

High-Density Core Routing Capabilities Blueprint: Huawei CloudEngine 16800

400GE Port Density and Throughput Matrix

PLATFORM ROLE IN ISP CORE AND AI-ERA DATA CENTER FABRICS

The Huawei CloudEngine 16800 series represents a purpose-built modular data center switch platform engineered to address the explosive traffic growth and stringent performance requirements of AI-era computing and carrier-grade ISP core infrastructures. As the industry's first data center switch designed specifically for the AI era, the platform integrates an embedded AI chip and the innovative iLossless algorithm to achieve zero packet loss and end-to-end microsecond-level latency while maximizing effective throughput . The CloudEngine 16800 serves as the foundational hardware element for building elastic, virtualized, and high-quality data center networks, supporting seamless evolution from 100GE to 400GE and beyond. Its orthogonal, backplane-free Clos architecture eliminates traditional 背板 bandwidth bottlenecks, enabling linear scaling of port density and switching capacity across chassis configurations ranging from the 4-slot CE16804 to the 16-slot CE16816 .



NON-BLOCKING SWITCHING ARCHITECTURE AND 400GE PORT DENSITY MATRIX

The core architectural advantage of the CloudEngine 16800 lies in its industry-leading backplane-free Clos switching fabric, which utilizes cell switching and Virtual Output Queuing to deliver non-blocking, line-rate forwarding across all service ports. This architecture enables the platform to support an unprecedented density of 400GE interfaces: a single 16-slot chassis can accommodate up to 16 line cards, each providing 36 or 48 ports of 400GE, yielding a maximum configuration of 576 to 768 line-rate 400GE ports per system . The 400GE line card, specifically the CEL36DQHG-X, supports flexible port breakout configurations, allowing each 400GE QSFP-DD interface to operate as 400GE, 200GE, 100GE, or 40GE, or to be split into multiple lower-speed lanes for granular bandwidth provisioning . This density matrix

ensures that a single CloudEngine 16816 chassis can replace multiple legacy core switches, dramatically reducing rack space, power consumption, and operational complexity while delivering the switching capacity required for hyperscale and AI training clusters.

TRAFFIC MANAGEMENT AND ILOSSLESS PERFORMANCE OPTIMIZATION

The platform incorporates Huawei's proprietary iLossless intelligent lossless network technology, which fundamentally transforms Ethernet behavior for RoCEv2 and storage traffic. By embedding an AI chip within the forwarding plane, the switch performs real-time learning and training of network-wide traffic patterns, dynamically adjusting Explicit Congestion Notification thresholds and proactively controlling packet sending rates to prevent congestion before it occurs . This capability enables the CloudEngine 16800 to achieve 100% throughput improvement over traditional Ethernet under lossy conditions, effectively doubling AI computing power utilization and improving storage IOPS by 30% . The system supports comprehensive traffic management features including Network-based Proactive Congestion Control, PFC deadlock prevention, and AI ECN, ensuring deterministic low latency and zero packet loss even under bursty, high-pressure workloads typical of distributed AI training and all-flash storage access .

PERFORMANCE PARAMETERS

The CloudEngine 16800 platform delivers a switching capacity matrix that scales from 45 Tbps in the CE16804 to 178 Tbps in the CE16816 for the standard series, with the enhanced CE16800-X series reaching up to 1548 Tbps in the X16 model . Forwarding performance for the X-series reaches 104,400 Mpps in the 16-slot configuration, ensuring wire-speed packet processing at the highest port densities . The system supports comprehensive Layer 2 and Layer 3 features including VXLAN, BGP-EVPN, M-LAG, and segment routing, with hardware-based BFD providing sub-second failure detection .

Parameter	Specification
Form Factor	Modular chassis: CE16804 (4 slots), CE16808 (8 slots), CE16816 (16 slots)
Switching Capacity	45 Tbps to 178 Tbps (standard); up to 1548 Tbps (CE16800-X16)
Maximum 400GE Port Density	576 to 768 ports per chassis (16-slot configuration)
Line Card Options	36-port 400GE (CEL36DQHG-X) or 48-port 400GE per slot
Forwarding Rate	Up to 104,400 Mpps (CE16800-X16)
Fabric Architecture	Backplane-free Clos, cell switching,

	VoQ
Power Supply	1+1 redundant AC/DC, hot-swappable, intelligent dual-input

CARRIER COMPLIANCE AND DEPLOYMENT SCENARIOS

The CloudEngine 16800 series is engineered to meet the stringent reliability and environmental requirements of carrier-grade ISP core deployments and hyperscale data centers. The platform features a strict front-to-back airflow design optimized for hot-aisle/cold-aisle containment, and supports 1+1 redundant power supplies with intelligent dual-input switching for millisecond-level failover . The system complies with industry-standard protocols including NETCONF, Ansible automation frameworks, and Telemetry-based streaming data collection for real-time network monitoring and fault localization within three minutes . Typical deployment scenarios include AI training cluster spine layers, ISP core aggregation, and integrated big data center fabrics where high-density 400GE uplinks and deterministic low-latency forwarding are critical requirements.

