The switch supports optical modules

Overview

For example, if a non-XGE optical module is installed on an XGE port, the rate of the optical module does not match the port rate.

Key Takeaways

Switches support a variety of optical modules, including SFP, SFP+, XFP, and next-generation pluggable optics, but compatibility depends on certification, speed, fiber type, and module form factor.Types of Optical Modules

Switches typically support several types of optical modules:

• SFP (Small Form-factor Pluggable): Common for 1G connections, used with both single-mode and multi-mode fibers .

• SFP+: Supports 10G speeds and can sometimes operate at lower speeds (1G, 2.5G, 5G) depending on the port and cable .

• XFP: Used for 10G connections, but interoperability with SFP+ requires careful consideration .

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• Next-Generation Modules: Includes XPO (eXtra-dense Pluggable Optics), CPO (Co-Packaged Optics), and NPO (Near-Packaged Optics), designed for high-bandwidth, AI-focused data centers, offering higher density, power efficiency, and advanced cooling solutions .

Compatibility Considerations

• Certification: Switches often require modules certified by the manufacturer. For example, Huawei switches only guarantee reliability with Huawei-certified modules, which are labeled accordingly and verified via commands like display transceiver . Non-certified modules may cause link instability or service disruption.

• Speed Matching: Modules must match the port speed. Inserting a 1G SFP into a 10G SFP+ port may limit speed or fail to connect, while some SFP+ modules can operate at multiple speeds using compatible cabling .

• Fiber Type: Modules must match the fiber type—single-mode (SMF) or multi-mode (MMF). Using a multi-mode module on single-mode fiber or vice versa can prevent connectivity .

• Wavelength and Duplex Mode: Both ends of the link must use the same wavelength and duplex mode (full or half) to ensure proper transmission .

Advanced Optical Modules

• XPO Modules: Deliver up to 12.8Tbps per module with 64 channels, supporting DR, FR, LR, SR, and ZR optical architectures. They are designed for high-density AI data centers and allow field pluggability for quick upgrades .

• CPO and NPO: Focus on reducing power consumption and improving thermal efficiency by integrating optics closer to the switch ASIC or mainboard, though they may require new hardware designs .

Summary

When selecting optical modules for a switch, consider form factor, speed, fiber type, wavelength, duplex mode, and manufacturer certification. Using certified modules ensures reliability and service stability, while next-generation modules like XPO, CPO, and NPO provide higher bandwidth and efficiency for modern data center environments .

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