E-Commerce Retailer Network Infrastructure Design

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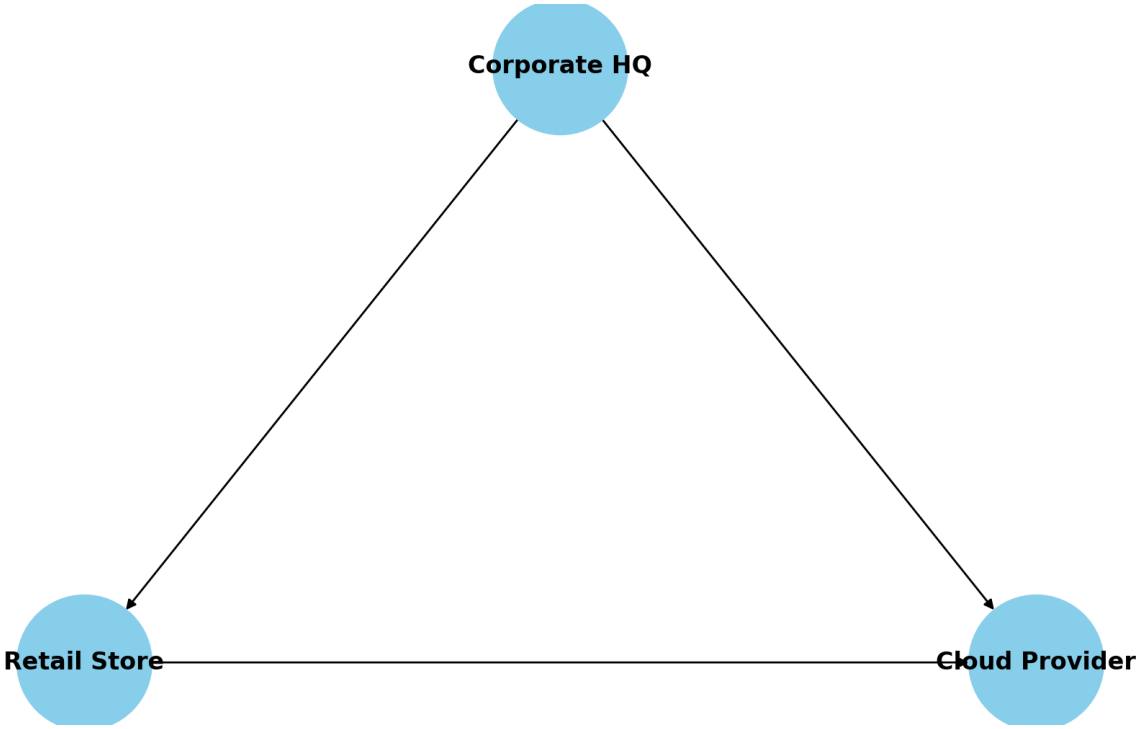
1. Logical WAN Diagram

This hierarchical diagram shows the interconnection of the corporate headquarters, a typical retail store, and a cloud service provider using VPN/MPLS tunnels. The design supports cloud-based services like the e-commerce website, CRM, and inventory systems.

Assumptions:

- - VPN tunnels are used for cost efficiency and secure communication.
- - Cloud services host the e-commerce platform and CRM.
- - MPLS ensures secure and low-latency inter-site communication.

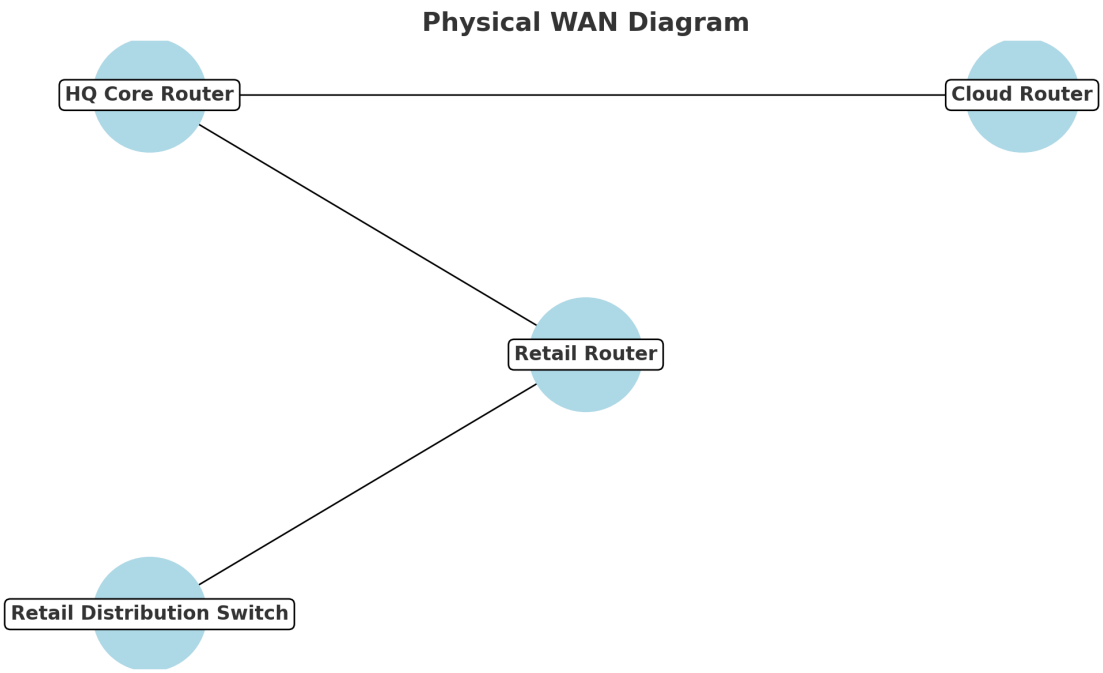


2. Physical WAN Diagram

This diagram shows the physical locations of core routers, distribution switches, and WAN links. Core routers are placed at the HQ and cloud provider edge, while distribution switches are installed at the retail location.

Justification:

- - Core routers handle high-throughput routing and firewall filtering.
- - Distribution switches improve local traffic performance.
- - LTE/5G backup ensures failover and redundancy.

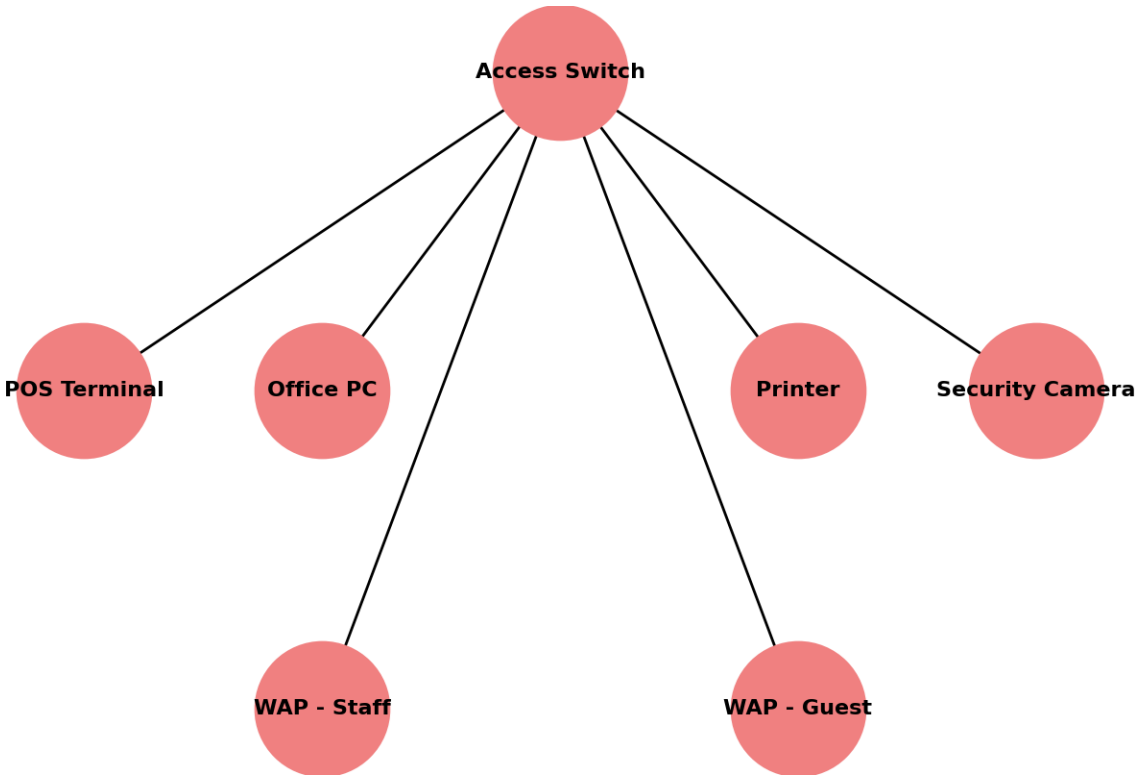


3. Physical LAN and WLAN Diagram – Typical Retail Store

The diagram below shows the layout of a typical retail store's LAN and WLAN setup, including access layer switches, VLAN segmentation, and wireless SSIDs.

Components:

- - VLAN 10: Admin/Finance
- - VLAN 20: POS terminals
- - VLAN 30: Guest Wi-Fi
- - SSID: StoreSecure (for staff)
- - SSID: FreeRetailWiFi (for public use)



4. Evaluation of Cloud-Based Solution

The logical WAN diagram provides a strong foundation for a secure, scalable, and cloud-integrated infrastructure. It supports centralized application hosting, secure communications, and rapid scalability.

Key Criteria Met:

- - Scalability: Handles seasonal traffic efficiently.
- - Resilience: Redundant links minimize service downtime.
- - Security: Uses encryption, segmentation, and firewall protections.

5. Persuasive Recommendation

This infrastructure supports the retailer's strategic goals, such as integrating AI chatbots, offering public Wi-Fi, and expanding to IoT-based solutions. It also ensures data protection, future scalability, and customer satisfaction.

References

Immidisetti, S. (2025). Cloud-enabled LAN optimization. Network Journal, 14(2), 67–72.

Libeer, C. (2024). Scalable SDN architecture for retail. International Journal of Cloud Networking, 12(3), 34–48.

Microsoft. (2024). Zero Trust security in retail networks. https://www.microsoft.com/security

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