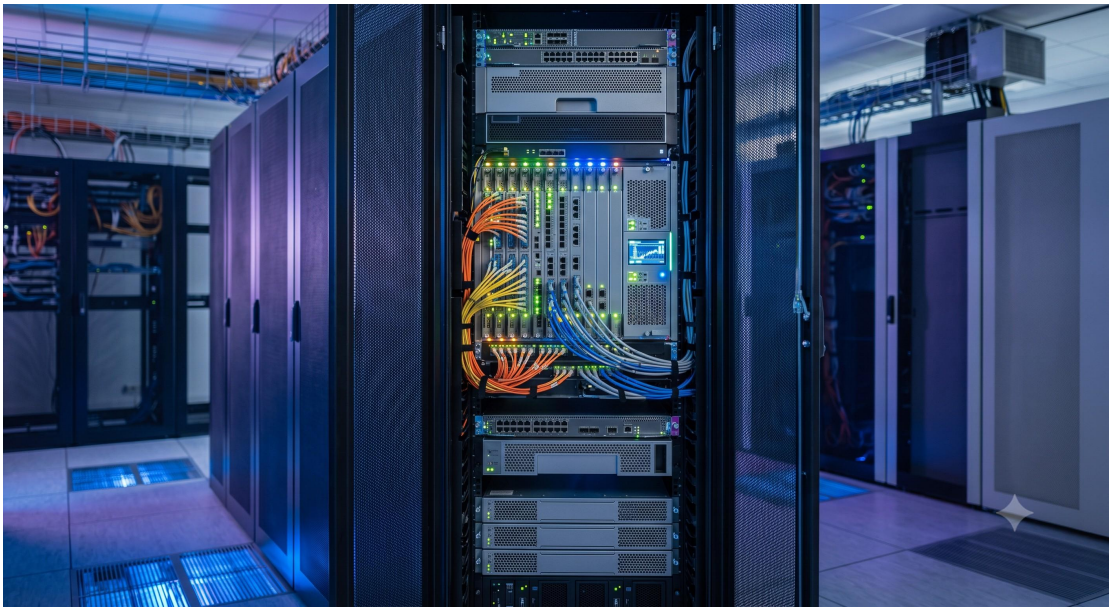
Core Switch Capacity Planning Guide - Official Technical Overview & Hardware Datasheet

EXECUTIVE SUMMARY

This document provides comprehensive technical guidance for network architects, systems engineers, and IT procurement specialists engaged in capacity planning for the Core Switch platform. Designed for high-density enterprise and carrier-grade environments, the Core Switch integrates advanced forwarding silicon with a modular, future-ready chassis architecture to deliver deterministic performance under demanding traffic loads. This datasheet details hardware specifications, scalability parameters, environmental tolerances, and ordering information essential for accurate network design and equipment selection.



ARCHITECTURE & CHASSIS DESIGN

The Core Switch is built upon a high-availability, modular chassis system that supports both single-stage and multi-stage Clos architectures. The central backplane provides non-blocking connectivity between line cards, fabric modules, and redundant supervisor engines, ensuring a fully distributed forwarding plane. All active components—including power supplies, fan trays, and control modules — are field-replaceable and support N+1 or N+N redundancy configurations. The chassis uses hot-swappable, front-accessible line cards to minimize service disruption during maintenance operations. The airflow design follows front-to-back cooling for efficient data center integration or side-to-side configurations for central office environments.

HARDWARE FEATURES

- SUPERVISOR ENGINES: Dual-slot active/standby controllers with integrated hardware-assisted route processing, BGP/OSPF/IS-IS scaling, and telemetry streaming.
- FABRIC MODULES: Up to six fabric modules provide the switching plane with 8.4 Tbps of total fabric capacity per module, enabling a multi-terabit system aggregate throughput.
- LINE CARDS: A versatile portfolio of 1GbE, 10GbE, 25GbE, 40GbE, 100GbE, and

400GbE ports with wire-speed L2/L3 forwarding and programmable pipeline support.

- PACKET BUFFERING: Up to 12 GB of shared buffer memory per line card with advanced dynamic allocation to absorb micro-bursts.

- MANAGEMENT PORTS: Dedicated out-of-band management ports, console RJ-45, USB, and an auxiliary Ethernet port for system recovery.

COMPLIANCE & STANDARDS

The Core Switch adheres to rigorous industry standards for safety, electromagnetic compatibility, and environmental operation, including compliance with NEBS Level 3 and ETSI standards. It is certified for operation within Network Equipment Building Systems (NEBS) and carries CE, FCC, UL, and CB scheme approvals. The platform supports IEEE 802.1Q, 802.1ad, 802.3x, and 802.1Qbb (PFC) to ensure interoperability with legacy and modern network infrastructures. Additionally, the device meets RoHS and WEEE directives for responsible material usage and recycling.

TECHNICAL SPECIFICATIONS

SYSTEM CAPACITY

- Total Switching Capacity: Up to 25.6 Tbps (full configuration, duplex)

- Forwarding Rate: Up to 8.4 Bpps

- Maximum MAC Addresses: 1,048,576

- IPv4 Routes: 4,000,000 (hardware assisted)

- IPv6 Routes: 2,000,000 (hardware assisted)

- Maximum VLANs: 4,094

- Jumbo Frame Support: Up to 9,216 bytes

INTERFACES AND MODULES

- SFP+ Ports: Up to 48 per 10G line card

- QSFP28 Ports: Up to 36 per 100G line card

- QSFP-DD Ports: Up to 16 per 400G line card

- Management Interfaces: 1x RJ-45 console, 1x USB 2.0, 1x 10/100/1000Base-T Ethernet, 1x SFP management port

- Timing Synchronization: IEEE 1588v2 PTP, NTP, SyncE, and GNSS/RF inputs via optional module

POWER AND THERMAL

- Power Supplies: 2000W AC and 2400W DC, up to 6 units (4+2, 5+1, 6+0 configurations)

- Input Voltage AC: 100-240V ~ 50/60Hz, 16A max per supply

- Input Voltage DC: -48V to -60V, 50A max per supply

- Typical Power Consumption: 2800W (full load)

- Maximum Heat Dissipation: 9500 BTU/hr

PHYSICAL DIMENSIONS AND WEIGHT

- Chassis Height: 7RU (13.97 inches / 355.6 mm) for standard models; 13RU available for extended port density

- Chassis Width: 17.5 inches (444.5 mm) – compatible with 19-inch EIA racks

- Chassis Depth: 28 inches (711.2 mm)

- Weight (empty chassis): 35.2 lbs (16 kg) for 7RU; 52.8 lbs (24 kg) for 13RU

- Weight (fully loaded): up to 110 lbs (50 kg) for 7RU; up to 176 lbs (80 kg) for 13RU

ENVIRONMENTAL CONDITIONS

- Operating Temperature: 0°C to 45°C (32°F to 113°F) at sea level, derated by 1°C per 300 meters above 1800 m

- Storage Temperature: -40°C to 70°C (-40°F to 158°F)

- Relative Humidity (operating): 5% to 85% (non-condensing)

- Altitude (operating): -60m to 4000m

- Acoustic Noise: ≤ 65 dBA at 23°C ambient

Parameter	**Specification**
Form Factor	Modular 7RU / 13RU Chassis (EIA-310 compliant)

Switching Capacity	Up to 25.6 Tbps (full duplex)
Forwarding Rate	Up to 8.4 Billion packets per second (Bpps)
Power Supply	Hot-swappable 1+1, 2+1, or 2+2 Redundant AC/DC (2000W AC, 2400W DC)
Operating Temperature	0°C to 45°C (32°F to 113°F)

ORDERING OPTIONS

All Base Chassis and Accessory Kits are orderable via standard SKUs. Main Chassis options include 7RU and 13RU variants, each with either AC or DC power entry modules, and an optional fan tray bundle. The Supervisor Engine is available in two performance tiers: Standard (2-core, 8 GB RAM, 64 GB flash) and Performance (4-core, 16 GB RAM, 128 GB flash, hardware encryption acceleration). Fabric modules are sold separately and are required for operation, with a minimum of three modules for basic redundancy and five for full performance. Line card options cover port speeds and densities as listed in the Tech Specs, with separate models for SFP+, QSFP28, and QSFP-DD. Accessory packs include power cord kits, mounting brackets, and cable management arms. Extended support contracts, including 4-hour onsite response, 24x7 TAC

support, and advanced hardware replacement, may be added at the time of purchase.