



VyOS
Networks



/ SOLUTION BRIEF

EVPN-VXLAN FOR ENTERPRISE CAMPUS NETWORKS

Overview

Enterprise networks are evolving rapidly to meet the demands of digital transformation, mobility, and cloud connectivity. Traditional VLAN-based campus designs are reaching their scalability and agility limits.

EVPN-VXLAN (Ethernet VPN over Virtual Extensible LAN) brings data center-grade technologies to the enterprise campus, delivering a modern, scalable, and service-oriented fabric that unifies Layer 2 and Layer 3 connectivity with automation and cloud readiness.

By decoupling logical services from the physical topology, EVPN-VXLAN enables enterprises to design programmable, resilient, and secure campus networks that adapt dynamically to changing business needs.

Key Benefits

Unified Layer 2/Layer 3 Fabric

EVPN-VXLAN provides a consistent and scalable network fabric across the entire campus. It simplifies routing and segmentation, allowing seamless communication between users, devices, and applications, independent of physical location.

Secure Network Segmentation

Using VXLAN Network Identifiers (VNIs) and EVPN route types, organizations can implement micro-segmentation for departments, applications, or user roles, enhancing security and reducing attack surfaces.

Scalability and Flexibility

VXLAN extends the scalability of traditional VLANs, supporting thousands of virtual segments across the campus. This ensures easy expansion and seamless integration with data center or cloud environments.

Seamless User and Device Mobility

Distributed gateway functionality allows users and devices to move freely across the network while maintaining consistent IP addressing and policies—essential for BYOD and IoT deployments.

High Availability and Fast Convergence

Active-active multihoming and EVPN's control-plane-based MAC learning eliminate loops and ensure rapid convergence during topology changes or failures.

Network Automation and Operational Simplicity

EVPN-VXLAN aligns with modern automation frameworks such as Ansible, NetConf, and Terraform, enabling faster deployments, policy consistency, and simplified day-2 operations.

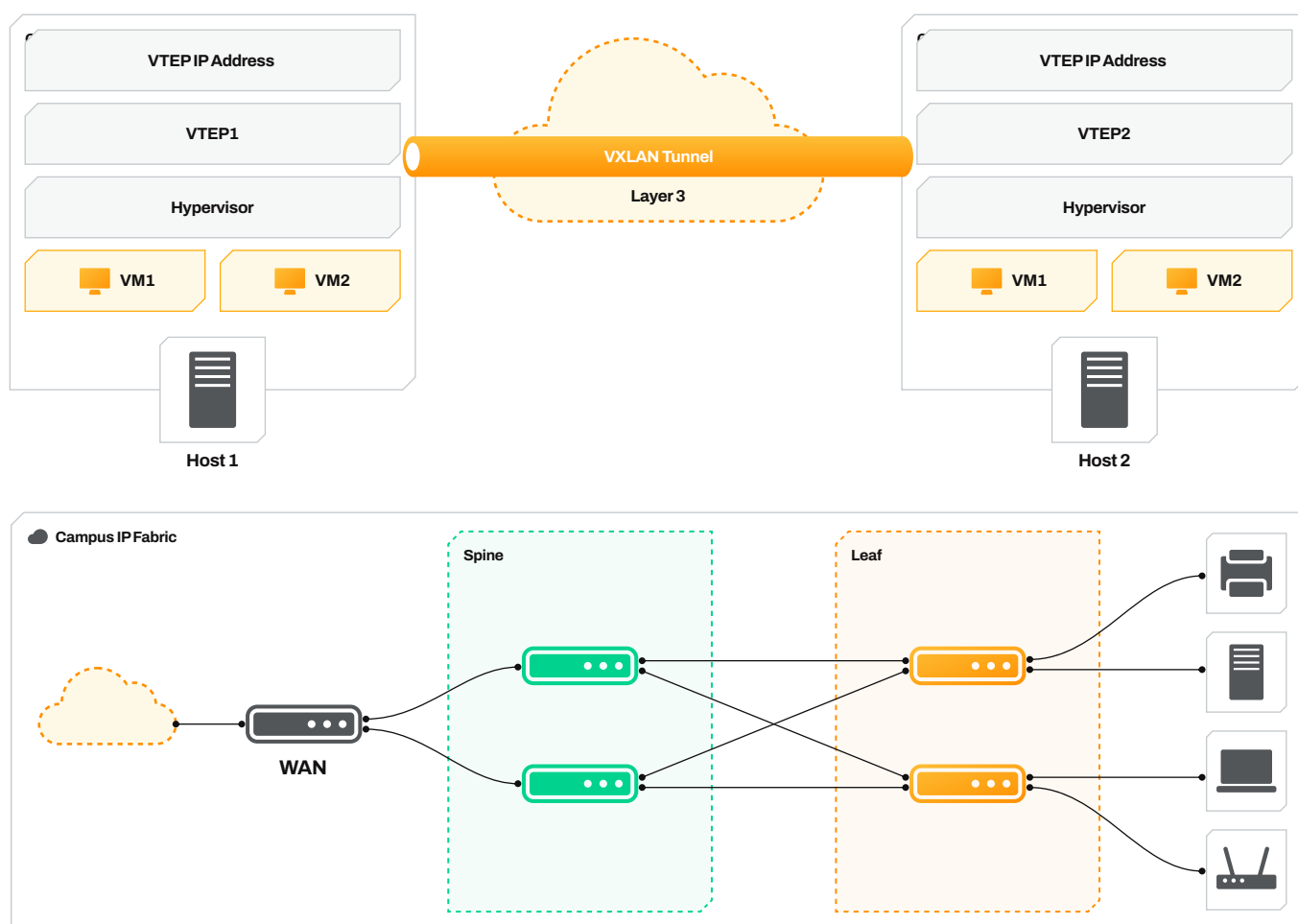
Cloud and SDN Integration

The architecture is inherently cloud-ready, integrating seamlessly with SDN controllers and hybrid-cloud platforms—preparing the enterprise for future digital initiatives.

How EVPN-VXLAN Works

EVPN-VXLAN overlays a virtual Layer 2 network on top of an IP-based Layer 3 underlay.

- VXLAN encapsulates Ethernet frames in UDP packets, identified by VXLAN Network Identifiers (VNIs) to separate tenants or services.
- EVPN (via BGP) serves as the control plane, distributing MAC and IP mappings between VXLAN Tunnel Endpoints (VTEPs), eliminating flooding and improving efficiency.
- This architecture supports Integrated Routing and Bridging (IRB), ARP suppression, and active-active multihoming, creating a high-performance, deterministic campus network fabric.



EVPN-VXLAN vs. Traditional Campus Networks

Feature	Traditional Campus Network	EVPN-VXLAN Campus Fabric
Architecture	Hierarchical (Core–Distribution–Access)	Leaf-Spine or collapsed-core with overlays
Layer 2 Extension	VLAN-based, STP-dependent	VXLAN overlay with loop-free L3 underlay
Segmentation	VLANs and VRFs (limited)	Scalable VNIs for macro/micro-segmentation
Mobility	Limited, DHCP renewals required	Seamless with distributed gateways
High Availability	Active/standby links, STP convergence	Active-active multihoming with fast failover
Traffic Learning	Flood-and-learn MAC/ARP	Control-plane-based via EVPN
Automation	Manual, CLI-based	API-driven (Ansible, Terraform, NetConf)
Multitenancy	Complex and limited	Native secure multi-tenancy support
Cloud/Edge Integration	Difficult to extend	Simple overlay extension to cloud/edge
Security	Port ACLs, static	Fine-grained segmentation and policy enforcement

Conclusion

EVPN-VXLAN modernizes the enterprise campus network, replacing legacy protocols with a scalable, automated, and cloud-ready fabric.

It delivers unified L2/L3 connectivity, seamless mobility, and enhanced security, while aligning with modern automation and SDN frameworks.

By adopting EVPN-VXLAN, enterprises can achieve **data center-class performance and agility** across their entire campus, preparing the network for the next decade of digital innovation.