

# Photowave Optical Interconnect for a Composable Data Center

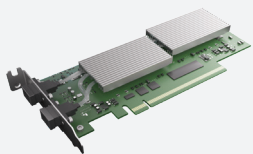
Photowave™ optical communications hardware is the first of its kind designed for PCIe and Compute Express Link (CXL) connectivity. Available in multiple form factors, Photowave hardware leverages the significant latency and energy efficiency of photonic technology, empowering data center managers to scale resources within or across server racks. It enables CXL 2.0/PCIe Gen 5 connectivity over optics, with support for x16, x8, x4 and x2 bifurcation modes of operation, allowing for a wide variety of deployment scenarios. In addition to high speed electrical-to-optical conversion for the data signals, the Photowave optical link also supports sideband signals over optics, making it possible to implement more efficient and reliable disaggregation architectures.

## Key Features

- **CXL 2.0/PCIe Gen5 x 16**
- **Jitter reduction, SI cleanup**
- **Sideband signals over optics**
- **x8, x4, or x2 bifurcation**



## Versatility in Form Factor and Application



### Low-Profile PCIe

- Latency: <math><20\text{ns} + \text{TOF}</math>
- Power: 30 W
- Interface: PCIe CEM



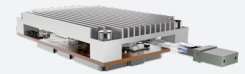
### OCP 3.0 SFF

- Latency: <math><20\text{ns} + \text{TOF}</math>
- Power: 30 W
- Interface: OCP 3.0



### Active Optical Cable

- Latency: <math><1\text{ns} + \text{TOF}</math>
- Power: 15 W
- Interface: CDFP



### On-Board Optics Module

- Latency: <math><1\text{ns} + \text{TOF}</math>
- Power: 6 W
- Interface: Mezzanine

## Key Technology: Optical Networking (oNET)

Using a CXL optical interconnect, latency is kept low via direct connection to the CPU/GPU and memory.

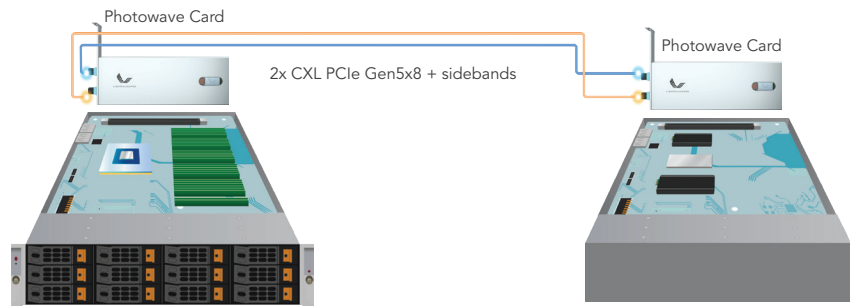


## Demonstration: Memory Expansion Improves LLM Inference Efficiency

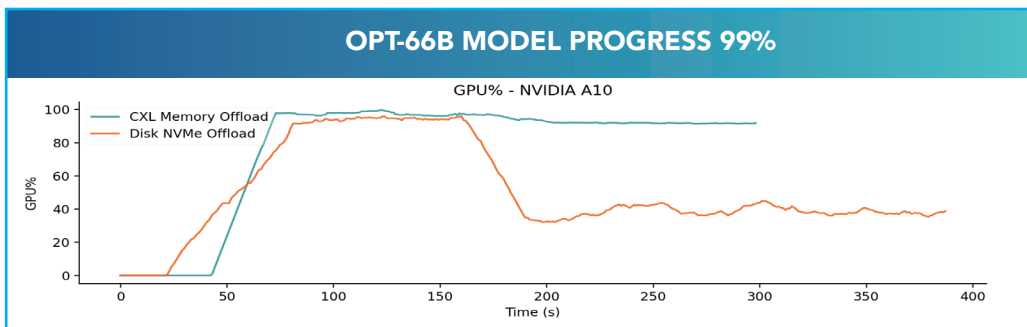
At Flash Memory Summit 2023 in Santa Clara, California, Lightelligence demonstrated the benefits of memory expansion using CXL to improve workload efficiency for Large Language Model OPT-66B, an AI model used for text summarization. Using two Photowave PCIe cards to connect an AMD Genoa server and Samsung Memory Expansion Module, CXL memory expansion over optics demonstrated a 2.4x throughput advantage compared to SSD/NVMe disk offloading with performance remaining constant.

**AI Workload:** OPT-66B  
**Server:** Supermicro AS -2025HS-TNR  
**CPU:** AMD Genoa  
**GPU:** NVIDIA A10  
**Memory Expansion:** Samsung CXL 128GB  
**Software:** MemVerge Memory Machine

### Hardware Layout



## Demonstrating Superior Performance



Performance of the CXL Memory Offload remained constant while Disk / NVMe deteriorated.

Decode throughput was higher for optical CXL memory, resulting in a 2.4x faster time to completion.

### FOR MORE INFORMATION

Visit [www.lightelligence.ai](http://www.lightelligence.ai) and social media to stay up to date on our latest news



### Address

One Boston Place, 201 Washington Street,  
 Ste 1700, Boston, MA 02108, USA

+1 (617) 780 4404

info@lightelligence.ai