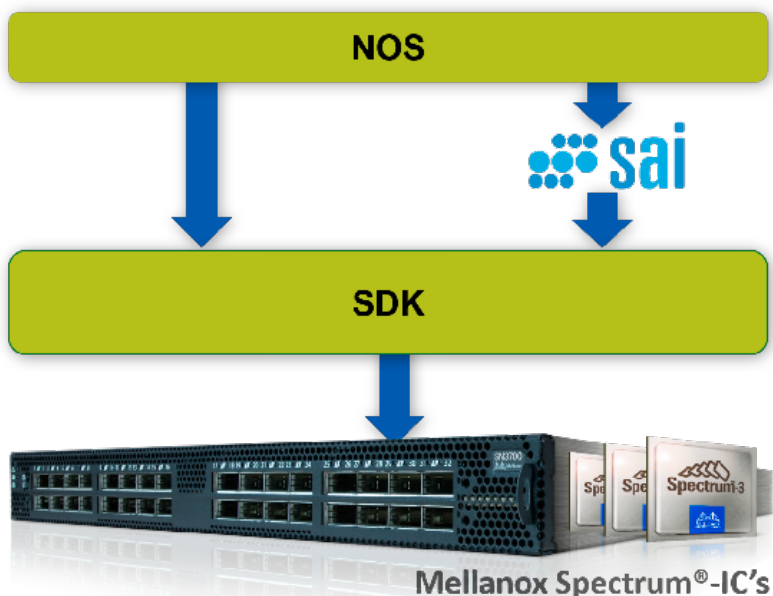


Figure 3. Mellanox's open and proven industry-standard API

Switchdev

- Pristine open source Linux as NOS
- Standard Linux interfaces and APIs
- Hardware independent abstraction layer
- Upstreamed and supported with all major Linux distributions

Mellanox developed the Switchdev kernel level module, another approach to network disaggregation, and contributed it to the open source community. The Switchdev module is an abstraction layer which provides open, standard Linux interfaces, ensuring that any Linux application can run on top of it. The interfaces can be Open Ethernet protocol stacks, management tools, user-developed applications, and more. Disaggregation also decouples the switch hardware from the switch software, meaning software built on standard Linux APIs can run on different hardware with zero porting effort. Any Linux application that runs on top of the Mellanox switchdev driver enjoys genuine maximal hardware performance by design – the driver is natively implemented in the Linux kernel and interfaces directly with the switch silicon.

Switchdev provides users the flexibility to customize and optimize the switch to their exact needs without paying for expensive proprietary software including features they neither need nor will ever use. It also reduces software maintenance expenses, resulting in lower TCO and improved ROI.

Once the Mellanox Switchdev driver is loaded into the Linux Kernel, each of the switch's physical ports is registered as a net_device within the kernel. Switchdev turns switch platforms into yet another server running Linux easing management and automation. SwitchDev is available with all major Linux distributions including RedHat, Ubuntu, Suse and CentOS.

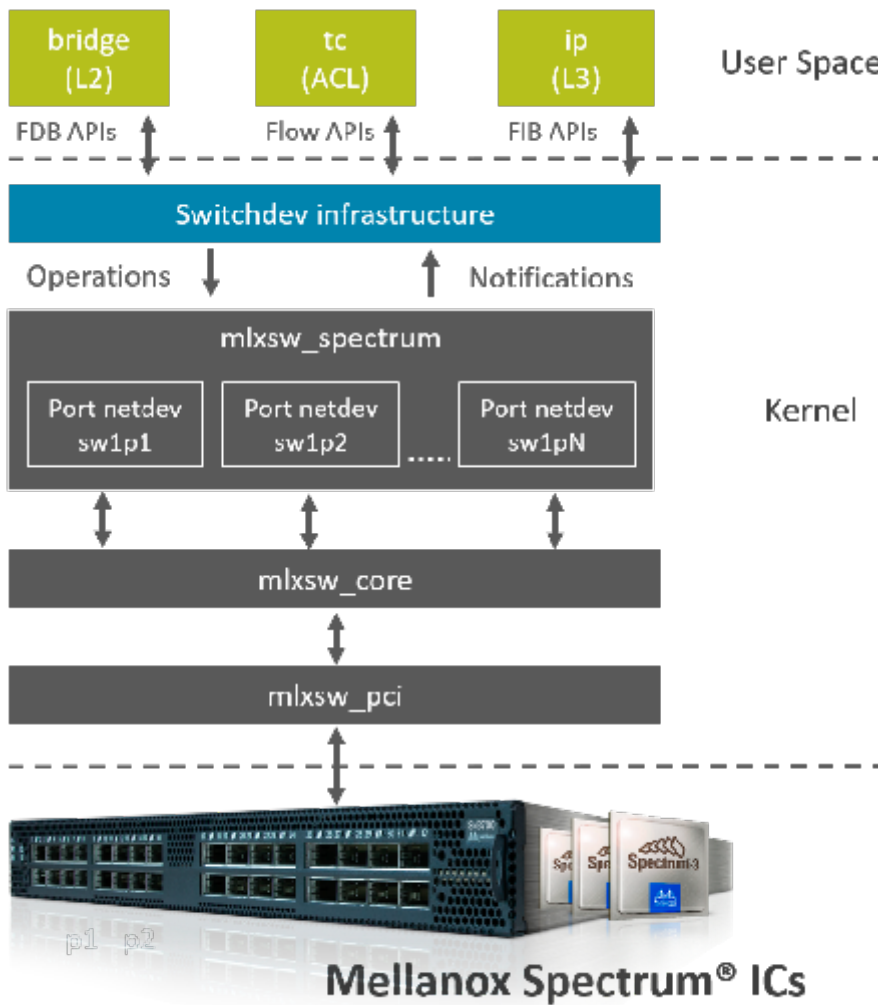


Figure 4. Mellanox's Switchdev provides users the flexibility to customize and optimize the switch to their exact needs.