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Two-point converged optical module



Overview

This technology has evolved from traditional board-edge optical modules to smaller and more integrated solutions.

Key Takeaways

A two-point converged optical module integrates both packet and optical functions in a single pluggable device, enabling simplified, high-capacity, and flexible optical networking.Overview

A two-point converged optical module is designed to combine packet switching and optical transport capabilities within a single module, often in a digital coherent pluggable (DCO) format. This integration allows network operators to collapse multiple network layers, reduce equipment footprint, and simplify management while supporting high-speed data transmission over dense wavelength-division multiplexing (DWDM) networks .

Key Features
• Integrated DSP and Transceiver: Unlike traditional analog modules where the digital signal processor (DSP) resides on the line card, digital CFP2 modules embed both the DSP and optical transceiver in the pluggable itself, enabling software-configurable line rates and modulation schemes such as 100G QPSK, 200G 8-QAM, and 200G 16-QAM .

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• Packet-Optical Convergence: These modules support both packet and optical functions, allowing seamless integration into converged SDN transport architectures. This reduces the need for separate transponders and simplifies multi-layer network management .

• High Bandwidth and Flexibility: By integrating optical conversion close to the ASIC or router, modules reduce electrical trace losses and improve energy efficiency, supporting speeds from 100G to 400G per lane and beyond .

• Deployment Scenarios: Suitable for data centers, metro networks, and long-haul DWDM systems, these modules enable scalable, automated, and programmable optical networks .

Advantages

• Simplified Network Architecture: Collapses packet and optical layers into a single device, reducing operational complexity .

• Energy Efficiency: Shorter electrical paths and integrated DSP reduce power consumption compared to traditional pluggable optics .

• Flexibility and Interoperability: Software-configurable modulation and line rates allow deployment across multiple platforms with CFP2 interfaces .

• Automation and SDN Integration: Supports end-to-end network automation and programmability, aligning with modern routed optical networking strategies .

Technical Considerations

• Coherent Optical Technology: Uses coherent detection to improve spectral efficiency and transmission distance.

• Thermal Management: Integrated modules require careful thermal design to maintain performance and avoid wavelength drift .

• Compatibility: Designed to interoperate with ROADM-based networks and traditional transponders, enabling gradual network upgrades .

Conclusion

Two-point converged optical modules represent a next-generation approach to optical networking, combining packet and optical functions in a single pluggable device. They provide high-speed, flexible, and energy-efficient solutions for modern data center, metro, and long-haul networks, supporting scalable and automated network architectures while simplifying operational complexity .

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Ultra-High-Speed Optical Devices Key units of a coherent optical module include integrated coherent receiver (ICR),

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As data centers continue to evolve, Co-Packaged Optics (CPO) technology is gradually replacing traditional

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