

Multi-Site SD-WAN Lab

Self-Directed Project — Cisco Viptela / SD-WAN Architecture

OVERVIEW

This lab was built to close a specific gap: strong hands-on fundamentals in Cisco routing/switching and Palo Alto security, but limited direct exposure to SD-WAN. Rather than only studying SD-WAN concepts, I built a simulated multi-site environment to work with the architecture directly — controller-based management, overlay tunnel design, and application-aware routing.

ARCHITECTURE

The lab simulates the standard Cisco Viptela SD-WAN control/management/data-plane split:

- vManage — centralized management plane for device configuration and monitoring
- vSmart — control plane controller distributing routing and policy information to edge devices
- vEdge routers — data-plane devices at simulated branch and hub sites, including a dedicated branch vEdge used for policy-based routing (PBR) testing

A full IP addressing plan was built out across sites to keep the underlay (physical/ISP-style transport) and overlay (encrypted tunnel mesh) cleanly separated and documented, mirroring how a real multi-site deployment would be planned before implementation.

WHAT I BUILT & TESTED

- Underlay/overlay separation across simulated sites, with a documented addressing plan for both layers
- Centralized policy distribution from vSmart to vEdge devices, rather than per-device configuration
- Policy-based routing (PBR) on a branch vEdge to steer traffic by policy rather than default routing behavior — the same mechanism production SD-WAN deployments use for application-aware path selection
- Change documentation for the PBR configuration, written in the same MOP/change-request format used for production changes, to practice applying real change-management discipline to lab work

WHY THIS MATTERS

SD-WAN is where a lot of enterprise WAN architecture is headed, and I wanted hands-on reps with the controller model and policy-based traffic steering before I needed them on the job. This lab isn't production work — it's deliberate practice, built and documented the same way I'd document a real change, so the habits transfer directly.

SKILLS DEMONSTRATED

Cisco Viptela SD-WAN architecture · Underlay/overlay design · Controller-based policy management · Policy-based routing (PBR) · IP addressing planning · Change documentation discipline