

Flash Comment — August 26, 2025

Semiconductors
IT Hardware & Communications Networking

NVDA Hot Chips Presentation—'Scale-Across' Fabric via New Spectrum-XGS; Co-Packaged Optics, & More

Our Call

At *Hot Chips 2025* today, Gilad Shainer, SVP of NVIDIA Networking, provided a presentation titled "*Co-Packaged Silicon Photonics Switches for Gigawatt AI Factories*". With investor focus on CPO we thought we would highlight a few quick takes:

Initial Thoughts

- **The Next Dimension of the AI Fabric = Scale-Across.** Mr. Shainer's presentation highlighted NVIDIA's push to support across campus / regional data center connectivity with new [Spectrum-XGS](#) Ethernet for *Giga-Scale AI super-factories* (+1,000km scaling; algorithms built by NVIDIA have no distance limitations overtime; today at 10's KMs). NVIDIA emphasized AI-optimized Ethernet vs. off-the-shelf (OTS) Ethernet with a 1.9x NCCL performance advantage for multi-data center connectivity.
- [Spectrum-XGS](#) is now available as part of NVIDIA's Spectrum-X portfolio. [CoreWeave](#) will be the first customer to deploy NVIDIA's new [Spectrum-XGS](#) platform.
- **Co-Packaged Optics (CPO) for Scale-Out Fabric.** Mr. Shainer's presentation was more of a reaffirmation of NVDA's views of requiring the eventual move to CPO (Silicon Photonics) for scale-out connectivity; emphasizing the continued focus on [utilizing copper as long as possible in scale-up fabric](#) (no comments on CPO for GPU-to-GPU / rack-level).
- As intro'd at GTC '25, Spectrum-X with CPO is the industry's 1st 1.6T Silicon Photonics CPO switch utilizing new internally-developed Micro-Ring Modulation (MRM). NVDA uses TSMC's COUPE (Compact Universal Photonics Engine) platform. MRM allows increased switch radix scaling. NVDA's presentation highlighted 100s of patents and alignment with key strategic partners (including laser partners). CPO is noted to provide 3x more GPU connectivity at same ISO power.
- NVDA also highlighted Spectrum-X Ethernet Photonics (102T integrated SiPho) providing 2x better throughput, 63x higher signal integrity, 4x fewer lasers with 13x better laser reliability, and 1.6x bandwidth density improvement. NVIDIA CPO options are available in a 144-port 800G Quantum-X InfiniBand 115Tb/s switch and 512-port (409.6Tb/s) or 128-port (102.4Tbps) Spectrum-X Ethernet switches. All of these switches are liquid-cooled.
- We would re-highlight this write-up on NVDA CPO-based switches from earlier this year - [NVIDIA Weaves Silicon Photonics into InfiniBand and Ethernet](#) (*The Next Platform*)

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- **Different Types of Ethernet:** 1. Off-the-shelf for heavy enterprise data centers; a lot of features and small radix and a lot of virtualization support. 2. Hyperscale spine networks for single-workload characteristics; jitter is fine in these environments. 3. Service provider Ethernet for core, carrier, and data center interconnect (DCI). 4. AI Factory (optimized) Ethernet – a new Ethernet; why NVIDIA designed Spectrum-X Ethernet with a focus on RDMA optimization (key element) and key to provide a lossless network (no packet drops).
- **NVIDIA Spectrum-X Ethernet is Platform:** Mr. Shainer noted that NVIDIA is focused on designing an infrastructure (not a switch); Spectrum-X is a portfolio / platform consisting of Spectrum-X Ethernet SuperNICs (each end) and Ethernet switching to work end-to-end. Switching is focused on spreading of traffic across the network; eliminating hotspots via port failures. SuperNICs control congestion rates based on telemetry from the switching; schedule data transmission. The second thing the SuperNIC does is placing the data back in order.
- **Spectrum-X in Multi-Tenant.** NVIDIA's presentation reiterated the company's 35% higher performance versus traditional off-the-shelf Ethernet. Additionally, the company highlighted a 3x higher expert dispatch performance. On large training, Spectrum-X was highlighted to provide very deterministic performance (range from 15%-40%+ difference vs. OTS Ethernet). Other specs: 1.6x better load balancing, 1.3x better tail latency, 2.2x noise isolation, high-frequency telemetry at 1,000x, and data path programmability (16 cores / 256 threads for in-network compute).

Investment Thesis, Valuation and Risks

Nvidia Corporation (NVDA)
Investment Thesis

Our Overweight rating is based on our positive stance on NVIDIA’s competitive positioning in gaming GPUs and expanding growth opportunities in data center, HPC, and emerging / expanding AI opportunities (autonomous vehicles, healthcare, robotics, etc.). We see sustainability in NVIDIA's CUDA software platform differentiation, as well as the company's continually deepening system software capabilities. We see NVIDIA as one of the most attractive secular growth stories in large-cap semis.

Target Price Valuation for NVDA: \$220.00

Our \$220 price target is ~29x P/E on our C2027E. This compare to NVDA trading at a ~36x median NTM P/E on consensus estimates over the past three years. We think a premium multiple for NVIDIA is warranted given its strong multi-year competitive positioning for data center growth, driven by cloud and AI, gaming, next-generation autonomous vehicles, and an expanding ecosystem of products/ applications (e.g., Omniverse).

Risks to Our Price Target and Rating for NVDA

Risks include: (1) increased competition in the PC gaming, cloud data center markets, and high-performance computing, (2) the continued development of new markets, including artificial intelligence/machine learning and autonomous driving, (3) delays in product introduction due to use of third-party process technology, component availability, etc.

Companies Mentioned in Report

Company Name	Ticker	Last Price (08/25/25)	Rating
Nvidia Corporation	NVDA	\$179.81	Overweight

Source: Wells Fargo Securities LLC Estimates, FactSet

