Layer 3 Gateway Core Switch



Overview

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.

Key Takeaways

A core switch operating as a Layer 3 gateway serves as the high-speed backbone of a network, performing inter-VLAN routing, IP address assignment, and centralized traffic forwarding for both wired and wireless users.

Role in Network Architecture

A core switch sits at the top of the three-tier network hierarchy, connecting distribution layer switches and providing ultra-low latency, high-throughput backbone connectivity across the enterprise or campus network. Unlike access switches, which connect end devices, or distribution switches, which aggregate traffic and enforce policies, the core switch handles massive traffic volumes and ensures fast inter-segment data transfer. It bridges Layer 2 switching and Layer 3 routing, enabling efficient communication between VLANs and subnets.

Layer 3 Gateway FunctionsWhen configured as a Layer 3 gateway, a core switch performs several critical functions: Inter-VLAN Routing: It routes traffic between multiple VLANs, reducing the load on firewalls and improving local traffic efficiency.

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P Address Management: Core switches can act as DHCP servers for wired and wireless clients, while access points may receive IP addresses from the core or associated ACs. Redundancy and High Availability: Core switches implement protocols like VRRP or HSRP to provide failover capabilities, ensuring uninterrupted network operation. Traffic Forwarding: Using ASIC-based hardware, Layer 3 core switches forward packets at high speed, supporting large-scale enterprise traffic without bottlenecks.

Configuration Considerations

To deploy a core switch as a Layer 3 gateway effectively: Interface Setup: Create Layer 3 interfaces for each subnet or VLAN and assign IP addresses. Remove these interfaces from the firewall if it previously handled routing. Routing: Configure static or dynamic routes to ensure WAN traffic reaches the firewall while local inter-VLAN traffic is handled by the core switch.

VLA

N Management: Avoid using VLAN 1 for management or service traffic; separate management and service VLANs to prevent service interruptions. Scalability: Ensure the switch has sufficient slots and module types to support future expansion, including high-speed uplinks and additional VLANs.

Benefits

Using a core switch as a Layer 3 gateway improves network performance by offloading inter-VLAN routing from firewalls, centralizes IP management, and provides a scalable, fault-tolerant backbone for both wired and wireless users. It is particularly effective in environments with high inter-VLAN traffic or multiple access points and distribution switches. In summary, a Layer 3 core switch acts as the central routing and forwarding hub of a network, combining high-speed switching, inter-VLAN routing, DHCP services, and redundancy to maintain a reliable and efficient enterprise network infrastructure.

Article Content

MS Layer 3 Switching and Routing

To start using layer 3 routing, navigate to the Switching > Configure > Routing & DHCP page. Alternatively, you could go to Switching > Monitor >

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

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Layer 3 Switch Example

This article outlines a basic example of how layer 3 routing functionality on MS series switches could be implemented. Before proceeding, please refer to the Layer 3 Switch Overview for general information

What Is a Core Switch?

Unlike access or distribution switches, a core switch is optimized for Layer 3 performance, modular scalability, and redundancy. In smaller networks, it may be combined with the distribution layer in a

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Like a regular switch, it can forward frames at Layer 2 based on MAC addresses. At the same time, it can perform Layer 3 routing between VLANs or IP subnets using IP addresses, just like a router.

Routing & Switching Design | Validated Solution Guide

The active gateway features enable configuration of a redundant Layer 3 network gateway using a shared IP and MAC address. Dual-homing connected devices in this manner adds

Configuring layer-3 routing on FortiSwitch units

To use layer-3 routing on FortiSwitch units, the managed switches must be running FortiSwitchOS 7.2.0 or later. You can configure the following layer-3 routing on FortiSwitch units: You add static routes to

Cisco C9350 Series Smart Switches Data Sheet

The Cisco C9350 series supports advanced Layer 2 and Layer 3 forwarding capabilities, increased forwarding and access control scale, and hardware-based encryption, delivering high

InterVLAN routing using Layer 3 switch

In this lesson, we will learn to configure a multilayer switch (also called Layer 3 switch) to perform inter-VLAN routing, which was previously done using an

Software-Defined Access Solution Design Guide

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The multiple Layer 3 gateways on all the access layer switches are called anycast gateways. This provides the benefit of any subnet being available anywhere without the challenges of Spanning Tree

Layer 2 Vs. Layer 3 Switches Vs. Routers: Key Differences?

Compare Layer 2 switches, Layer 3 switches & routers. Learn how each works, their use cases & which device fits best for your network setup.

MX and MS Basic Recommended Layer 3 Topology

Correct Topology In this topology: Client VLAN 1 and VLAN 2 are only defined on a single layer 3 device (Layer 3 MS switch). Client devices have a default gateway of the layer 3 device the VLAN has been

Hub, Switch, & Router Explained

This is an animated video that explains the difference between a hub, switch, and a router. It explains how a router works, how a switch works and how a hub works.

MikroTik · Switches

MikroTik makes networking hardware and software, which is used in nearly all countries of the world. Our mission is to make existing Internet technologies faster, more powerful and affordable to wider

Differences Between a Gateway and a Firewall

3. Gateway 3.1. Introduction Gateways play an important role in enabling secure and efficient communication between different networks. Additionally, they provide a layer of protection

Core, Distribution, and Access Layer Explained with

Small business implementations: Collapsed core Small to medium businesses don''t need the same scale, but they can still benefit from the

Cisco Catalyst SD-WAN Design Guide

This design guide provides an overview of the Cisco Catalyst SD-WAN solution. It discusses the architecture and components of the solution,

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