

Production Monitoring of Optics in Meta Datacenters

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Abstract— As Meta continues to expand its data center footprint - particularly with the recent rise in AI/ML workloads and the deployment of large-scale clusters - the demand for high-speed optical interconnects is growing rapidly. Efficient deployment of such a massive interconnect network requires robust monitoring capabilities across the full life cycle of the optical modules. With model training taking place over large clusters where multiple accelerators are communicating with each other, the consequences of a single link failure become increasingly severe; potentially impacting job completion times and cluster performance.

Given the massive scale and mission-critical nature of optical connectivity in these environments at data centers, real-time optics metrics monitoring and failure detection is essential to identify degradation trends and improve time to repair (TTR). These capabilities enable continuous visibility into the health and reliability of deployed optical links.

This paper outlines Meta's strategy for monitoring optical modules, beginning at the NPI stage and extending through production and sustaining throughout the full lifecycle of the optical modules. We highlight the infrastructure capabilities required to support both unit-level and fleet-scale monitoring and maintenance. Additionally, we explore key trends and challenges in optics lifecycle management as optical networks scale in complexity and importance.

Keywords— *Optics, Interconnect, Datacenters, AI Infrastructure*