

Core Switch Data Center



AI Overview

A core switch is the high-capacity backbone of a data center network, designed for ultra-fast, reliable, and scalable data routing between distribution and access layers.

Role and Function A core switch sits at the core layer of a hierarchical network, acting as the central hub that interconnects distribution switches and aggregates traffic from multiple access switches. It ensures high-speed data transmission, minimizes latency, and maintains network stability, making it essential for large-scale networks, data centers, and enterprise environments. Unlike access switches, which connect directly to end-user devices, core switches focus on routing and switching large volumes of traffic efficiently.

Key Features

- High Performance:** Core switches support wire-speed forwarding and large buffers to handle bursty traffic without packet loss.
- Scalability:** Modular or stackable designs allow expansion to accommodate growing network demands.
- Redundancy:** Dual power supplies, hot-swappable modules, and link aggregation (LAG) ensure continuous operation even during component failures.
- Advanced Routing:** Layer 3 capabilities enable IP routing between VLANs, subnets, and security zones, supporting protocols like OSPF, BGP, and VRRP.
- Security and Management:** Core switches often include ACLs, 802.1X support, SNMP, and centralized management interfaces for traffic control and policy enforcement.

Differences from Other Switch Layers

- Access Layer:** Connects end devices, prioritizes high port density and low cost, and handles user-level traffic.
- Distribution Layer:** Aggregates multiple access switches, performs selective routing, and reduces congestion before traffic reaches the core.
- Core Layer:** Aggregates distribution traffic, provides high-speed backbone connectivity, and ensures network reliability and redundancy.

Deployment Considerations Core switches are critical in data centers with high traffic volumes, virtualization, cloud computing, and real-time applications like VoIP, video conferencing, and AI workloads. They are typically req...

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Leaf switches provide connectivity to storage, compute, service, and data center edge network elements. Leaf switches may be deployed by themselves or in a

Cisco Data Center Infrastructure 2.5 Design Guide

The data center core layer provides a fabric for high-speed packet switching between multiple aggregation modules. This layer serves as the

What Is a Core Switch?

Whether you're building a data center, scaling an enterprise network, or upgrading for future performance, selecting the right core switch ensures stability, performance, and growth readiness.

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