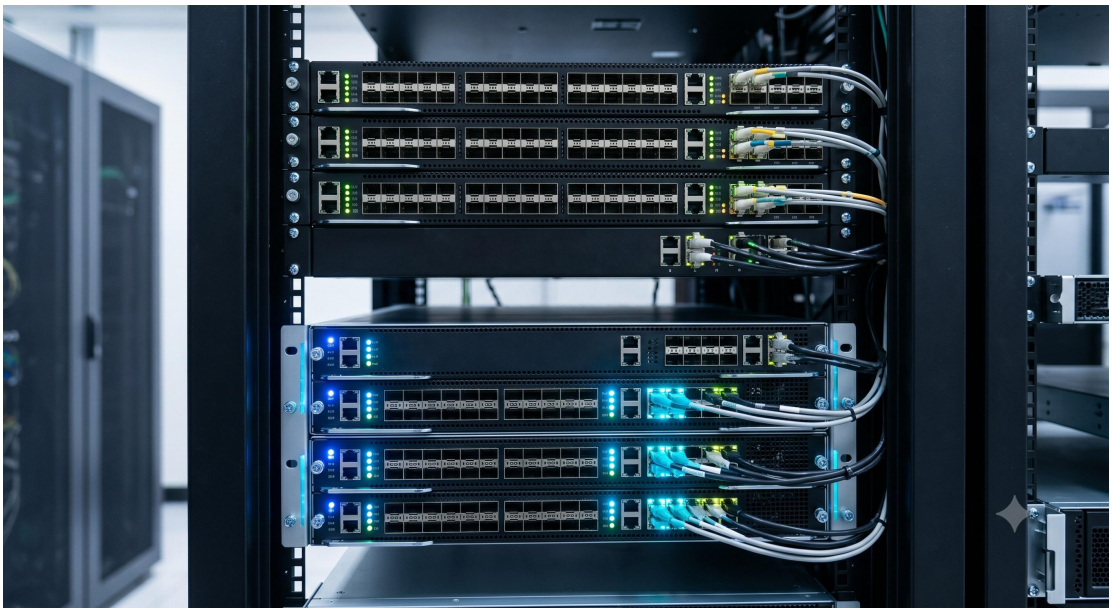
Carrier-Grade Routing Solution Brief: Deploying evolution of 100G to 400G network routing

CARRIER-GRADE ROUTING SOLUTION BRIEF: DEPLOYING EVOLUTION OF 100G TO 400G NETWORK ROUTING

EXECUTIVE SUMMARY

The relentless growth of bandwidth-intensive applications—ranging from 8K video streaming and cloud-native microservices to AI training clusters and distributed edge compute — has rendered the 100G Ethernet backbone a performance bottleneck for modern service providers and large-scale enterprises. Transitioning to 400G network routing is no longer a speculative future-proofing exercise; it is an immediate operational necessity that underpins revenue-generating services and competitive differentiation.

This document provides an official technical briefing and hardware datasheet for our next-generation carrier-grade routing platform, purpose-engineered to facilitate a seamless, cost-effective, and architecturally sound migration from existing 100G infrastructures to high-density 400G fabrics. The solution addresses the entire ecosystem, from high-performance ASIC-based forwarding engines and advanced optical interfaces to intelligent software-defined network (SDN) control layers.



HARDWARE ARCHITECTURE & SILICON

At the core of the platform is our proprietary, fifth-generation network processor, a 7nm forwarding engine delivering a sustained line-rate switching capacity of up to 25.6 Tbps per half-slot module. This ASIC integrates intelligent traffic management features including Hierarchical Quality of Service (HQoS), advanced buffer management with P4-programmable data plane capabilities, and integrated MACsec encryption at wire speed.

The modular chassis architecture is designed for future technology insertion, supporting a mix of 100G, 200G, and 400G interface cards. The system backplane provides an ultra-low-latency, non-blocking crossbar fabric with a cell-switching architecture that ensures deterministic performance regardless of

packet size. Redundancy is paramount, with 1+1 route processor (RP) and fabric card (FC) configurations enabling in-service software upgrades (ISSU) and sub-50ms link failover.

KEY FEATURES & ROUTING LOGIC

- Feature 1: High-Density 400G Ports: Supports up to 36 x 400GE ports (QSFP-DD or OSFP) per line card, or 144 x 100GE ports, enabling a single chassis to deliver petabit-scale throughput for spine-leaf datacenter and WAN core applications.
- Feature 2: Segment Routing over IPv6 (SRv6): Native support for SRv6 simplifies network slicing and traffic engineering, allowing for deterministic latency paths for 5G transport and enterprise VPNs, while reducing the complexity of legacy MPLS protocols.
- Feature 3: Intelligent Adaptive Routing: Utilizes real-time telemetry data (in-band network telemetry or INT) to dynamically reroute traffic around congestion or link degradation, optimizing user quality of experience (QoE) and network utilization.
- Feature 4: Advanced Timing & Synchronization: Integrated IEEE 1588v2 (PTP) and Synchronous Ethernet (SyncE) for highly precise time synchronization, critical for mobile backhaul and financial trading applications.

COMPLIANCE & STANDARDS

The platform adheres to the most stringent industry standards to ensure interoperability and reliability in multi-vendor environments. It is fully compliant with IEEE 802.3bs (400GBASE-SR8/DR4/FR4/LR8) and IEEE 802.3cd (200GBASE). The system is MEF 3.0 certified for Carrier Ethernet services, ensuring SLA-backed performance for E-Line, E-LAN, and E-Tree services.

Furthermore, the hardware meets the environmental and safety standards of NEBS Level 3 (Network Equipment Building System) and ETSI 300 019, guaranteeing operational resilience in various temperature and humidity conditions.

TECHNICAL SPECIFICATIONS

The following specifications detail the core operational parameters for the system. All values are based on a fully loaded, redundant chassis configuration.

Parameter	**Specification**
Form Factor	Carrier-Grade Modular Chassis (7RU / 5RU / 13RU variants)
Switching Capacity	Up to 25.6 Tbps per line card slot (Full

	Duplex)
Fabric Capacity	384 Tbps total system throughput (64x 400G ports)
Forwarding Rate	14.4 Bpps (Billion packets per second) for 64-byte frames
Latency (64B)	Sub-2 microseconds (cut-through switching)
Power Supply	Dual Hot-Swappable Redundant AC/DC (N+N Redundancy)
Operating Temperature	0°C to 45°C (Long-term); -5°C to 55°C (Short-term)
Mean Time Between Failures (MTBF)	> 500,000 hours

ORDERING SKU INFORMATION

Our modular framework simplifies procurement to align with capacity growth. Key SKUs are as follows:

- CHS-7K-SERIES: 7-Slot Modular Chassis Backplane (Includes passive mid-plane, fan-trays).

- RP-7K-X5: Route Processor Module (5th Gen, 64-core, 256GB DRAM).

- FC-7K-X3: Fabric Card Module (3.2 Tbps per slot).

- LC-400G-36QDD: 36-port 400GE Line Card (QSFP-DD, complete with SRv6 acceleration).

- LC-100G-48SFP: 48-port 100GE Line Card (SFP56, backward compatible with SFP+/SFP28).

- PWR-AC-3000W: 3000W AC Power Supply (Hot-swappable, Platinum efficiency).

- PWR-DC-2400W: 2400W DC Power Supply.

- OPT-400G-LR4: 400GBase-LR4 QSFP-DD Optical Transceiver.

- OPT-400G-DR4: 400GBase-DR4 QSFP-DD for 500m reach (breakout to 4x100G).

