

Latency Comparison of OTN Router QSFP-DD in Intelligent Computing Center

Article Overview

QSFP-DD SR4 modules generally offer lower latency (~85 ns) than SR8 modules (~102 ns), making SR4 preferable for latency-sensitive HPC and AI workloads, while SR8 provides higher channel density at slightly higher latency.

QSFP-DD Module Overview

QSFP-DD (Quad Small Form-factor Pluggable Double Density) modules are widely used in high-performance data centers and intelligent computing centers due to their dual-density 8-channel design, backward compatibility with QSFP28, and support for 400G and 800G Ethernet connections . They are optimized for low-latency environments, particularly when forward error correction (FEC) is reduced or bypassed, which can otherwise introduce up to 100 ns of additional latency .

Latency Comparison

- QSFP-DD SR4: Uses 4-channel 100G PAM4 modulation, requiring 8-core fibers (MPO-12). Latency is typically around 85 ns, as it avoids complex signal multiplexing and Gearbox chips, making it suitable for server-to-switch connections and latency-sensitive HPC or AI workloads .
- QSFP-DD SR8: Uses 8-channel 50G PAM4 modulation, requiring 16-core fibers (MPO-16). Latency is slightly higher, around 102 ns, due to additional DSP and Gearbox processing. SR8 is optimized for switch-to-switch interconnects where higher channel density is prioritized over minimal latency

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QSFP-DD ports are optimized for the thermal dissipation of the host system. Thermal management is not limited by the design of the

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