Broadcom Delivers Industry's First 51.2-Tbps Co-Packaged Optics Ethernet Switch Platform for Scalable AI Systems

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Bailly 51.2T CPO switch delivers 70% improvement in optical interconnect power

PALO ALTO, Calif., March 14, 2024 (GLOBE NEWSWIRE) -- Broadcom Inc. (NASDAQ: AVGO) announced today that it has delivered Bailly, the industry's first 51.2 terabits per sec (Tbps) co-packaged optics (CPO) Ethernet switch, to its customers. The product integrates eight silicon photonics based 6.4-Tbps optical engines with Broadcom's best-in-class StrataXGS® Tomahawk®5 switch chip. Bailly enables the optical interconnect to operate at 70% lower power consumption and delivers an 8x improvement in silicon area efficiency as compared to pluggable transceiver solutions.

The optical interconnect is critical for both front-end and back-end networks in large scale generative AI clusters. Today, pluggable optical transceivers consume approximately 50% of system power and constitute more than 50% of the cost of a traditional switch system. The growing bandwidth requirement for the newer generation of GPUs, coupled with the ever-increasing sizes of AI clusters, requires disruptively power-efficient and cost-efficient optical interconnects that extend beyond discrete solutions. Broadcom's CPO and silicon photonics technology platform, with its high degree of integration, provides the lowest latency, highest bandwidth density, lowest power, and lowest cost solution to meet this need and can help build large-scale, power-efficient AI clusters.

Bailly integrates hundreds of optical components and hundreds of millions of transistors in a single optical engine. The high degree of integration enables the placement of the optical engines on a common substrate with complex logic ASICs minimizing the need for signal conditioning circuitry. This allows the optical interconnect to operate at 70% lower power consumption as compared to pluggable transceivers. Bailly's high-volume production is made possible by Broadcom's innovative manufacturing approach that utilizes proven CMOS foundry processes, advanced packaging technologies and a highly automated high-density, edge-coupled fiber attach capability.

Broadcom is co-designing platforms with cloud service providers (CSPs) and system integrators to accelerate adoption of CPO platforms. Broadcom will showcase the Bailly 51.2T CPO system at the Optical Fiber Communication (OFC) 2024 exhibition.

"As AI clusters demand higher bandwidth density, lower power consumption and lower latency, we are pleased to announce delivery of the industry's first 51.2-Tbps CPO switch," said Near Margalit, Ph. D., vice president and general manager of the Optical Systems Division at Broadcom. "Bailly will enable hyperscalers to deploy lower-power, cost-efficient, large-scale AI and compute clusters. Broadcom's technology leadership and manufacturing innovations help Bailly deliver 70% better power efficiency and ensure an optical I/O roadmap that can walk in tandem with the future bandwidth and power needs of AI infrastructure."

"Pluggable optics are expected to account for an increasingly significant portion of power consumption at a system level, exceeding 50% of the switch system power at 51.2 Tbps and beyond. This issue will be further exacerbated as Cloud Service Providers build their next-generation AI networks and continue to push for higher speeds," said Sameh Boujelbene, vice president at Dell'Oro Group. "Substantial investments in AI infrastructure are accelerating the development of innovative optical connectivity solutions such as Broadcom's Bailly co-packaged optics platform, aiming to meet the demands of AI clusters while solving cost and power consumption hurdles."

"Innovation in the optical interconnect will be of great importance to future generations of AI networks," said Feng Luo, head of network systems at ByteDance. "Broadcom's continued progress in the development of co-packaged optics is exactly what the industry will require to overcome cost and power bottlenecks of current generation optical interconnects."

"System design has become more challenging with each increase in SerDes speed, but only recently have we had to re-design our systems and optics to overcome the physical limitations of copper," said Richard Li, general manager of H3C's switch product line. "Our partnership with Broadcom to design systems with highly integrated co-packaged optics is a huge step forward to overcoming the design limitations of pluggable transceivers in high density systems."

"Artificial Intelligence (AI) has introduced a set of challenges that the networking must address," said Mansour Karam, global vice president (GVP) of data center products at Juniper Networks. "We are excited to partner with Broadcom to deliver co-packaged optics throughout the data center, thereby improving cost, power consumption and bandwidth efficiency of the optical interconnect."

"System design has become more challenging with the need to meet the requirement of AI/ML and high-performance large-scale datacenter networks," said Grant Lai, chief technology officer (CTO) of Micas Networks. "Our partnership with Broadcom to design systems with highly integrated co-packaged optics will enable a more power efficient future network. The 51.2 Tbps switch that Micas co-developed with Broadcom will reduce communication latency and power consumption in data centers and unleash more AI power."

51.2-Tbps CPO Switch Product Highlights:

- Broadcom 51.2-Tbps StrataXGS® Tomahawk®5 switch silicon
- Broadcom 6.4T-FR4 Bailly SCIP optical engines with Broadcom Fiber Connector (BFC) for CPO systems
- 4RU system design with high-efficiency air cooling to deliver 128 ports of 400G FR4 connectivity externally fiber-coupled with 128 duplex LC optical connectors
- CPO engine to front-panel routing supports traditional single-mode fiber
- System design compatible to support multiple remote laser modules (RLM) for field replaceability
- More than 70% optical interconnect power consumption savings compared to standard pluggable optics solutions

Showcase at OFC 2024

Broadcom will showcase the following CPO products and technologies:

- Bailly 51.2T CPO Ethernet switch system
- 6.4T optical engine co-packaged with a multi-chip module that includes HBM, logic and PHY

These products will be shown in the Broadcom Booth 5325 at OFC 2024 from March 26th to 28th.

For more information on Broadcom CPO, please click here.

About Broadcom
Broadcom Inc. (NASDAQ: AVGO) is a global technology leader that designs, develops, and supplies a broad range of semiconductor, enterprise software and security solutions. Broadcom's category-leading product portfolio serves critical markets including cloud, data center, networking, broadband, wireless, storage, industrial, and enterprise software. Our solutions include service provider and enterprise networking and storage, mobile device and broadband connectivity, mainframe, cybersecurity, and private and hybrid cloud infrastructure. Broadcom is a Delaware corporation headquartered in Palo Alto, CA. For more information, go to www.broadcom.com.

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