

Is VLAN segmentation done on the core switch



Overview

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Key Takeaways

Core switches act as the central backbone in VLAN segmentation, enabling efficient traffic management, inter-VLAN routing, and network scalability. Core Switch Function in VLAN Segmentation

Core switches are high-capacity, high-performance switches that operate at the center of a network, connecting distribution and access layers. In VLAN segmentation, they play a critical role by:

- Aggregating VLAN traffic: Core switches receive traffic from multiple access switches, each hosting different VLANs, and ensure that data is forwarded efficiently across the network without unnecessary broadcast flooding .
- Inter-VLAN routing: Since VLANs are Layer 2 broadcast domains, devices in different VLANs cannot communicate directly. Core switches, often Layer 3 capable, perform routing between VLANs, allowing controlled communication while maintaining logical separation .

- **VLAN tagging and trunking:** Core switches use protocols like IEEE 802.1Q to tag Ethernet frames with VLAN IDs, enabling a single physical link to carry traffic for multiple VLANs. This ensures that VLAN membership is preserved as traffic traverses the network .

- **Enforcing security and access control:** By integrating ACLs and segmentation policies, core switches can restrict traffic between VLANs, reducing the risk of lateral movement by compromised devices and enhancing overall network security .

- **Optimizing performance:** Core switches reduce broadcast traffic and congestion by containing VLAN traffic within its logical boundaries and efficiently routing inter-VLAN traffic, improving latency and throughput across the network .

Benefits of Using Core Switches for VLAN Segmentation

- **Scalability:** Core switches support large numbers of VLANs and high traffic volumes, making it easier to expand the network without redesigning the topology .

- **Centralized management:** VLAN configurations, routing policies, and security rules can be managed centrally, simplifying administration and troubleshooting .

- **Enhanced security:** Segmentation at the core layer limits the blast radius of attacks and isolates sensitive resources, complementing perimeter defenses .

- **Efficient resource allocation:** Core switches can prioritize critical VLAN traffic, ensuring bandwidth is allocated according to organizational needs .

Summary

Core switches are essential in VLAN segmentation because they aggregate traffic from multiple VLANs, enable inter-VLAN communication, enforce security policies, and optimize network performance. By combining Layer 2 VLAN management with Layer 3 routing capabilities, core switches provide a robust backbone that supports scalable, secure, and efficient network segmentation .

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