What optical module should be selected for the aggregation switch



Overview

Optical module selection at the aggregation layer must account for higher bandwidth and longer transmission distances.

Key Takeaways

Aggregation switches typically use 10G SFP+, 40G QSFP+, and 100G QSFP28 optical modules, with single-mode SFP+ modules recommended for longer distances.

Common Optical Modules10

G SFP+ Modules: These are widely used for downlinks to access switches and uplinks to the core network. They support standards such as 10GBASE-SR (short-range, multimode fiber), 10GBASE-LR (long-range, single-mode fiber), and 10GBASE-ER (extended-range, single-mode fiber) to accommodate distances from a few hundred meters up to 40 km or more depending on the module type and fiber used. 40G QSFP+ Modules: Used in high-density aggregation scenarios, these modules aggregate multiple 10G links or provide high-speed uplinks to the core.

They are suitable for data center environments where multiple 10G or 25G connections need to be consolidated. 100G QSFP28 Modules: These modules are designed for ultra-high-speed aggregation, typically in large data centers or enterprise backbones. They support single-mode fiber for long-distance connections and can also be used with breakout cables to connect multiple lower-speed ports.

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Fiber Type and Distance ConsiderationsSingle-mode fiber (SMF): Recommended for aggregation switches when connecting across buildings or over distances exceeding 10 km. Modules like 10GBASE-LR or 10GBASE-ER are standard choices. Multimode fiber (MMF): Suitable for short-range connections, typically under 300 meters, using 10GBASE-SR modules.

Additional Considerations

When selecting optical modules for aggregation switches, consider: Link Aggregation (LACP): Combining multiple physical links into a single logical link for higher bandwidth and redundancy. Port Density: Aggregation switches often have 24–48 downlink ports and 4–8 uplink ports, so module form factor and size (SFP+, QSFP+) are important for high-density deployments. Redundancy and Reliability: Dual power supplies, redundant engines, and support for protocols like VRRP/HSRP enhance network resilience.

Monitoring and Diagnostics: Many SFP/SFP+ modules support Digital Diagnostic Monitoring (DDM) to track temperature, voltage, and optical power, aiding in proactive maintenance. In summary, aggregation switches rely on modular optical transceivers such as 10G SFP+, 40G QSFP+, and 100G QSFP28, with single-mode fiber preferred for long-distance uplinks and multimode fiber for short-range connections. Proper selection ensures high throughput, redundancy, and scalability in enterprise and data center networks.

Article Content

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Optical module selection at the aggregation layer must account for higher bandwidth and longer transmission distances. Recommended options include: 10G SFP+ modules (10GBASE

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