How do different VLANs communicate on an aggregation switch



Overview

Although VLAN aggregation allows different VLANs to use IP addresses on the same subnet, it creates a Layer 3 forwarding problem between sub-VLANs.

Key Takeaways

Different VLANs on an aggregation switch communicate through Layer 3 interfaces, often using super-VLANs with proxy ARP to enable inter-VLAN traffic.

VLA

N Aggregation OverviewVLAN aggregation, also called super-VLAN technology, groups multiple sub-VLANs under a single logical Layer 3 interface (super-VLAN). Each sub-VLAN contains physical interfaces and isolates broadcast domains, but all sub-VLANs share the same IP subnet and default gateway provided by the super-VLAN interface. This approach conserves IP addresses and simplifies network design by allowing multiple VLANs to use the same subnet.

Layer 2 vs Layer 3 CommunicationLayer 2: Hosts in different sub-VLANs can communicate only if they are in the same broadcast domain. By default, sub-VLANs are isolated at Layer 2, so direct communication is blocked. Layer 3: To enable inter-VLAN communication, the aggregation switch uses a Layer 3 interface on the super-VLAN.

Hosts send traffic to the super-VLAN gateway, which routes packets between sub-VLANs.

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Using Proxy ARP

Because sub-VLANs share the same subnet, hosts may not know the MAC addresses of devices in other sub-VLANs.

Proxy AR

P allows the switch to respond to ARP requests on behalf of hosts in other sub-VLANs: Host_1 in sub-VLAN 2 wants to communicate with Host_2 in sub-VLAN 3. Host_1 broadcasts an ARP request for Host_2's IP. The aggregation switch, with proxy ARP enabled on the super-VLAN interface, replies with its own MAC address.

Host_1 sends packets to the switch, which then forwards them to Host_2 across sub-VLANs. This mechanism effectively allows Layer 3 communication between isolated sub-VLANs without requiring separate IP subnets for each VLAN. Alternative Inter-VLAN CommunicationOn switches with full Layer 3 capabilities, you can also create VLAN interfaces (SVIs) for each VLAN and enable routing between them.

Traffic is then routed internally by the switch without needing an external router. In traditional Layer 2 switches, inter-VLAN communication requires a router or a Layer 3 device connected via trunk links. SummarySub-VLANs isolate broadcast domains but share a super-VLAN subnet.

Hosts in different sub-VLANs cannot communicate at Layer 2 by default.

Proxy AR

P on the super-VLAN interface enables Layer 3 communication between sub-VLANs. Layer 3 switches can also use SVIs to route traffic between VLANs directly. This design reduces IP address waste and simplifies network management while maintaining inter-VLAN connectivity.

Article Content

Understanding VLAN Aggregation

Although VLAN aggregation allows different VLANs to use IP addresses on the same subnet, it creates a Layer 3 forwarding problem between sub-VLANs. In common VLAN mode, hosts in different

Routing Between VLANs Overview [Networking Software (IOS & NX

The bridging domain is supported on various pieces of network equipment; for example, LAN switches that operate bridging protocols between them with a separate bridge group for each VLAN.

VLAN Configuration Guide

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Communication between different VLANs always requires a Layer 3 routing device. This means adding complexity and potential bottlenecks if not properly designed.

VLAN Basic Concepts Explained with Examples

This tutorial explains the basic concepts and fundamentals of VLANs. Learn what VLANs are and how they work in an Ethernet LAN network.

Inter-VLAN Routing Configuration

Inter-VLAN routing is a network configuration technique that allows communication between devices on different VLANs (Virtual Local Area Networks) within the same network. VLANs

Understanding VLANs and Inter-VLAN Routing

Understanding VLAN tagging is essential for implementing more advanced networking concepts like inter-VLAN routing, which allows devices on different VLANs to communicate with each

Routing Between VLANs & Layer 3 Switches

Learn what a Router Sub-interface and a L3 Switch is, as well as how to configure both of them on Cisco devices to enable Routing between VLANs.

Bridging and VLANs | Junos OS | Juniper Networks

By default, when you boot a switch that runs Junos OS that supports ELS and uses the factory default configuration, or when you boot the switch and do not explicitly configure a port mode,

Introduction to Switching and VLANs

Trunking allows multiple VLANs to use a single connection between switches, routers, or other network devices. Trunking is useful when you want VLANs to communicate between different...

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EOS 4.36.1F

Arista switches support Multi-Chassis Link Aggregation (MLAG) to logically aggregate ports across two switches. For example, two 10-gigabit Ethernet ports, one each from two MLAG configured switches,

VRF Routing Basics Follow & Subscribe Networks Baseline # ...

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TikTok video from Networks Baseline (@the_network_dna): “VRF Routing Basics Follow & Subscribe Networks Baseline #education #networking #technology #fblifestyle #fyp”. Worldcup - Joe elshater.

L3 Switch for Advanced Networks | Omada by TP-Link

L3 switches work best as core or aggregation devices in networks with multiple VLANs or building segments that need routing between them. If your network requires routing between internal subnets

How can hosts on two different VLANs communicate?

It is clear that hosts on two different VLANs can''t directly communicate on a single switch, but how do they communicate to each other at all? Do they use a router? How does it work?

LAN Switching Configuration Guide

Where an aggregation route performs inter-VLAN routing for multiple VLANs, traffic can be switched autonomously on-card or between cards rather than through the central Route Switch

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Routing Between VLANs Overview

Implementation of VLANs also improves scalability, particularly in LAN environments that support broadcast- or multicast-intensive protocols and applications that

Setting up VLAN across 2 switches with link aggregation

Hummm, this is an interesting setup. Lets be clear; link aggregation is different than vlan trunking (tagging). You can have a LACP trunk that is untagged (no vlan info) and you can have a

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