

Core Working Principle of Layer 3 Switches



AI Overview

Layer 3 switches combine the high-speed switching of Layer 2 devices with the routing capabilities of routers, using both MAC and IP addresses to efficiently manage network traffic.

Overview A Layer 3 switch is a network device that operates at both the Data Link layer (Layer 2) and the Network layer (Layer 3) of the OSI model, effectively merging the functions of a traditional switch and a router. It can forward traffic within the same subnet using MAC addresses, like a Layer 2 switch, and route traffic between different subnets or VLANs using IP addresses, like a router.

Switching Functionality Within a single VLAN or subnet, a Layer 3 switch behaves like a standard Layer 2 switch. It examines the MAC addresses of incoming frames and forwards them to the appropriate port, creating separate collision domains for each port and ensuring fast, low-latency communication between devices on the same network segment.

Routing Functionality For traffic between different VLANs or subnets, the Layer 3 switch performs IP-based routing. It inspects the IP header of each packet, consults its routing table, and determines the optimal path to the destination interface. This allows the switch to efficiently manage inter-VLAN traffic without the need for an external router, reducing latency and improving throughput in large networks.

Inter-VLAN Routing Layer 3 switches are particularly effective for inter-VLAN routing, enabling communication between multiple VLANs while maintaining separate broadcast domains. This capability allows network administrators to segment traffic for security, performance, or organizational purposes while still allowing controlled communication between segments.

Performance Advantages Unlike traditional routers, Layer 3 switches are optimized with hardware-based routing logic, often using specialized ASICs (Application-Specific Integrated Circuits) to process packets...

Article Content

Layer 3 switches explained

Layer 3 switches are explained in this tip, including the difference between a switch, a router and a Layer 3 switch.

Layer 3 Switching

Layer 3 Switching – Routing Between VLANs on Modern Multilayer Switches In today's high-performance networks, speed, segmentation, and scalability are crucial—especially in environments

Layer 2 vs. Layer 3 Switching — A Comprehensive Comparative ...

Layer 2 vs. Layer 3 Switching — A Comprehensive Comparative Analysis for Modern Networks In today's networking

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

A Layer 3 switch combines the high-speed forwarding capability of a Layer 2 switch with the routing intelligence of a router. It can forward frames based on MAC addresses inside the same

What is Layer 3 Switch and How Does it Works?

An introduction to Layer 3 switch and how it works within the network to further understand its benefits and capabilities.

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

What is a Layer 3 switch? Learn the definition, how it works, use cases, pros and cons, and when to choose a multilayer switch for enterprise LANs.

ITPro Today, Network Computing, IoT World Today combine

ITPro Today, Network Computing and IoT World Today have combined with TechTarget . The page you are looking for may no longer exist.

Understanding Layer 3 Switches: A Comprehensive Guide

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

Understanding Layer 3 Switches: A Comprehensive Guide

Conclusion Layer 3 switches are powerful networking devices that provide the advanced routing capabilities of routers combined with the high-speed data forwarding of switches. They are

Cisco Switch Layer2 Layer3 Design and Configuration

Layer2 and Layer3 switches are the foundation of any network. After all, any network devices (routers, firewalls, computers, servers etc) have to be connected to a switch. Sooner or later, as a network

Three-Layer Model

The Cisco hierarchical model can help you design, implement, and maintain a scalable, reliable, cost-effective hierarchical internetwork. Cisco defines three layers of hierarchy, as it is shown below, each

Here's Why Your Network Might Need a Layer 3 Switch

What Is a Layer 3 Switch? A Layer 3 switch is a specialized hardware device used in network routing. Layer 3 switches technically have a lot in

What is Layer 3 Switch and How Does it Works?

You can group switching interfaces in various ways to allocate bandwidth and contain broadcasts, which makes Layer 3 switches a powerful, scalable technology for building high-speed Ethernet backbone

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

Layer 3 Switch operates at the third layer of the OSI model, namely the network layer. It can not only efficiently process layer 2 packets like a layer 2 switch but also process layer 3 packets

Fundamentals of Operations on a Layer 3 Switch

SVI - Switched virtual interface - Example: Interface VLAN 10. In the example "interface VLAN 10" & "interface VLAN 20" are connected "virtually / conceptually" to the SW-1 IOS that supports routing.

Layer 3 Switches in Cisco

In simple words, a Layer 3 Switch is a networking device that can perform switching (functions of layer 2) as well as routing (functions of Layer 3).

Layer 3 Switches

The switch has its own IP interface on VLAN 1, with its own IP address Imagine the switch's CPU is plugged into VLAN 1 (but without using up a physical port) You use this to manage the switch (ssh,

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

While a Layer 2 switch allows communication within each VLAN, a Layer 3 switch seamlessly routes data between VLANs, ensuring efficient interdepartmental connectivity without

Layer 2 and Layer 3 switches

How Layer 2 switches work Layer 1, also referred to as the Physical Layer, describes the electrical interface and isn't of much interest to switch vendors. Rather it's to Layer 2 (the Data Link

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

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

Layer 3 Switch can effectively manage network traffic in different areas, providing stable network connections. Overall, we can understand that a Layer 3 Switch is a powerful and flexible

Routers and L3 Switches | NetworkAcademy.IO

Learn how routers and Layer 3 switches connect networks, route IP packets, and enable fast inter-VLAN communication in modern network designs.

Routers and Layer 3 Switching

However, a Layer 3 switch has the ability to reprogram the hardware dynamically with the current Layer 3 routing information. This is what allows for faster packet processing. On current Layer 3 switches,

Layer 2 vs Layer 3 Switch: What's the Difference? | Auvik

Layer 2 vs Layer 3 switches The OSI networking model defines a number of network "layers." (Getting into each layer is beyond the scope of this article but our Network Management in a

An Introduction to Layer 3 Switches

Layer 2 switches work well when there is low to medium traffic on VLANs. But these switches would hang when traffic increased. So, it became necessary to increase the functionality of

Core Differences Between Layer 2 and Layer 3 Switches

Scenarios Where Layer 3 Switches Must be Used · Enterprise-Level Core Networks: Dividing different VLANs for multiple departments, and requiring high-speed communication across

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

A Layer 3 switch (multilayer switch) combines Layer 2 Ethernet switching with Layer 3 IP routing. It switches traffic within the same VLAN/subnet

Layer 2, Layer 3, and Layer 4 Switches

Therefore, Layer 2 switches are used to provide cheap and easy workgroup connectivity, and Layer 3 switches are used to segment and control internal networks with no loss of bandwidth. Likewise,

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