Enterprise Dual-Route Access Switch



Overview

Routing & Switching Design | Validated Solution GuideStacking allows multiple access switches to be connected to each other and behave like a single switch.

Key Takeaways

Enterprise dual-route access switches provide high availability and redundancy by connecting access layer devices to multiple distribution or core switches, ensuring continuous network operation even if one path fails.

Overview

A dual-route access switch is an access layer switch configured to maintain two independent uplink paths to the distribution or core layer. This design ensures redundancy, load balancing, and high availability in enterprise networks, minimizing downtime for critical applications such as voice, video, and data services.

Key Features

Layer 2/Layer 3 Capabilities: Modern access switches support both Layer 2 switching and Layer 3 routing, enabling routed access designs with protocols like OSPF or EIGRP for dynamic path selection. Link Aggregation: Dual-route access switches often use Link Aggregation Control Protocol (LACP) or multi-chassis link aggregation (MC-LAG) to combine multiple uplinks into a single logical connection, improving bandwidth and providing failover. High Port Density and Speed: Access switches typically offer Gigabit or 10GbE uplinks and sufficient port density to connect multiple end devices, supporting enterprise desktop access, IP phones, and wireless access points.

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Redundancy and Resiliency: Dual-route designs allow dual-homing of hosts or switches to separate distribution switches, ensuring traffic can reroute automatically if one uplink or switch fails.

Deployment Considerations

Hierarchical Network Design: Dual-route access switches are deployed in a three-tier or two-tier campus network, connecting to distribution or core switches to form a resilient topology. Routing Protocols: Implementing Layer 3 routed access with OSPF or EIGRP allows each access switch to maintain multiple active paths, improving convergence and network stability. Stacking and Virtualization: Some access switches support stacking or IRF (Intelligent Resilient Framework), allowing multiple physical switches to operate as a single logical unit, simplifying management and enhancing redundancy.

Power over Ethernet (PoE): Many enterprise access switches provide PoE+ to power devices like IP phones and wireless access points, ensuring uninterrupted service even during partial network failures.

Example Hardware

Tejas Networks TJ1400P M Series: Offers Layer 2/Layer 3 switching with high-density ports and advanced routing features suitable for enterprise access and distribution layers.

H3

C S5130S-EI Series: Provides dual-route support, IRF stacking, PoE+, and flexible Layer 2/Layer 3 routing for campus networks.

HPE Aruba C

X 63xx Series: Supports dual-homed hosts, MC-LAG, and Layer 3 routed access in data center and campus environments.

Benefits

High Availability: Continuous network operation even if one uplink or switch fails. Load Balancing: Traffic can be distributed across multiple uplinks for better performance. Simplified Management: Stacking and virtual chassis technologies allow centralized configuration and monitoring.

Scalability: Supports growth by adding additional switches or uplinks without disrupting existing services. Enterprise dual-route access switches are essential for mission-critical networks, providing redundancy, resiliency, and efficient traffic management while supporting modern Layer 2/Layer 3 features and high-speed connectivity.

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