VXLAN Gateway Deployment on Hardware Core Switches for Multi-Tenant Clouds - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

Modern multi-tenant cloud architectures demand a network fabric that can deliver strict tenant isolation, seamless workload mobility, and deterministic high-throughput forwarding without compromising operational simplicity. The VXLAN Gateway Deployment on Hardware Core Switches for Multi-Tenant Clouds solution addresses these requirements by embedding hardware-accelerated VXLAN tunnel termination and origination directly into the core switching silicon. This document provides a comprehensive technical overview of the platform, its architectural advantages, and the deployment models that enable cloud service providers and large enterprises to scale tenant networks across Layer 2 and Layer 3 boundaries with line-rate performance.

By leveraging ASIC-based VXLAN gateway functionality, the core switch eliminates the latency and throughput bottlenecks associated with software-based tunnel endpoints. Each tenant receives a logically isolated VXLAN segment identified by a 24-bit VXLAN Network Identifier (VNI), while the hardware core switch performs encapsulation, decapsulation, and inter-VNI routing at wire speed. This approach preserves the benefits of overlay

networking while maintaining the predictable, low-latency behavior required for mission-critical cloud workloads.



HARDWARE ARCHITECTURE & SILICON

The core switching platform is built around a programmable, non-blocking packet forwarding ASIC that integrates dedicated VXLAN tunnel processing pipelines. Unlike general-purpose CPUs or software virtual switches, the hardware VXLAN gateway performs tunnel encapsulation and decapsulation entirely in silicon, ensuring that overlay traffic does not incur the performance penalties typically associated with virtual tunnel endpoints.

KEY ARCHITECTURAL ELEMENTS

- Dedicated VXLAN Tunnel Engine: Supports up to 16,000 VXLAN tunnel

endpoints (VTEPs) and 4,000 VNIs per switch, enabling dense multi-tenant segmentation without external appliances.

- Hardware-Based Encapsulation: UDP-based VXLAN encapsulation and decapsulation are executed at line rate, with no impact on forwarding latency or jitter.

- Unified Control and Data Plane: The platform supports both static VXLAN tunnel configuration and dynamic VXLAN tunnel establishment via EVPN control plane, allowing seamless integration with existing cloud orchestration systems.

- Multi-Tenant VRF Awareness: Each VNI is mapped to a dedicated VRF instance, ensuring strict tenant separation at Layer 3 while allowing shared infrastructure services where required.

KEY FEATURES & ROUTING LOGIC

- Line-Rate VXLAN Gateway: Hardware-accelerated VXLAN encapsulation and decapsulation at full line rate on all ports simultaneously.

- EVPN-VXLAN Control Plane: Standards-based EVPN (Ethernet VPN) signaling for dynamic VTEP discovery, MAC learning, and multi-homing, reducing operational complexity and enabling seamless workload mobility.

- Inter-VNI Routing: Hardware-based routing between VXLAN segments, allowing tenants to communicate across subnets without hairpinning traffic

through external routers.

- Tenant Isolation: Per-VNI VRF enforcement, ACL-based micro-segmentation, and hardware-level traffic separation ensure that tenant traffic remains logically isolated.

- Multi-Tenant Cloud Integration: Support for OpenStack, VMware NSX, and Kubernetes CNI integrations via standard EVPN and VXLAN APIs.

- High Availability: Dual hot-swappable power supplies, redundant fan trays, and multi-chassis link aggregation (MLAG) for hitless failover.

COMPLIANCE & STANDARDS

The platform complies with the following industry standards and regulatory requirements:

- IEEE 802.1Q VLAN Tagging

- IEEE 802.1ad Provider Bridging (QinQ)

- RFC 7348 VXLAN

- RFC 8365 EVPN-VXLAN

- RFC 7432 BGP EVPN

- MEF 3.0 Carrier Ethernet

- NEBS Level 3

- RoHS, WEEE, and REACH

TECHNICAL SPECIFICATIONS

The following table summarizes the key technical parameters of the VXLAN Gateway Deployment on Hardware Core Switches for Multi-Tenant Clouds platform. All specifications are per switch unless otherwise noted.

Parameter	**Specification**
Form Factor	1RU Standard / 2RU Modular Chassis
Switching Capacity	3.2 Tbps to 12.8 Tbps (depending on model)
VXLAN Tunnel Endpoints	Up to 16,000 VTEPs per switch
VXLAN Network Identifiers	Up to 4,000 VNIs per switch
Encapsulation Throughput	Line rate on all ports simultaneously
Latency	< 1 microsecond port-to-port for VXLAN encapsulated traffic
Power Supply	Dual Hot-Swappable Redundant AC/DC
Cooling	Front-to-Back Airflow, Redundant Fan Trays
Management	CLI, NETCONF/YANG, RESTCONF, SNMPv3
Operating Temperature	0°C to 40°C (32°F to 104°F)

ORDERING SKU INFORMATION

- VXLAN-GW-CORE-48T: 48 x 10GbE SFP+ ports, 6 x 40GbE QSFP+ uplinks, dual AC power supplies, VXLAN gateway license included.

- VXLAN-GW-CORE-32Q: 32 x 40GbE QSFP+ ports, 8 x 100GbE QSFP28 uplinks, dual DC power supplies, VXLAN gateway license included.

- VXLAN-GW-CORE-64P: 64 x 100GbE QSFP28 ports, modular expansion slots, dual AC power supplies, VXLAN gateway license included.

- VXLAN-GW-LIC-UPG: Software license upgrade for existing core switches to enable hardware VXLAN gateway functionality.

