XPONSHOP Multi-Vendor Network Lab Testing Infrastructure Capability Profile - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

The XPONSHOP Multi-Vendor Network Lab Testing Infrastructure represents a purpose-built, carrier-class validation environment engineered to emulate, stress-test, and certify heterogeneous telecom hardware under real-world operating conditions. This capability profile details the architectural philosophy, hardware inventory, and operational methodology that enable XPONSHOP to deliver vendor-neutral interoperability verification, protocol conformance testing, and performance benchmarking across multi-vendor routing, switching, and optical transport platforms. The infrastructure is designed for network equipment manufacturers, tier-1 carriers, and enterprise engineering teams requiring rigorous, repeatable validation of Layer 2 and Layer 3 forwarding behavior, control plane scalability, and hardware resilience prior to production deployment.



HARDWARE ARCHITECTURE & SILICON

The XPONSHOP lab infrastructure is anchored by a spine-leaf physical topology comprising modular chassis-based core routers, fixed-configuration aggregation switches, and high-density optical transport terminals from multiple tier-1 vendors. Each hardware node is interconnected through a non-blocking 100GbE/400GbE optical backplane, with dedicated out-of-band management and console servers ensuring isolated control plane access. The test bed incorporates programmable traffic generators capable of line-rate injection across 10/25/40/100/400GbE interfaces, synchronized via IEEE 1588v2 Precision Time Protocol for nanosecond-accurate latency measurement. All devices under test (DUTs) are housed in redundant A/B power feeds with independent PDUs, enabling hot-swap failover validation without disrupting adjacent test cells.

KEY FEATURES & ROUTING LOGIC

- Multi-Vendor Interoperability Matrix: Simultaneous validation of BGP, OSPF, IS-IS, and MPLS L3VPN across Cisco, Juniper, Nokia, Huawei, and Arista platforms within a single test fabric.

- Protocol Conformance Suite: Automated regression testing for EVPN-VXLAN, Segment Routing MPLS, BGP-LU, and carrier Ethernet services per MEF 3.0 and IETF RFC standards.

- Line-Rate Performance Benchmarking: RFC 2544 and Y.1564 throughput, latency, jitter, and frame loss measurements at 100% line rate across all port speeds.

- Hardware Failover Validation: Forced switchover testing for redundant route processors, power supplies, fan trays, and uplink ports with sub-second convergence measurement.

- Scalability Stress Testing: Control plane scaling to 1M+ BGP prefixes, 100K+ MPLS labels, and 10K+ VXLAN tunnel endpoints per DUT.

- Environmental Chamber Integration: Temperature and humidity cycling from -5 ° C to 55 ° C to validate hardware reliability under extreme operating conditions.

COMPLIANCE & STANDARDS

The XPONSHOP lab operates in accordance with ISO/IEC 17025 general requirements for testing competence. All test methodologies align with IETF RFC 2544, RFC 6349, ITU-T Y.1564, and MEF 3.0 service validation frameworks. Electromagnetic compatibility testing follows EN 55032 and EN 55035. Safety certifications include IEC 62368-1 and UL 60950-1. The infrastructure maintains a documented calibration schedule for all traffic generation, timing, and optical power measurement equipment, traceable to NIST standards.

TECHNICAL SPECIFICATIONS

The following table summarizes the core hardware and operational parameters of the XPONSHOP Multi-Vendor Network Lab Testing Infrastructure.

Parameter	**Specification**
Form Factor	Multi-Rack Distributed Test Fabric, 42RU Standard Cabinets
Switching Capacity	Up to 51.2 Tbps Non-Blocking Per Spine Chassis
Interface Speed Support	10GbE / 25GbE / 40GbE / 100GbE / 400GbE
Protocol Coverage	BGP, OSPF, IS-IS, MPLS, EVPN-VXLAN, Segment Routing, LACP,

	STP/RSTP/MSTP
Power Supply	Dual Hot-Swappable Redundant AC/DC, A/B Feed Independence
Timing Synchronization	IEEE 1588v2 PTP, SyncE, GPS-Disciplined Oscillator
Traffic Generation	Line-Rate RFC 2544 / Y.1564, 16x 100GbE Test Ports
Environmental Range	-5°C to 55°C Operational, 5% to 95% Non-Condensing Humidity
Management Access	Out-of-Band Console Server, SNMPv3, NETCONF/YANG, gNMI
Compliance	ISO/IEC 17025, MEF 3.0, IETF RFC 2544/6349, ITU-T Y.1564

ORDERING SKU INFORMATION

XPONSHOP-LAB-CORE-01: Core spine test cell, 4x modular chassis routers, 400GbE fabric, redundant route processors.

XPONSHOP-LAB-AGG-02: Aggregation leaf test cell, 8x 1RU switches, 100GbE uplinks, EVPN-VXLAN capable.

XPONSHOP-LAB-OPT-03: Optical transport test cell, ROADM and OTN

switching, 200G/400G coherent interfaces.

XPONSHOP-LAB-TRAF-04: Traffic generation and analysis bundle, 16x 100GbE test ports, PTP synchronization.

XPONSHOP-LAB-ENV-05: Environmental chamber integration kit, thermal cycling range -5°C to 55°C.

