A Layer 2 switch can be used for the aggregation layer



Overview

can implement aggregation at any of the lowest three layers of the. Examples of aggregation at layer 1 () include (e.g.) and (e.g. IEEE 802.11) network devices that combine multiple frequency bands. OSI layer 2 (, e.g. in LANs or in WANs, Ethernet) aggregation typically occurs across switch ports, which can be either physical ports or virtual ones managed by an operating syste.

Key Takeaways

A Layer 2 switch operates at the data link layer to connect devices within the same network segment, while the aggregation layer consolidates traffic from multiple access switches and forwards it to the core layer for efficient network management.Layer 2 Switch

A Layer 2 switch functions at the data link layer (Layer 2) of the OSI model, primarily handling MAC address-based forwarding within a local area network (LAN). These switches are typically deployed at the access layer of a network, connecting end devices such as PCs, printers, and IP phones. Key features include:

• VLAN support: Allows segmentation of the network into multiple broadcast domains for better traffic management and security .

• Layer 2 adjacency: Essential for applications like NIC teaming, high-availability clusters, and database clusters that require devices to be in the same broadcast domain .

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• Port security and PoE: Many Layer 2 switches provide security features and Power over Ethernet for connected devices .

• Looped access topologies: Layer 2 switches can be connected in looped designs using 802.1Q trunks to ensure redundancy and high availability .

Aggregation Layer

The aggregation layer sits between the access layer and the core layer in a three-tier network architecture. Its main purpose is to consolidate traffic from multiple access switches and provide uplink connectivity to the core layer . Aggregation switches can operate at Layer 2 or Layer 3, depending on network requirements, and typically offer higher performance and port density than access switches. Key functions include:

• Traffic consolidation: Aggregates data from multiple access switches to streamline network flow and reduce bottlenecks .

• Routing and forwarding: Determines optimal paths for data transmission and can perform inter-VLAN routing if Layer 3 functionality is enabled .

• Load balancing and QoS: Manages traffic prioritization and distributes load across multiple links, often using protocols like Link Aggregation Control Protocol (LACP) .

• Security and access control: Implements filtering, firewall policies, and multicast/broadcast domain management .

• Redundancy and failover: Supports link aggregation and high-availability configurations to maintain network resilience .

Interaction Between Layer 2 Switches and Aggregation Layer

In a typical network:

• Layer 2 switches at the access layer connect end devices and maintain VLANs and broadcast domains.

• Aggregation switches collect traffic from these access switches, perform filtering, load balancing, and optionally routing, then forward the traffic to the core layer for high-speed backbone transport .

• Link aggregation can be used between access and aggregation switches to increase bandwidth and provide redundancy, ensuring efficient Layer 2 traffic flow across the network . This layered approach allows networks to scale efficiently, maintain high availability, and simplify management while supporting both Layer 2 and Layer 3 functionalities as needed.

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Article Content

Link aggregation

OverviewArchitectureMotivationIEEE link aggregationProprietary link aggregationSupportLinux driversUsage

Network architects can implement aggregation at any of the lowest three layers of the OSI model. Examples of aggregation at layer 1 (physical layer) include power line (e.g. IEEE 1901) and wireless (e.g. IEEE 802.11) network devices that combine multiple frequency bands. OSI layer 2 (data link layer, e.g. Ethernet frame in LANs or multi-link PPP in WANs, Ethernet MAC address) aggregation typically occurs across switch ports, which can be either physical ports or virtual ones managed by an operating syste

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