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Marvell Unveils Industry's First Coherent-lite 1.6 Tbps O-band-optimized DSP for Data Center Campus Connectivity

New Aquila DSP Delivers Cost, Power, and Scalability for 2 km to 20 km Connectivity, Extending Marvell Optical Interconnect Leadership

SANTA CLARA, Calif., Dec. 10, 2024 /PRNewswire/ -- [Marvell Technology, Inc.](#) (NASDAQ: MRVL), a leader in data infrastructure semiconductor solutions, today announced [Marvell® Aquila](#), the industry's first coherent-lite DSP optimized for 1.6 Tbps coherent optical transceiver modules operating at O-band wavelengths. By combining advanced coherent modulation with scalable O-band optics, the Aquila DSP delivers a power and performance-optimized solution tailored for the emerging market for distributed campus data center interconnects spanning up to 20 km with high bandwidth and low latency.

The industry is shifting from large-scale facilities to campus-based data centers due to power and space constraints. While PAM4 interconnects remain the standard for inside data center connections and coherent data center interconnect (DCI) interconnects address regional data center connectivity, both areas where Marvell is the industry leader, campus-based data centers require optimized interconnects spanning 2-20 km, driving the need for coherent-lite technology.

Marvell, leveraging its unique expertise in both PAM4 and coherent DSPs, is leading this market transformation. Traditional coherent DSPs are optimized for C-band tunable optics, which lack the scalability needed for high-volume data center deployment. The new Aquila coherent-lite DSP introduces an innovative O-band coherent architecture that delivers cost efficiency, power savings, and scalability, enabling the next generation of campus-based data center connectivity.

"Interconnect bandwidth, data center traffic, and data center capacity needs are all growing at accelerated rates because of AI, and operators are limited by the available power delivery in a single building," said Xi Wang, vice president of product marketing for Optical Connectivity at Marvell. "Aquila offers data center operators a new, groundbreaking avenue for optimizing their infrastructure for sustainability and developing campus facilities that can scale with their customers' demands for cloud and AI services."

"The transition to distributed data centers is creating a growing demand for innovative solutions to address campus connectivity challenges," said Osa Mok, chief marketing officer at TeraHop Ltd. (previously known as InnoLight Technology). "Marvell's Aquila represents a significant step forward, bringing coherent technologies to this evolving market. By combining the advancements from Aquila with TeraHop's expertise in coherent modules and scalable optical solutions, we are establishing a new standard for performance and efficiency in campus networks."

"Shipments of coherent-lite solutions are expected to grow from sample volumes this year to over 1 million units per year by 2029," said Vlad Kozlov, founder and CEO of LightCounting. "Coherent-lite technology like Aquila from Marvell expands the options available to hyperscalers, providing a more energy-efficient solution to an emerging and critical use case."

Aquila is one of the latest members of the Marvell interconnect portfolio, optimized for specific use cases to help data centers maximize the utilization and performance of their infrastructure while reducing overall cost and power per bit. The extensive 1.6 Tbps portfolio also includes the Marvell LPO TIA and driver chipset; [Ara](#), the industry's first 3nm PAM4 interconnect platform; [Nova family of PAM4 DSPs](#) featuring 200 Gbps electrical and optical interfaces; and [Alaska® A PAM4 DSP](#) for active electrical cables.

Aquila Coherent-lite DSP Attributes

- Optimized for mid-distance performance: Aquila delivers an ideal, energy-optimized solution for up to 20 km data center interconnects, providing a balance of efficiency, cost and high performance for AI and cloud-based applications.
- Scalability to meet future bandwidth needs: Aquila is designed to enable 1.6 Tbps total bandwidth in pluggable module form factor with 400 Gbps/lane 16-QAM signaling, future-proofing data center infrastructure as AI-driven demands grow.
- Cost-effective coherent technology for up to 20 km connectivity links: By leveraging O-band wavelengths, Aquila reduces cost-per-link compared to traditional C-band solutions.
- Low power and high performance for sustainability: The Aquila simplified DSP architecture reduces power consumption and latency, creating a sustainable, high-performance solution for dense, large-scale environments while advancing the data center's goal towards carbon-net zero emissions.

Availability

The Marvell Aquila coherent-lite DSP is sampling to select customers.

About Marvell

To deliver the data infrastructure technology that connects the world, we're building solutions on the most powerful foundation: our partnerships with our customers. Trusted by the world's leading technology companies for over 25 years, we move, store, process and secure the world's data with semiconductor solutions designed for our customers' current needs and future ambitions. Through a process of deep collaboration and transparency, we're ultimately changing the way tomorrow's enterprise, cloud, automotive, and carrier architectures transform—for the better.

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