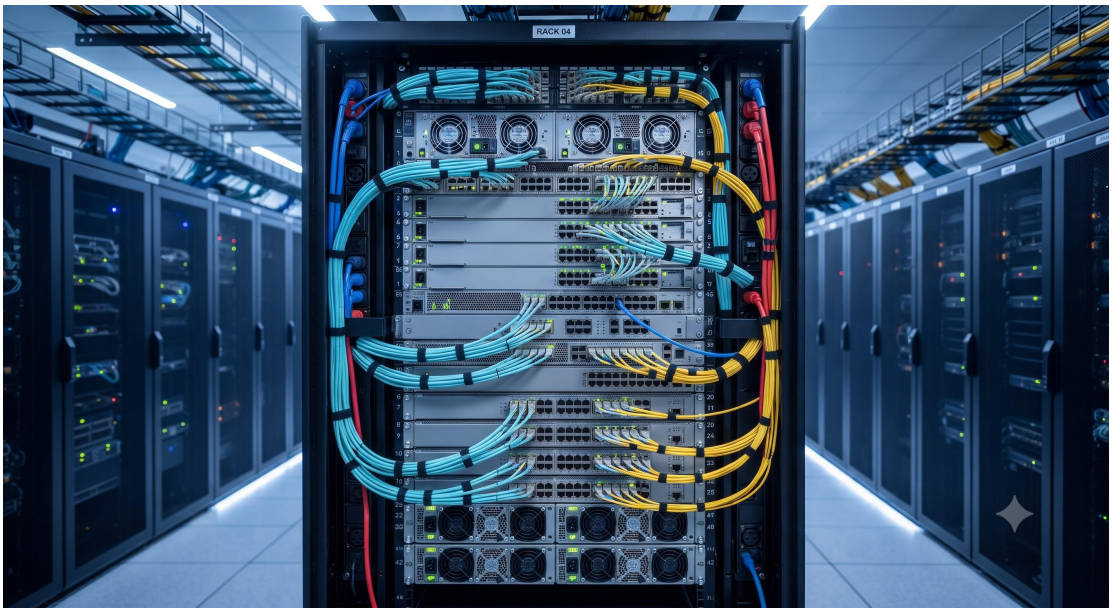
High-Availability Campus Switch Redundancy Guide - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

This document serves as the definitive technical reference for the High-Availability Campus Switch Redundancy Guide (hereafter referred to as the ‘Platform’), a next-generation switching solution engineered to deliver carrier-grade resilience and deterministic performance for modern enterprise campus networks. As digital transformation initiatives place unprecedented demands on the network edge, the requirement for a zero-downtime operational model has transitioned from a value-added feature to a fundamental business imperative. This Platform addresses this critical need through a purpose-built hardware architecture that integrates redundant power systems, hot-swappable fabric modules, and stateful failover mechanisms at the silicon level. This datasheet provides a comprehensive overview of the chassis design, hardware feature set, environmental compliance standards, and precise technical specifications required for network architects and procurement specialists to validate the Platform's suitability for mission-critical deployments.



ARCHITECTURE & CHASSIS DESIGN

The foundational element of the redundancy guide is its modular, high-density chassis architecture, designed to accommodate up to eight (8) line cards and two (2) supervisory engine modules. The backplane is constructed on a multi-layer printed circuit board with a passive mid-plane design, ensuring that no single active component represents a point of failure for data forwarding. The chassis is hardened for electromagnetic interference (EMI) suppression and optimized for front-to-back airflow to maintain consistent thermal performance in high-density colocation environments. Mechanical design principles ensure that all field-replaceable units (FRUs), including power supplies and fan trays, are accessible from the front panel to facilitate rapid maintenance without requiring the unit to be de-racked. The system is engineered to support both AC and DC power inputs with automatic sensing and seamless transition in the

event of a source failure.

HARDWARE FEATURES

The Platform distinguishes itself through the integration of a distributed forwarding architecture where each line card is equipped with an application-specific integrated circuit (ASIC) capable of performing wire-speed Layer 2 and Layer 3 lookups. The supervisory engine operates in an active/standby configuration with full state synchronization, enabling sub-second failover for both control plane protocols and data plane forwarding tables. Enhanced features include hardware-based bidirectional forwarding detection (BFD) for rapid link failure detection and support for Link Aggregation Groups (LAGs) across multiple line cards for physical layer redundancy. Power efficiency is optimized through the use of variable-speed fans that modulate based on inlet temperature readings, reducing operational expenditure (OPEX) in partial-load scenarios. The system includes a built-in environmental monitoring unit that continuously tracks voltage, current, and temperature at critical nodes, providing proactive alerts to management stations before thresholds are breached.

COMPLIANCE & STANDARDS

This Platform is designed and validated to meet a comprehensive suite of international and industry-specific standards to ensure interoperability and regulatory compliance. It adheres to IEEE 802.1D, 802.1w, 802.1s (STP/RSTP/MSTP), and 802.3ad (Link Aggregation) for Ethernet bridging. For network management, full support is provided for SNMPv3, RMON, and NETCONF/YANG data models, consistent with IETF RFC 7950. On the safety and emissions front, the equipment bears the CE marking, complies with UL 60950-1 and IEC 62368-1 standards for audio/video, information and communication technology equipment, and meets FCC Part 15 Class A and EN 55032 Class A limits for radiated emissions. The redundancy mechanisms specifically align with ITU-T G.8032 for Ethernet ring protection switching, facilitating seamless integration into service provider and large enterprise topologies.

TECHNICAL SPECIFICATIONS

The Platform's operational parameters are defined across electrical, physical, and environmental categories to support a diverse range of deployment scenarios. The following specifications represent the rated maximum capacities and tolerances.

Parameter	Specification

Form Factor	6RU Modular Chassis (19-inch rack mountable)
Switching Capacity	Up to 6.4 Tbps (non-blocking, full-duplex)
Power Supply	Up to two (2) 1+1 Redundant AC/DC (450W AC / 600W DC)
Management Ports	1x RJ45 Console, 1x USB Type-B, 1x 10/100/1000 Management Ethernet
Operating Temperature	0°C to 45°C (Short-term: -5°C to 55°C)
Relative Humidity	5% to 95% (non-condensing)
Mean Time Between Failures (MTBF)	>350,000 hours (at 25°C ambient)

ORDERING OPTIONS

To provide maximum configuration flexibility, the Platform is available in multiple factory-assembled bundles and as a collection of modular components for a-la-carte procurement. The base chassis (PN: HACS-CS-BASE) includes the passive backplane, mid-plane, and hardware mounting kit, and is ordered without power supplies, fan modules, or fabric cards. To ensure adequate cooling, the dual-fan tray unit (PN: HACS-FAN-DUAL) must be ordered concurrently. For power, customers can select between the 450W AC

power supply (PN: HACS-PWR-AC-450) or the 600W DC power supply (PN: HACS-PWR-DC-600), with a minimum of two units recommended for full redundancy in a 1+1 configuration. The supervisory engine is available in two performance tiers: the HACS-SUP-CP for standard control plane operations and the HACS-SUP-XL for enhanced capacity and additional hardware acceleration. Several 1-Gigabit Ethernet and 10-Gigabit Ethernet line cards are available to populate the remaining slots, allowing for exact port density matching to user requirements. Network architects are encouraged to consult the accompanying price list or engage with the Sales Engineering team to validate Bill of Materials (BOM) correctness.