NOMURA

Global AI Trend Tracker

EQUITY: TECHNOLOGY

AI Expert Call #56: CPO market updates

Quick Note

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We hosted our AI Expert Call Series #56 today (20 January), with an expert from a leading global AI networking company. We discussed CPO technology roadmaps, CPO application in scale-out and scale-up network, commercialization timeline, and CPO supply-chain dynamics. Below are the key takeaways:

CPO penetration might rise from 2H27E, while NPO could be transitional in 2026E

- Currently, CPO switches are still in the small-scale shipment stage, with Broadcom's (AVGO US, Not rated) CPO switches taking a high portion of market share. The biggest bottlenecks for mass production include thermal management materials and the yield rate of optoelectronic co-packaging process. The expert expects that the **CPO penetration could reach 3-5% in 2026E**, **accelerate from 2H27E**, and scale-up (a major scenario) in the future.
- In terms of price, CPO switches are generally **30-40% more expensive** than traditional switches and pluggable optical modules. Regarding cost breakdown, versus BOM cost, **switch chips account for about one-third of the cost**, **optical engines account for about 30%**, **external lasers 10-15%,** and p**ackaging, PCB, and fiber arrays make up the remaining 15%**. The expert projects that once CPO switches reach mass production, the cost could be **30% lower than that of traditional solutions**.
- In terms of CPO supply chain, major laser providers include Lumentum (LITE US, Not rated), Coherent (COHR US, Not rated), and Broadcom. Fiber array manufacturers include Senko Advanced Components (Unlisted) and US Conec (Unlisted), and fiber cable manufacturers include Corning (GLW US, Not rated) and YOFC (6869 HK, Buy).
- **NPO is a transitional solution that could be deployed in 2026E**, with the (pluggable) optical engine located as close as possible to the ASIC. NPO consumes less power than traditional switches, and is also easier to produce than CPO.
- In the data center switch segment, the expert thinks the **400G switches** will remain the mainstream in 2026E, with a **penetration rate of around 50%**; **800G switches** will see large-scale growth in 2026E, with the **penetration rate expected to approach 50%** while 1.6T switches are expected to only be shipped in small batches this year.

Broadcom vs NVIDIA CPO solution

- Broadcom and NVIDIA (NVDA US, Not rated) have different strategies for their CPO switches. NVIDIA aims to create a full-stack CPO system, which is highly integrated with its GPUs; therefore, it uses **3D packaging and Micro-Ring Modulator (MRM) to achieve** higher integration and better performance, but this is also more technically challenging. Broadcom, on the other hand, s**eeks greater compatibility with various network architectures of Cloud Service Providers (CSPs);** hence it uses a more mature Mach-Zehnder Modulator (MZM) at the current stage.

Ultra Ethernet vs NVLink Fusion vs UALink

- Scale-up network protocol primarily follows two major roadmaps: one is the bus architecture, including **NVLink, PCIe, etc, which offers low latency but has limited bandwidth**. The other roadmap uses the **Ethernet architecture, with a higher bandwidth but also has a higher latency**.

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- Broadcom has launched **SUE1.0 based on TH5 chip and SUE2.0 based on TH6 chip**, primarily using standardized Ethernet protocols, with compatibility and cost being its biggest advantages.
- NVLink Fusion is still a customized system, with low latency performance, and it is already adopted by Oracle (ORCL US, Not rated) and AWS (AMZN US, Not rated), according to the expert. UALink has prototypes available, but it is still in early stages and its overall progress is slow.

EML chips could face 20% supply gap in 2026E

- EML chips will face supply shortages in 2026E, due to strong optical transceiver demand, and 200G EMLs shortages are more severe, according to the expert.
- The expert thinks that the overall demand for **100G+200G EMLs this year** will be **around 500mn units**, while **production capacity can only reach 400mn units, resulting in an overall shortage of about 20%**. Due to the **long lead time of optical chip production (around 9 months)**, the expert thinks that optical chips will remain in a tight supply situation over the next 2-3 years.

Appendix A-1

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