



NVIDIA Spectrum-X SN5600

Also known as: Spectrum-4 SN5600 · 920-9N42F-00RI-7C0

The SN5600 is a 64-port 800GbE Spectrum-4 switch and the leaf/spine building block of Spectrum-X, NVIDIA's Ethernet alternative to InfiniBand for AI training and inference fabrics. On its own it is a 51.2 Tb/s cut-through Ethernet switch. Paired with BlueField-3 SuperNICs on the host side, it becomes the full Spectrum-X stack: lossless RoCE, per-packet adaptive routing and telemetry-based congestion control tuned for GPU collective traffic. Buy it as a commodity switch or as one half of a matched fabric; the two behave very differently.

51.2 Tb/s Switching capacity · non-blocking, cut-through	64 × 800 GbE OSFP Ports · plus 1× SFP28 for management	Spectrum-4 ASIC · single-chip, purpose-built for AI/cloud
33.3 Bpps Forwarding rate · line rate, all ports	940 W Typical power · with passive copper cables	2U, 19-inch rack Form factor · 23.5 kg

SWITCHING01/05	
ASIC	NVIDIA Spectrum-4 · single ASIC per switch
Aggregate throughput	51.2 Tb/s · bidirectional
Packet forwarding rate	33.3 Bpps
Latency	Cut-through · fully shared packet buffer
Max port configurations	64×800G / 128×400G / 256×200G · also 256×100G, 256×50G, 128×40G via breakout

PORTS & CABLING02/05	
Data ports	64 × OSFP · 10/25/50/100/200/400/800 GbE per port
Management port	1 × SFP28 · 1/10/25 GbE, port 65
Cabling	Passive DAC, active AEC, optical transceivers · OSFP, vendor-qualified
MACsec/VXLANsec	Up to 12.8 Tb/s · line-rate encryption

POWER & THERMAL		03/05
Typical power	940 W · with passive copper cables	
Input voltage	200-264 VAC · 2× AC power supplies	
Operating temperature	0-35°C	
Humidity	10-85% · non-condensing	
Max altitude	3050 m	
PHYSICAL		04/05
Form factor	2U, 19-inch rack	
Dimensions	88 × 438 × 720/745 mm · H × W × D, D varies with fan levers	
Weight	23.5 kg	
SPECTRUM-X FEATURES		05/05
Adaptive routing	Per-packet · requires BlueField-3 SuperNIC on hosts	
Congestion control	Telemetry-based, real-time reroute · avoids ECMP hash collisions on elephant flows	
Fabric behavior	Lossless RoCE · InfiniBand-style behavior ported to Ethernet	
Claimed AI throughput gain	Up to 1.6× · vs. off-the-shelf Ethernet, NVIDIA benchmark	
PROCUREMENT		
Typical lead time Not publicly listed by NVIDIA. Distributors (Hardware Nation, Avendor) mark listings "call for availability" or quote from spot stock rather than a fixed lead time; treat any in-stock count as a snapshot, not a supply signal. Pricing Reported \$65,000-\$87,000 street for a single new unit, before optics, cables, or BlueField-3 NICs: Hardware Nation lists \$67,213, Avendor lists \$70,391 (sale) against an \$87,125 list price. Used/refurbished units have traded near \$18,750 on secondary channels.		
Price excludes 800G OSFP transceivers/DACs and BlueField-3 SuperNICs, which for a rail-optimized build typically cost more in aggregate than the switches. Full Spectrum-X behavior (adaptive routing, RoCE congestion control) requires BlueField-3 on the host side; an SN5600 paired with commodity NICs runs as a fast but ordinary Ethernet switch. Volume/allocation pricing for large fabrics is quote-only; the street prices above are single-unit list or reseller prices, not deployed-at-scale pricing.		

FIELD NOTES

- InfiniBand vs. Spectrum-X is a fabric decision, not a switch spec sheet decision: InfiniBand stays more deterministic for tight GPU collective synchronization; Spectrum-X trades a little of that determinism for Ethernet-standard tooling, ops staffing, and multi-vendor optics.
- Adaptive routing and RoCE congestion control are a matched-pair feature: they only fully engage when BlueField-3 sits on the other end of the link. Mixing an SN5600 with third-party or older ConnectX NICs falls back to plain ECMP RoCEv2, which is a meaningfully different fabric.
- One 51.2 Tb/s ASIC replacing what used to take two Spectrum-3 switches cuts rack count and fiber runs for a given port count; that consolidation is the practical reason to move off Spectrum-3, independent of the AI-specific features.
- 940 W typical per switch sounds small next to a GPU node, but a spine/leaf Spectrum-X fabric runs dozens of these; budget PDU and cooling headroom for the switch tier separately from the compute tier, not as a rounding error on it.
- "Call for availability" pricing from every reseller checked means real lead time and volume pricing only shows up once you are in a live quote; do not plan a build timeline off a website price alone.

QUESTIONS WE GET ON THIS PART

Is Spectrum-X the same thing as InfiniBand?

No. Spectrum-X is an Ethernet fabric (Spectrum-4 switches like the SN5600 plus BlueField-3 SuperNICs) engineered to behave more like InfiniBand: lossless transport, per-packet adaptive routing, and telemetry-driven congestion control. It is NVIDIA's Ethernet answer to InfiniBand for AI clusters, not a rebrand of InfiniBand itself.

Does the SN5600 need BlueField-3 to work?

No, it functions as a standard 51.2 Tb/s Ethernet switch with any RoCE-capable NIC. But the Spectrum-X-specific behavior, adaptive routing and telemetry-based congestion control, requires BlueField-3 SuperNICs on the connected hosts to fully engage.

How much does an SN5600 cost?

Reported street pricing runs roughly \$65,000 to \$87,000 per unit for a new switch, before optics, cables, or NICs, based on Hardware Nation and Avendor listings. Get a live quote for volume or allocation pricing.

What cabling does the SN5600 use?

64 OSFP ports supporting 10 through 800 GbE via passive DAC, active AEC, or optical transceivers, plus one SFP28 port for out-of-band management (1/10/25 GbE).

REFERENCES

[1] <https://networking-docs.nvidia.com/sn5000hw/specifications>

[2] <https://www.fibermall.com/blog/nvidia-sn5600.htm>

[3] <https://hardwarenation.com/product/nvidia-spectrum-4-sn5600-800g-64-port-51-2tb-s-2u-data-center-switch/>

[4] <https://www.avendor.com/products/nvidia-spectrum-sn5600-ethernet-switch>

[5] <https://www.ebay.com/itm/405026356093>

[6] <https://firstpasslab.com/blog/2026-03-15-nvidia-spectrum-x-ethernet-ai-fabric-deep-dive/>

[7] <https://www.blocksandfiles.com/ai-ml/2025/02/04/nvidia-says-spectrum-x-adaptive-routing-can-boost-storage-fabric-bandwidth/1606433>