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The Global Co-Packaged Optics Market 2026-2036

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Abstracts

The co-packaged optics (CPO) market addresses a structural bottleneck in AI datacentre infrastructure: as switch ASIC bandwidth doubles roughly every 18–24 months while the electrical reach of copper signalling shrinks at higher SerDes rates, conventional pluggable optical transceivers are reaching fundamental physical and economic limits. CPO resolves this by integrating the optical engine directly within the switch ASIC or GPU/XPU package, shortening the electrical path, cutting interconnect power consumption from roughly 15 picojoules per bit toward 5 pJ/bit and below, and removing the front-panel density ceiling that constrains pluggable designs at 102.4 Tbps and above.

The market comprises two sub-segments with distinct timing. Scale-out CPO — optical engines for Ethernet and InfiniBand network switches — is the earlier and more standardised segment, with first commercial deployments at hyperscalers in 2026 on Broadcom Tomahawk 6-based platforms. Scale-up CPO — optical I/O integrated within GPU packages to replace copper interconnects such as NVLink — begins its volume ramp later in the decade with the NVIDIA Rubin generation, and is widely expected to become the larger and faster-growing of the two sub-segments as GPU optical I/O attach rates rise.

Importantly, CPO is additive rather than a wholesale replacement for pluggable transceivers, which retain structural dominance in enterprise, telecom, and lower-bandwidth cloud applications throughout the forecast period. The late-2020s window is best understood as a managed coexistence of pluggable, near-package, and co-packaged optics across different datacentre tiers, with the balance shifting steadily toward integration as reliability, thermal, and interoperability challenges are resolved.

The competitive landscape spans vertically integrated leaders — NVIDIA and Broadcom — and a layer of specialist innovators. Among these, Ayar Labs is notable: the fabless

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optical I/O chiplet developer closed a $500 million Series E round in March 2026 led by Neuberger Berman, bringing total funding to approximately $870 million and a valuation of $3.75 billion, with strategic backing from AMD and NVIDIA. The proceeds are earmarked for scaling high-volume production and test capacity for its co-packaged optics solution. Advanced semiconductor packaging — 2.5D interposers, through-silicon vias, fan-out, glass interposers, and 3D hybrid bonding — is the critical enabling technology and the principal supply-chain bottleneck, alongside laser source capacity. NVIDIA's March 2026 investment in Lumentum and Coherent underscores how upstream silicon-photonics and laser supply have become strategically central to the CPO ecosystem.

The Global Co-Packaged Optics Market 2026-2036 delivers a comprehensive analysis of one of the most significant technological transitions in data centre infrastructure since the advent of optical communications. As switch ASIC bandwidth doubles roughly every 18–24 months while the electrical reach of copper signalling shrinks at higher SerDes rates, conventional pluggable optical transceivers are reaching fundamental physical and economic limits. Co-packaged optics (CPO) resolves this by integrating the optical engine directly within the switch ASIC or GPU/XPU package, dramatically shortening the electrical path, reducing interconnect power consumption from roughly 15 picojoules per bit toward 5 pJ/bit and below, and removing the front-panel density ceiling that constrains pluggable designs at 102.4 Tbps and above.

This report examines the market across two principal sub-segments. Scale-out CPO — optical engines for Ethernet and InfiniBand network switches — is the earlier and more standardised segment, with first commercial deployments at hyperscalers using Broadcom Tomahawk 6-based platforms. Scale-up CPO — optical I/O integrated within GPU packages to replace copper interconnects such as NVLink — ramps later in the decade with the NVIDIA Rubin generation and is expected to become the larger, faster-growing sub-segment as GPU optical I/O attach rates rise. CPO is positioned as additive rather than a wholesale replacement for pluggable transceivers, which retain structural dominance in enterprise, telecom, and lower-bandwidth cloud applications, producing a managed coexistence of pluggable, near-package, and co-packaged architectures across the forecast period.

The report provides detailed coverage of CPO technology fundamentals, photonic integrated circuits, optical engines, and the advanced semiconductor packaging that enables CPO — including 2.5D silicon, organic and glass interposers, through-silicon vias, fan-out wafer-level packaging, and 3D hybrid bonding. It analyses EIC/PIC integration approaches, optical alignment and laser integration, CPO standards, the

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competitive divergence between NVIDIA's vertical integration and Broadcom's open-ecosystem strategy, supply-chain structure, regional dynamics, adoption-curve and scenario analysis, and ten-year market forecasts by application, component, technology generation, and packaging technology. Drawing on extensive primary research and industry interviews, it offers strategic intelligence for semiconductor professionals, investors, data centre operators, and technology strategists seeking to understand how CPO will reshape AI and data centre architecture through 2036.

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