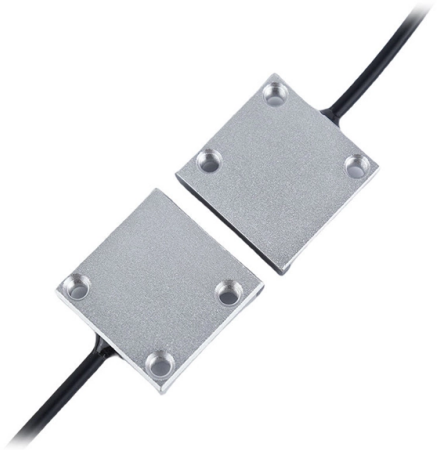
Layer 3 switches used in the core layer



Overview

What Is a Layer 3 Switch?

Features, Benefits, and Use CasesLearn what a Layer 3 switch is, how it works, and why it's a common solution for enterprise netw.

Key Takeaways

Core switches are high-capacity Layer 3 switches that serve as the backbone of enterprise networks, providing ultra-fast routing and aggregation of traffic from distribution layers.

Core Switch Overview

A core switch is positioned at the top of a hierarchical network, forming the backbone that connects distribution switches and ensures high-speed data transfer across the network. Its primary role is to aggregate massive volumes of traffic and forward it with ultra-low latency, maintaining maximum throughput without performing resource-intensive tasks like deep packet inspection or complex access control. Core switches are critical for fault tolerance; if the core fails, the entire network can be disrupted.

Layer 3 Switch OverviewA Layer 3 switch operates at the network layer (Layer 3) of the OSI model, combining traditional switching with routing capabilities. Unlike Layer 2 switches, which forward traffic based on MAC addresses, Layer 3 switches route packets using IP addresses, enabling inter-VLAN routing and efficient traffic management between subnets. They often include advanced features such as Access Control Lists (ACLs) and Quality of Service (QoS) to manage traffic priorities.

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Core vs. Layer 3 SwitchWhile all core switches are typically Layer 3 devices, not all Layer 3 switches are deployed as core switches. Key distinctions include: Function: Core switches focus on high-speed backbone connectivity and aggregation, whereas Layer 3 switches can be used at distribution or access layers for routing between VLANs.

Performance: Core switches are optimized for maximum throughput and minimal latency, often using ASICs for hardware-based routing. Layer 3 switches may prioritize routing features over raw speed. Deployment: Core switches sit at the network's physical core, connecting multiple distribution switches and data centers.

Layer 3 switches can also serve in smaller networks for inter-VLAN routing without forming the backbone.

Hierarchical Network Context

In a three-tier network model: Access Layer: Connects end-user devices, often Layer 2 switches with PoE support. Distribution Layer: Aggregates traffic from access switches, enforces policies, and performs inter-VLAN routing using Layer 3 switches. Core Layer: High-speed Layer 3 switches aggregate distribution traffic and provide backbone connectivity across the network.

Summary

Core switches are high-capacity Layer 3 switches that act as the central backbone of enterprise networks, ensuring fast, reliable, and scalable data transport. Layer 3 switches provide routing capabilities and can be deployed at distribution or access layers, but when used as core switches, they handle massive traffic volumes with ultra-low latency and high fault tolerance. Understanding their roles is essential for designing efficient, hierarchical network architectures.

Article Content

What Is a Layer 3 Switch? Features, Benefits, and Use Cases

Learn what a Layer 3 switch is, how it works, and why it''s a common solution for enterprise networks needing speed, scalability, and efficient routing.

Layer 3 Switches Explained: Architecture, Routing Logic, Use Cases,

In enterprise networks, Layer 3 switches are commonly deployed at the core layer or aggregation layer. They connect different departments, service networks, server areas, wireless

Understanding Layer 3 Switches: A Comprehensive Guide

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Layer 3 switches operate by combining the functionality of Layer 2 switching and Layer 3 routing. They can perform both MAC address-based switching within the same subnet and IP

What Is a Core Switch? Network Backbone Architecture Guide

To achieve backbone speeds, a core switch must operate at Layer 3 of the OSI model, bridging the gap between traditional MAC-based switching and IP-based routing.

Access, Distribution, and Core Layers Explained

Switches connected in this layer are known as the distribution switches. Unlike access switches, distribution switches do not provide any service to end devices.

How to Understand Layer 3 Switch? What Are Its Main Functions and ...

Layer 3 Switch, also known as a three-layer switch, is a network device that combines the functions of traditional routers and layer 2 switches, playing a key role in modern network architecture.

Access vs. Distribution vs. Core Switch Comparison Guide

Distribution Layer Switches: Positioned between the access and core layers, distribution switches aggregate traffic from multiple access switches. They are typically Layer 3 devices responsible for

What Is a Layer 3 Switch? Definition, How It Works,

A Layer 3 switch (also called a multilayer switch) is a purpose-built hardware device that blends features of a traditional Layer 2 switch and a router.

Layer 3 Switches in Cisco

A layer 3 Switch is a special type of networking device which is able to perform/execute functions of 2 layers of the OSI Model i.e., the Data Link Layer (Layer 2) and the Network Layer

Routers and L3 Switches | NetworkAcademy.IO

In this lesson, we examine the network devices that operate at Layer 3 of the OSI model. We start with the introduction of the network router and go all the way to modern layer 3 switches that are capable

Cisco vs Aruba Switches: Enterprise Comparison Guide

Compare Cisco vs Aruba switches for enterprise networks. Read our expert guide on Catalyst vs CX, DNA licensing, Central, and ISE vs ClearPass.

Layer 3 Switches in Cisco

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This makes troubleshooting the network easier compared to Layer 2-only switch troubleshooting. It is less expensive than routers. Disadvantages of Layer 3 Switches: The cost (in

Difference between layer-2 and layer-3 switches

Layer 2 switches operate at the data link layer, forwarding data based on MAC addresses, while layer 3 switches route traffic using IP addresses. Understanding the differences between these

Comparing Layer 3 and Layer 2 Switches

This article discusses the difference between layer 2 and layer 3 switches and the appropriate use cases for each.

Meraki Switches

Meraki MS Switches combine enterprise-grade hardware with cloud management, allowing your organization to scale effortlessly. Explore the models.

Data Link Layer in OSI Model

The data link layer is the second layer from the bottom in the OSI (Open System Interconnection) network architecture model. Responsible for the node-to-node delivery of data within

What is Network Switching?

Switching in IT and computer networking is the transfer of data packets, or blocks of data, through a network switch.

HPE Aruba Networking CX switches

HPE Aruba Networking CX 6300 Switch Series Layer 3 stackable access and aggregation switches with Multi-Gigabit Ethernet, High Power PoE, and up to

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