DATASHEET

NVIDIA SPECTRUM ETHERNET SWITCH FAMILY

Accelerated Ethernet for AI and Cloud

NVIDIA provides the highest-performing Ethernet switch systems at port speeds ranging from 1GbE through 400GbE, enabling artificial intelligence, machine learning, simulation, cloud-native, storage, and high-performance computing applications to operate with maximum functionality at scale.

The NVIDIA Spectrum™ Ethernet family includes a broad portfolio of switches, ranging from 16 through 128 ports and with speeds from 1 gigabit per second (Gb/s) to 400Gb/s, allowing the construction of purpose-built data centers at any scale with any desired blocking ratio. This enables network and data center managers to design and implement a cost-effective switch fabric based on the "pay-as-you-grow" principle. Thus, a fabric consisting of a few servers can gradually expand to include hundreds or thousands of servers.

The Spectrum Ethernet switch family is powered by the Spectrum application-specific integrated circuit (ASIC). Spectrum switches feature dynamic, flexible shared buffers and predictable wire-speed performance. This high-performance design is required to accelerate NVIDIA platforms, including NVIDIA EGX™, NVIDIA DGX POD™, and NVIDIA OVX™ SuperPODs and AI solution stacks such as NVIDIA AI Enterprise and NVIDIA LaunchPad.

The Spectrum switch family is pretested and prevalidated with NVIDIA's full portfolio of Ethernet networking technology, including NVIDIA® BlueField® data processing units (DPUs), NVIDIA ConnectX® smart network interface cards (SmartNICs), and LinkX® interconnects. This end-to-end switch-to-host solution is critical to powering accelerated workloads and delivers the high-performance and innovative feature set needed to supercharge cloud-native applications at scale.

The SN2000, SN3000, and SN4000 series are available in three versions:

- Preinstalled with NVIDIA Cumulus® Linux, NVIDIA's flagship network operating system that takes the Linux user experience from servers to switches and provides a rich routing and automation functionality for large-scale applications
- Bare-metal switches, including an Open Network Install Environment (ONIE) image ready to be installed with the SONiC or another ONIE-mounted operating system
- Preinstalled with NVIDIA Onyx™, a home-grown operating system utilizing an industry-standard command-line interface (CLI).

BENEFITS

- **Cloud-Native Infrastructure**
  - Leaf and spine architectures that easily scale up to 10K+ nodes in two tiers
  - Best-in-class virtual extensible local area network (VXLAN)
  - Automation with best-of-breed tools, including Ansible, Chef, Puppet, and SaltStack
  - Hyperconverged infrastructure integration
  - Turnkey data center interconnect solutions
- **AI, Storage, and Cloud Interconnect**
  - A fair, high-bandwidth, low-latency, and bottleneck-free data path
  - Robust remote direct-memory access (RDMA) over converged Ethernet (RoCE) transport for NVMe over Fabrics (NVMe-oF) or NVIDIA Magnum IO™
  - Intelligent hardware-accelerated data movement, adaptive routing, and congestion control for applications leveraging RoCE
  - Built-in telemetry with NVIDIA What Just Happened® (WJH)

A Cloud Without Compromise

Performance

- Fully shared packet buffer, which provides a fair and high-bandwidth data path
- Intelligent congestion management that enables robust RoCE transport
- Adaptive flowlet routing to maximize link utilization

Features and Scale

- Single-pass VXLAN routing and bridging
- 10X better VXLAN scale
- Hardware-based network address translation (NAT)
- Multi-protocol label switching (MPLS) and Internet Protocol version 6 (IPv6) segment routing
- Massive layer-2, layer-3, and access control list (ACL) scale
- Large-scale flow counters

Visibility

- Hardware-based sub-microsecond buffer tracking and data summarization
- Granular and contextual visibility with WJH
- Streaming and in-band telemetry

SN2000 series

Spectrum-Based Switches	SN2201*	SN2010	SN2100	SN2410	SN2700
Connectors	48x RJ45 1GbE + 4x QSFP28 100GbE	18x SFP28 25GbE + 4x QSFP28 100GbE	16x QSFP28 100GbE	48x SFP28 25GbE + 8x QSFP28 100GbE	32x QSFP28 100GbE
100GbE ports	4	4	16	8	32
50GbE ports	8	8	32	16	64
40GbE ports	4	4	16	8	32
25GbE ports	16	34	64	64	64
10GbE ports	16	34	64	64	64
1GbE ports	48	34	64	64	64
Height	1 RU	1 RU	1 RU	1 RU	1 RU
Switching capacity [Tb/s]	0.488	0.85	1.6	2.0	3.2
FRUs	PS AND FANS	-	-	PS and fans	PS and fans
PSU redundancy	✓	✓	✓	✓	✓
Fan redundancy	✓	✓	✓	✓	✓
CPU	X86	X86	X86	X86	X86
Wire-speed switching [Bpps]	0.667	1.26	2.38	2.97	4.76

* Available Q3 2022

SN3000 series

Spectrum-Based Switches	SN3420	SN3700C	SN3700
Connectors	48x SFP28 25GbE + 12x QSFP28 100GbE	32x QSFP28 100GbE	32x QSFP56 200GbE
200GbE ports	-	-	32
100GbE ports	12	32	64
50GbE ports	24	64	128
40GbE ports	12	32	32
25GbE ports	48 + 48	128	128
10GbE ports	48 + 48	128	128
1GbE ports	48 + 12	128	128
Height	1 RU	1 RU	1 RU
Switching capacity [Tb/s]	2.4	3.2	6.4
FRUs	✓	✓	✓
PSU redundancy	✓	✓	✓
Fan redundancy	✓	✓	✓
CPU	X86	X86	X86
Wire-speed switching [Bpps]	3.58	4.76	8.33

SN4000 series

Spectrum-Based Switches	SN4410	SN4600C	SN4600	SN4700	SN4800*
Connectors	24x QSFP28-DD 100GbE + 8x QSFP-DD 400GbE	64x QSFP28 100GbE	64x QSFP56 200GbE	32x QSFP-DD 400GbE	Based on line cards
400GbE ports	8	-	-	32	-
200GbE ports	16	-	64	64	-
100GbE ports	48 + 32	64	128	128	Up to 128 in full chassis
50GbE ports	48 + 32	128	128	128	Up to 128 in full chassis**
40GbE ports	32	64	64	64	Up to 128 in full chassis**
25GbE ports	128	128	128	128	Up to 128 in full chassis**
10GbE ports	128	128	128	128	Up to 128 in full chassis**
1GbE ports	128	128	128	128	-
Height	1 RU	2 RU	2 RU	1 RU	4 RU
Switching capacity [Tb/s]	8.0	6.4	12.8	12.8	12.8
FRUs	✓	✓	✓	✓	✓
PSU redundancy	✓	✓	✓	✓	✓
Fan redundancy	✓	✓	✓	✓	✓
CPU	X86	X86	X86	X86	X86
Wire-speed switching [Bpps]	8.4	8.4	8.4	8.4	8.4

* Available Q3 2022
**Roadmap

Ready to Get Started?

To learn more about NVIDIA Spectrum Ethernet Switches visit:
nvidia.com/en-us/networking/ethernet-switching/