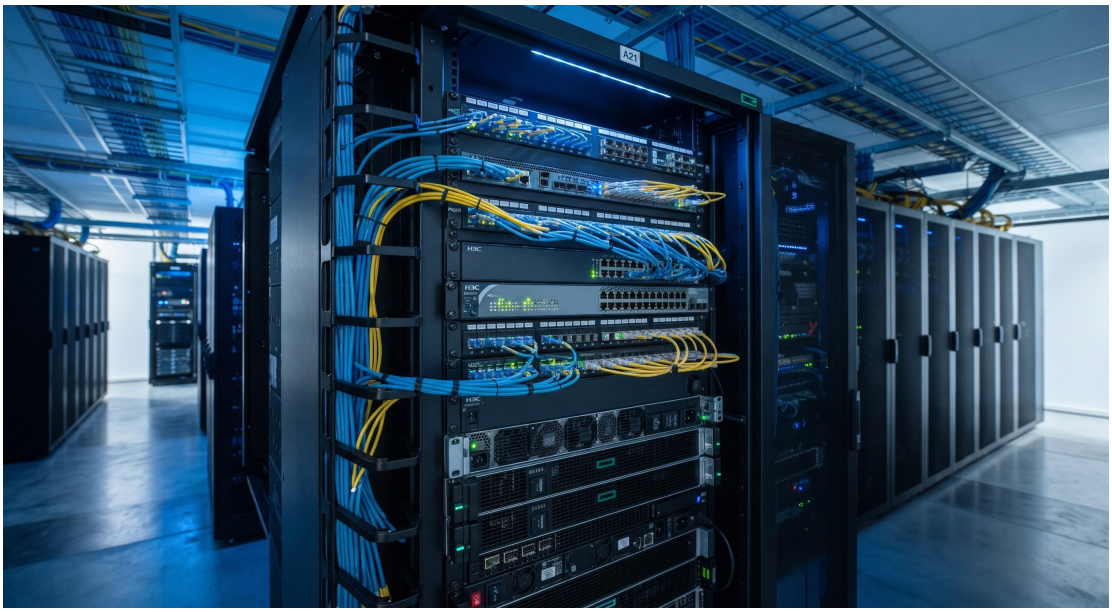
Carrier-Grade Infrastructure Solution Brief: Deploying H3C S6520X-EI 10G Switch Virtual Private LAN Service (VPLS) Implementation

MARKET POSITIONING

The H3C S6520X-EI series represents a purpose-built, high-density 10 Gigabit Ethernet access and aggregation platform engineered for the stringent demands of carrier-grade service provider edge networks and large enterprise WAN aggregation. Within the context of Layer 2 Virtual Private Network (L2VPN) service delivery, the S6520X-EI distinguishes itself as a compact, high-performance Provider Edge (PE) device capable of terminating Virtual Private LAN Service (VPLS) instances at wire speed. As networks transition toward converged multi-service architectures, the S6520X-EI provides the critical bridge between legacy TDM/ATM service emulation and modern Ethernet-based multipoint services, offering a scalable, operationally efficient hardware foundation for delivering transparent LAN services (TLS) and Ethernet Line (E-Line) / LAN (E-LAN) services over an MPLS core.



HIGH-AVAILABILITY REDUNDANCY

The S6520X-EI hardware architecture is designed around the principle of continuous service availability, a non-negotiable requirement for carrier VPLS deployments. The platform supports dual modular power supplies and dual or triple modular fan trays with front-to-back or back-to-front airflow options, ensuring no single point of failure exists within the chassis thermal or power subsystems . Beyond physical redundancy, the S6520X-EI integrates H3C Intelligent Resilient Framework 2 (IRF2) technology, enabling multiple physical switches to be virtualized into a single logical VPLS PE node. This architectural capability allows for cross-chassis link aggregation and distributed forwarding, ensuring that VPLS pseudowires (PWs) remain active even in the event of a complete member switch failure, thereby maintaining the full mesh or hierarchical VPLS (H-VPLS) topology without session re-establishment .

PROTOCOL INTEROPERABILITY

At the core of the S6520X-EI VPLS implementation lies the H3C Commware V7 software platform, which delivers a mature and standards-compliant MPLS and L2VPN stack. The switch supports both Label Distribution Protocol (LDP) and BGP-based VPLS auto-discovery and signaling, facilitating seamless interoperation with multi-vendor core routers and other PE devices . The implementation includes comprehensive support for hierarchical VPLS (H-VPLS) access modes, including MPLS access and Ethernet access, effectively reducing the full-mesh PW signaling burden in large-scale deployments by introducing User-facing PE (UPE) and Network PE (NPE) roles . Critical loop-prevention mechanisms, including split-horizon and full-mesh PW topology enforcement, are hardware-accelerated, ensuring deterministic forwarding behavior and eliminating broadcast storms across the emulated LAN segment.

DETAILED PARAMETERS

The S6520X-EI series offers a versatile port matrix that is adaptable to various VPLS edge deployment scenarios. The platform provides fixed 10GE SFP+ ports alongside 40GE or 100GE QSFP28 uplink ports, enabling high-bandwidth MPLS core connectivity while delivering granular 10M/100M/1G/10G access to

customer edge (CE) devices via expansion slots . The switching capacity ranges from 2.56 Tbps to 25.6 Tbps depending on the model, with packet forwarding rates scaling up to 1620 Mpps, ensuring that VPLS label imposition and disposition, MAC address learning, and flooding operations do not introduce bottlenecks under full line-rate traffic conditions . The platform supports jumbo frames up to 13312 bytes, accommodating the additional overhead of MPLS label stacks and enabling efficient transport of encapsulated customer payloads .

Parameter	**Specification**
Form Factor	1RU, 440 × 360 × 43.6 mm (W × D × H)
Switching Capacity	2.56 Tbps to 25.6 Tbps (depending on model)
Packet Forwarding Rate	720 Mpps to 1620 Mpps
Fixed Ports (Representative Model)	24 × 1/10GE SFP+, 2 × 40/100GE QSFP28
Expansion Slots	2 (rear panel), supporting 8-port 10G SFP+, 2-port 40GE QSFP+, firewall, Netstream, and iMC cards
Power Supply	1+1 Redundant, modular AC (100 – 240V) or DC (-48V to -60V)

Fan Modules	2 or 3 modular fan trays, front-to-back or back-to-front airflow
Operating Temperature	-5°C to +45°C
Relative Humidity	5% to 95%, non-condensing
VPLS Signaling	LDP, BGP (auto-discovery and signaling)
H-VPLS Support	Yes, MPLS access and Ethernet access modes
MAC Address Table Size	Up to 64K (IPv4 routing table); dependent on VSI scale
Jumbo Frame Support	Up to 13312 bytes
MTBF	≥ 60 years (typical, model dependent)

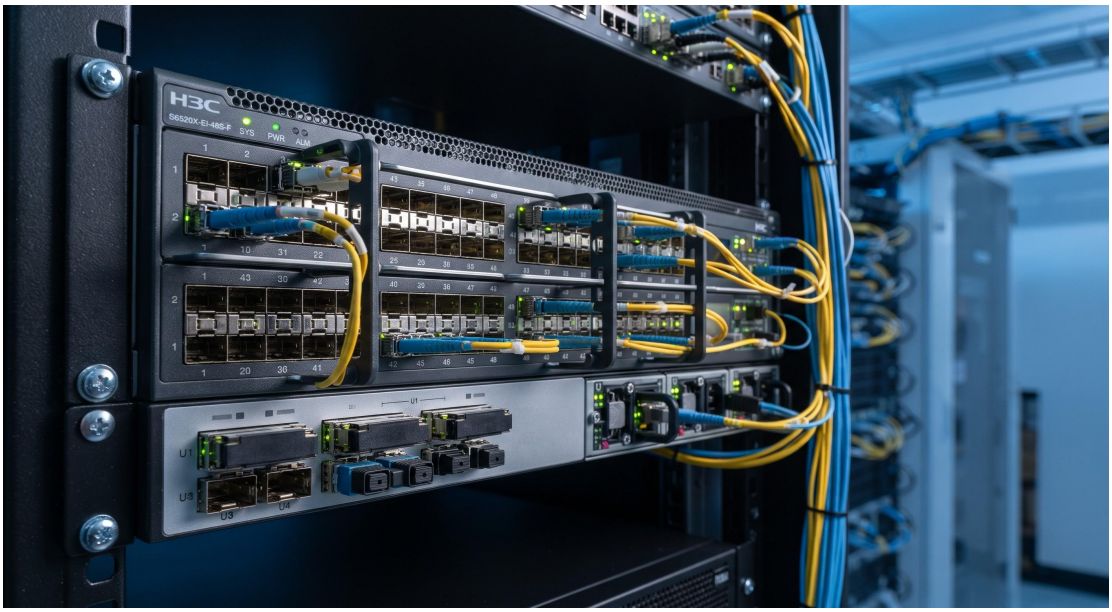
LIFECYCLE ASSURANCE (MTBF)

H3C subjects the S6520X-EI series to rigorous reliability validation, with published Mean Time Between Failures (MTBF) figures exceeding 60 years for representative models under controlled operating conditions . This reliability metric is underpinned by enterprise-grade component selection, comprehensive thermal simulation, and accelerated life testing of the power and fan subsystems. The platform supports digital diagnostic monitoring (DDM)

for optical transceivers, enabling proactive fault detection and link degradation alerting before service impact occurs. For carrier deployments where service level agreements (SLAs) mandate strict uptime guarantees, the combination of hardware redundancy, IRF2 virtualization, and high MTBF establishes a robust foundation for 99.999% service availability targets.

TARGET NETWORK TOPOLOGIES

The S6520X-EI is optimally positioned for two primary VPLS deployment topologies. First, in a Metro Ethernet aggregation scenario, the switch functions as a UPE or small-scale NPE, aggregating business customer Ethernet circuits into a VPLS instance that is backhauled over an MPLS metro core. Second, in a hierarchical VPLS (H-VPLS) architecture for large enterprise or campus WAN environments, the S6520X-EI serves as the UPE in the edge domain, establishing a single U-PW to the upstream NPE, thereby simplifying configuration and reducing signaling overhead across the backbone . The platform also supports integration into Software-Defined Networking (SDN) environments via standard protocols, allowing centralized controllers to manage VPLS instance provisioning and policy enforcement across the fabric.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S6520X-EI-48S-F
SYS
PWR
ALM