

Article Overview

Aggregation switches connect multiple access switches and optical modules, enabling high-speed, long-distance data transmission in enterprise and campus networks.

Overview of Aggregation and Access Layers

In a three-tier network architecture, the access layer connects end devices such as computers, IP cameras, and Wi-Fi APs to the network, while the aggregation layer consolidates traffic from multiple access switches and forwards it to the core network. Aggregation switches typically have higher backplane bandwidth and port throughput to handle combined traffic efficiently, and they often support 10G SFP+ or higher optical modules for uplinks.

Access Optical Modules

Access switches use optical modules to connect to aggregation switches over fiber. The choice of module depends on:

- o Transmission distance:
 - o Multimode modules: up to 550 meters, suitable for short-range connections within buildings.
 - o Single-mode modules: start at 2 km and can reach up to 160 km, ideal for campus or inter-building links.
- o Fiber type: OM2, OM3, or single-mode fiber depending on distance and bandwidth requirements.
- o Port speed: Gigabit or 10G SFP+ modules depending on network design.

Passive vs Active Aggregation Modules

Some networks use passive aggregation modules, which split or multiplex optical signals without requiring power. For example, the PEN passive aggregation module splits uplink light proportionally to multiple downlink ports and multiplexes signals from remote modules back to the uplink, supporting 2:8 splitting and backup links. Passive modules reduce power consumption and installation complexity, while active aggregation switches provide intelligent traffic management, VLAN, QoS, and security features.

Selection Considerations

When selecting aggregation switches and optical modules:

- o Backplane bandwidth: Ensure the switch can handle combined traffic from all access ports (calculated as port number x port speed x 2),.

- o Packet forwarding rate: Higher throughput ensures smooth handling of high-bandwidth applications like IP cameras or video streaming .
- o Compatibility: Choose optical modules compatible with both the access and aggregation switches.
- o Distance and fiber type: Match single-mode or multimode modules to the required link distance.
- o Redundancy and reliability: Consider uplink backup and passive/active module options for fault tolerance .

Practical Example

For a digital monitoring system with 720P cameras generating 4 Mbps streams, a Gigabit single-mode optical module with a single-mode fiber patch cord can connect the access switch to the aggregation switch over distances exceeding 2 km . For shorter distances within a building, a multimode module with OM2 fiber is sufficient. By carefully selecting aggregation switches and optical modules, network designers can ensure high-speed, reliable, and scalable connectivity across enterprise or campus networks.

With AXIS D8308 Fiber Aggregation Switch you can connect multiple Axis devices using fiber midspans

An aggregation switch refers to a type of switch used to connect multiple ToR switches to a core switch/router in a cloud data center

A comprehensive comparison of access layer and aggregation layer fiber optic network equipment, covering switch

Here, an optical aggregation network connects a server accommodating virtual network functions (VNFs) with access

Leveraging mainstream Ethernet protocols, the Xingmai PEN solution uses optical fibers to implement passive data transmission

In general, the access layer switch is closer to the user end, so sometimes it is relatively far

Discover the crucial differences between core, aggregation, and access switches. Find out which type can best transform your

As for an optical aggregation network architecture, our research group proposed a system architecture for optical TDM-based

At this time, we need to consider what product is more suitable for interconnection? In

What is switch aggregation? Switch aggregation refers to the concept of consolidating multiple access layer switches

For enterprises aiming to maintain a reliable and cost-effective enterprise network, the 1G SFP module remains an

In many network constructions, we have all heard of switches. So do you really understand switches? Why are

However, as applications demand more bandwidth, uplinks between access and aggregation switches are becoming

FS has recently officially declared a new 1G fiber optic switch - S5800-48F4SR, which is designed to meet the

High-performance 10G SFP modules for optimal connectivity. An 8-port, Layer 2 switch made for 10G

A 32-port, Layer 3 switch made for high-capacity 10G SFP+ and 25G SFP28 connections.

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