Fiber optic leased line connected to a Layer 3 switch

Article Overview

A fiber optic leased line can be connected to a Layer 3 switch to enable high-speed routing between VLANs and networks, often via an intermediate router or firewall for WAN integration.

Understanding the Leased Line

A leased line is a dedicated point-to-point connection provided by an ISP, often using fiber optic media for high bandwidth and long-distance transmission . It provides full-duplex communication and a fixed bandwidth, making it ideal for connecting branch offices or data centers. The fiber optic leased line typically terminates at an Optical Network Terminal (ONT) or similar device at the customer premises, which then interfaces with your network equipment .

Layer 3 Switch Overview

A Layer 3 switch operates at the network layer (Layer 3) and can route traffic between VLANs or subnets using IP addresses, unlike Layer 2 switches that only forward based on MAC addresses . When combined with fiber optic connections, Layer 3 switches support high-speed, long-distance data transmission, making them suitable for data-intensive applications like cloud computing, VoIP, and video streaming . They also support dynamic routing protocols such as OSPF and BGP, as well as Access Control Lists (ACLs) for traffic management and security.

Typical Connection Setup

o Fiber Termination: The ISP fiber uplink (leased line) is terminated at an ONT or media converter. This converts the optical signal to an electrical signal compatible with Ethernet interfaces if needed .

o Router/Firewall Integration: In most setups, the ONT or fiber termination connects to a router or firewall WAN port. This device handles IP addressing, NAT, and security policies before traffic enters the internal network .

o Layer 3 Switch Connection: The LAN side of the router/firewall connects to the Layer 3 switch. The switch can then route traffic between VLANs, subnets, or other internal networks without sending packets back to the router, reducing latency and improving efficiency .

o Direct Switch Connection (Optional): In some cases, if the leased line provides a routed Ethernet handoff, the fiber can be connected directly to a Layer 3 switch port configured with the ISP-provided IP address and VLAN tagging. However, this requires careful configuration of routing and security policies .

Configuration Considerations

o VLANs and Subnets: Configure VLANs on the Layer 3 switch to segment traffic efficiently. Assign IP

addresses to VLAN interfaces for inter-VLAN routing.
o Routing Protocols: Use static routes or dynamic routing protocols (OSPF/BGP) to manage traffic between the leased line and internal networks.
o Redundancy and Failover: Layer 3 switches often support link aggregation and redundant power supplies to ensure high availability for critical leased line connections .
o Security: Apply ACLs to control traffic flow and prevent unauthorized access from the WAN.

Summary

Connecting a fiber optic leased line to a Layer 3 switch typically involves terminating the fiber at an ONT or media converter, optionally routing through a firewall or router, and then connecting to the Layer 3 switch for internal routing. This setup leverages the high-speed capabilities of fiber and the routing efficiency of Layer 3 switches, supporting multiple VLANs, dynamic routing, and secure, low-latency communication across the network .

A switch can connect the computers via Ethernet port, Fast Ethernet port and optic fibre port. Switch works on its operating software

How a Leased Line Works A leased line functions as a private, high-speed data path between your business and its internet service

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

Layer 2 vs Layer 3 switch explained. Learn MAC vs IP forwarding, inter-VLAN routing,

Leased Line Connection Diagram Below is a block diagram illustrating a typical leased line network architecture

Layer2 and Layer3 switches are the foundation of any network. After all, any network devices (routers, firewalls, computers, servers

Learn how network switches connect to fiber optics for fast and reliable data transmission.

Layer 3 routing capabilities are available on most Cisco Meraki switches. This allows the switches to route traffic

In this section, you configure inter-VLAN routing using Layer 3 switches. Modern enterprise networks rarely

use router-on-a-stick

To connect multiple Ethernet switches, the best way is to use a multi-strand fiber cable. The 4-strand pre-terminated

The Catalyst 4500 series switch supports Layer 3 interfaces with the Cisco IOS IP and IP routing protocols. Layer 3,

SFP transceiver modules are specific to the type of fiber being connected (either single mode or multimode). Choose an SFP module

How Does a Leased Line Work? A leased line is a physical connection between two locations, typically provided by a

Routing Between VLANs & Layer 3 Switches Routing Between VLANs & Layer 3 Switches We wrote an article which covers Virtual

Connecting Layer 3 switch out to the internet So I"m trying to get my home network setup and I talked with my ISP and they said the

Layer 3 switch vs router: Explain what Layer 3 switches and routers are, along with their main similarities and

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