

Separation of internal and external networks for core switches



Overview

By connecting each access and distribution switch to multiple core switches, the network eliminates single points of failure.

Key Takeaways

Separating internal and external networks at the core switch level enhances security, reduces attack surfaces, and ensures reliable traffic management through VLANs, firewalls, and segmentation strategies. Core Principles of Network Separation

Network separation involves dividing a network into distinct segments to isolate internal corporate traffic from external or public-facing traffic. This reduces the risk of unauthorized access, limits the spread of malware, and allows for more granular security controls. Core switches, which handle high-speed data routing between access and distribution layers, are central to implementing this separation.

Methods for Separation



1. **VLAN-Based Segmentation** Virtual LANs (VLANs) allow logical separation of networks over the same physical infrastructure. Internal and external traffic can be assigned to different VLANs, ensuring that devices in one VLAN cannot directly communicate with devices in another without routing through a firewall or Layer 3 device . Port-based VLANs assign specific switch ports to a VLAN, while tagged VLANs (802.1Q) allow multiple VLANs to traverse a single trunk link. 2. **Layer 3 Routing and Firewalls** Core switches often provide Layer 3 routing capabilities. By routing traffic between internal and external VLANs through firewalls or access control lists (ACLs), organizations can enforce strict security policies, monitor traffic, and prevent unauthorized access . This approach also supports software-defined segmentation, where policies are applied based on user identity, device type, or context rather than just IP addresses . 3. **Software-Defined Segmentation** Modern core switches can integrate with software-defined access (SDA) solutions, using security group tags (SGTs) to classify traffic and enforce policies dynamically. This allows internal and external traffic to be separated based on roles, authentication, and contextual information, reducing the need for constant network redesign .

Best Practices

- **Document Network Inventory:** Maintain a detailed map of all devices, VLANs, and services to avoid misconfigurations and ensure proper firewall rules .
- **Redundancy and High Availability:** Avoid single points of failure by deploying redundant core switches and links, ensuring continuous connectivity for both internal and external networks .
- **Access Control:** Limit inter-VLAN communication to only what is necessary, using ACLs or firewall rules to enforce least-privilege access .
- **Monitoring and Logging:** Implement monitoring to detect anomalies or unauthorized access attempts between internal and external segments .
- **Scalability:** Design VLANs and routing policies to accommodate future growth without compromising security or performance .

Summary

Separating internal and external networks at the core switch level is achieved through a combination of VLAN segmentation, Layer 3 routing, firewall enforcement, and software-defined policies. This approach enhances security, improves traffic management, and ensures that critical internal resources remain protected from external threats while maintaining high network performance .

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Dears I am setting up a DMZ network and we have purchased a WSA, I would like to understand from design

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What are the different types of segmentation? Macro-segmentation: The most common form of network segmentation, macro

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You'll want to set up VLAN's (if the switch supports it) to provide physical separation between the internal and external NIC's.

Network Segmentation

Network segmentation Cheat Sheet Introduction ¶ Network segmentation is the core of multi-layer defense in depth for modern

Data Center Design: Basic 3 Layers, Core, Aggregation, and Access

Key Features of 3 layers design of Data Center: Data center network is divided into 3 standard three-layer structure.

Hyper-V networking: The three virtual switches that fuel connectivity

A firewall VM routes packets between the external network and the internal network. Hyper-V virtual switches also

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Because internal network segmentation requires much more firewall rules than the external firewall. Another

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Different Types of Network Switches

There are several types of network switches and understanding the differences can help you make the right choices for your small

Creating logical separations

Imagine I have a rack of servers, some are on a DMZ and some are in the internal network. They all reside in the

How to Create a Separate Network on an Existing Switch

As networks become more crowded, the need for segmentation isn't just about efficiency; it's about survival. A

Network Segmentation — MCSI Library

An example of the “show vlan” command on a Cisco switch, each port is in it's own VLAN and could not communicate with the

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Two-tier and three-tier switch architectures

A hierarchical switch network topology, with layers that each perform different functions and tasks, is therefore ideal for implementing

Network Switch Components and Technical Analysis

Depending on device configurations and coverage requirements, they can be further divided into Layer 2 and Layer 3

Enterprise LAN and Data Center Design

Selection criteria for switches include the need for QoS, the number of network segments to be supported, required network

Structuring and Modularizing the Network

In a campus environment, the distribution layer aggregates wiring closet bandwidth by concentrating multiple low-speed access links

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