Optical modules are used less often now

Overview

The following analysis examines the inevitability of the resale of used optical modules from three core scenarios, drawing an analogy to the used mobile phone market to help you better...

Key Takeaways

While some traditional applications of optical modules show reduced usage, overall demand is evolving and growing in high-speed, AI-driven, and data center environments.

Shifts in Usage Patterns

The perception that optical module usage has been greatly reduced is partly due to changes in data center architectures. Traditional three-tier network designs, common in many Chinese data centers, require fewer optical modules per server rack compared to emerging two-tier or leaf-spine architectures used by global cloud providers. In regions with lower east-west traffic, the need for high-density optical interconnects is less pronounced, which can make usage appear lower.

Growing Demand in AI and High-

Speed Networks

Conversely, AI infrastructure and high-performance computing are driving significant growth in optical module demand. Leading cloud providers like Google, Amazon, and Microsoft are deploying large-scale AI clusters, which require high-bandwidth, low-latency optical modules. For example, shipments of 800G optical modules for AI workloads are projected to reach millions of units, reflecting a surge in demand despite reductions in some traditional deployments.

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Similarly, 400G and 200G modules continue to see strong adoption in data centers and enterprise networks.

Technological and Market Factors

Technological advancements, such as silicon photonics, PAM4 modulation, and co-packaged optics, are increasing the efficiency and bandwidth of optical modules while reducing their physical footprint and power consumption. These innovations allow fewer modules to handle more data, which can contribute to the impression of reduced usage even as overall network capacity grows. Additionally, supply chain constraints, pricing pressures, and competition in high-speed segments (400G and above) influence deployment strategies.

Regional and Industry Dynamics

China remains the largest producer and consumer of optical modules, but adoption patterns vary. Domestic data centers often maintain traditional architectures, while overseas cloud providers adopt high-density, high-speed configurations that maximize module efficiency. Meanwhile, sectors like 5G fronthaul, submarine cables, and edge computing continue to expand optical module usage, offsetting reductions in other areas.

Conclusion

The apparent reduction in optical module usage is context-dependent. While traditional deployments may require fewer modules due to architectural changes and higher efficiency technologies, overall demand is growing in AI, high-speed data centers, and advanced network applications. The industry is simultaneously experiencing technological innovation, market competition, and regional variation, all of which shape optical module adoption patterns.

Article Content

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