COETZER OPTICAL SYSTEMS (Pty) Ltd

Layer 3 Ethernet Core Switch

Overview

What Is a Core Switch?

Network Backbone Architecture GuideWhat makes a core switch a “Layer 3” switch?

Core switches are considered Layer 3 switches becaus.

Key Takeaways

A Layer 3 core switch is a high-performance network device that combines switching and routing capabilities to serve as the backbone of enterprise networks.Overview

A Layer 3 core switch operates at the network layer (Layer 3) of the OSI model, enabling it to route traffic between VLANs and subnets while maintaining high-speed switching within the same VLAN . Unlike Layer 2 switches, which forward traffic based solely on MAC addresses, Layer 3 switches use IP addresses for routing, providing inter-VLAN communication and reducing the need for separate routers . Core switches are positioned at the top of the network hierarchy, aggregating traffic from distribution switches and ensuring ultra-low latency and maximum throughput across the network .

Key Features
• High Port Density and Speed: Core switches often feature multiple 10GbE, 25GbE, or even 100GbE ports to handle large volumes of traffic .

• Hardware-Based Routing: Uses ASICs (Application-Specific Integrated Circuits) to perform Layer 3 routing at wire speed, minimizing latency and avoiding bottlenecks .

• Redundancy and Reliability: Dual power supplies, fan redundancy, and non-blocking backplanes ensure continuous operation and fault tolerance .

• Advanced Network Management: Supports VLANs, Access Control Lists (ACLs), link aggregation (LACP), and routing protocols like OSPF or BGP for scalable enterprise networks .

• Security Features: Includes IP-MAC binding, IPv6 First Hop Security, and ACLs to protect against spoofing and unauthorized access .

Use Cases

Layer 3 core switches are ideal for:

• Enterprise Campuses: Connecting multiple buildings or floors with high-speed backbone links .

• Data Centers: Aggregating traffic from access and distribution layers while supporting high-throughput applications .

• High-Density Networks: Environments requiring rapid inter-VLAN routing, such as offices, educational campuses, or industrial facilities .

Popular Models

• Cisco Catalyst 9200 C9200L-24P-4G: 24 Gigabit Ethernet ports, 4 uplinks, stacking bandwidth up to 160 Gbps, PoE+ support, and advanced security features .

• MikroTik CRS317-1G-16S+RM: 16 SFP+ 10GbE ports, passive cooling, STP and LACP support, suitable for high-performance applications .

• Ubiquiti USW Enterprise XG 24: 24 10GbE RJ45 ports, 2 25G SFP28 uplinks, full Layer 3 routing, touchscreen interface, and remote management via UniFi Network .

• Dell Layer 3 Switches: Offer high-speed inter-VLAN routing, PoE+ support, and scalable options for office or campus networks .

Benefits

• Reduced Latency: Hardware-based routing ensures minimal delay even under heavy traffic.

• Scalability: Supports network growth with stacking, modular uplinks, and high port density.

• Simplified Network Design: Combines switching and routing in a single device, reducing the need for separate routers.

• Enhanced Security and Traffic Management: ACLs and VLAN segmentation improve network control and protection. In summary, a Layer 3 core switch is essential for modern enterprise networks requiring high-speed, reliable, and scalable backbone connectivity, combining the best of switching and routing to optimize performance and manage complex traffic patterns efficiently .

Article Content

Fixed Port L3 Managed Ethernet Switches

The HPE Aruba Networking 2930F Switch Series is designed for digital workplaces optimized for mobile users. These powerful Layer

Layer 3 Switches | Industrial Ethernet Switches | EtherWAN

EtherWAN''s Layer 3 switches can make routing decisions based on IP addresses, with support for both static routes and RIP v1/v2

Cisco Switch Selector

The Catalyst 3750 Series are energy-efficient, Layer 3 Fast Ethernet stackable switches. These switches support Cisco EnergyWise

Related Video Reference

This video was associated with the source search result. Verify technical details against current product documentation and project requirements.

Contact Us

Continue your research online:

Website: https://coetzerinvestments.co.za
Technical inquiry: https://coetzerinvestments.co.za/contact.html

This document is for preliminary research. Verify specifications against current standards, product documentation and project requirements.