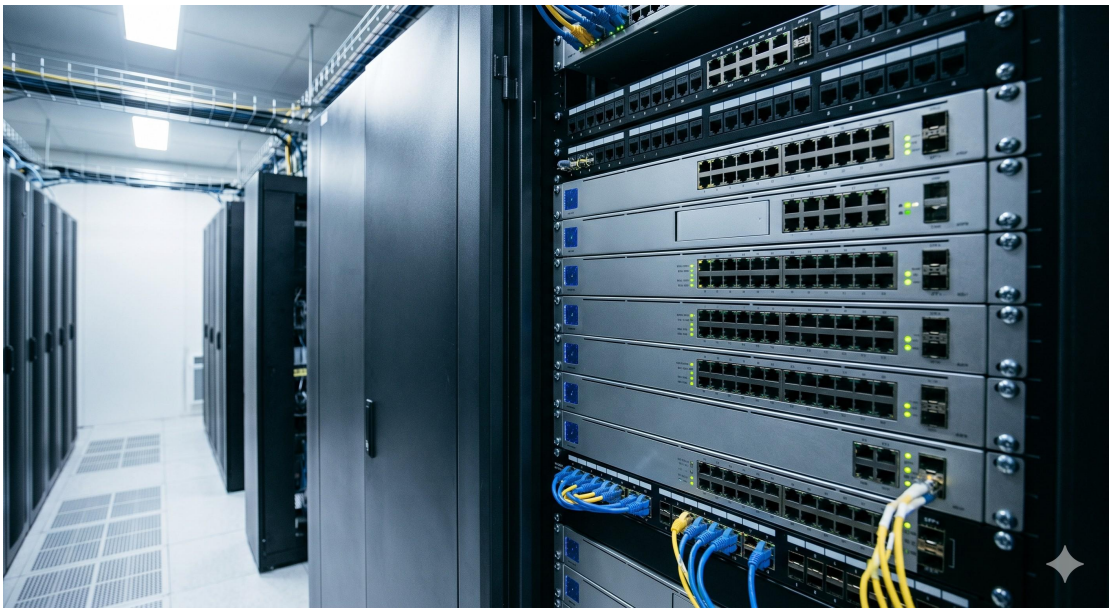
Carrier-Grade Routing Solution Brief: Deploying software defined networking SDN deployment hardware

CARRIER-GRADE ROUTING SOLUTION BRIEF: DEPLOYING SOFTWARE DEFINED NETWORKING SDN DEPLOYMENT HARDWARE

EXECUTIVE SUMMARY

This document serves as the definitive technical solution brief for the deployment of advanced Software-Defined Networking (SDN) hardware platforms. Designed for the modern, disaggregated network, this hardware family represents a paradigm shift from traditional, fixed-function routing to a programmable, high-performance forwarding infrastructure. It is engineered to meet the stringent demands of 5G transport, hyperscale cloud provider fabrics, and next-generation carrier Ethernet backbones. By decoupling the control and data planes, this hardware enables unprecedented network agility, automation, and operational efficiency while delivering carrier-grade reliability and deterministic performance.



HARDWARE ARCHITECTURE & SILICON

The foundation of this platform is a purpose-built, programmable forwarding engine based on a merchant silicon architecture that has been rigorously hardened for carrier and enterprise core environments. At its heart lies a state-of-the-art, high-bandwidth, and highly integrated chipset that supports flexible pipeline processing. This architecture is not merely a passive switching fabric; it is an active, programmable entity capable of executing complex match-action operations defined by the SDN controller via protocols such as OpenFlow and P4 Runtime.

KEY FEATURES & ROUTING LOGIC

- **Programmable Data Plane:** The hardware integrates a fully programmable

pipeline that allows network operators to define custom packet processing behaviors, service chaining, and in-band network telemetry without hardware replacement. This enables rapid service innovation and customized protocol support.

- **Segment Routing Capability:** Native hardware support for Segment Routing over IPv6 (SRv6) and MPLS (SR-MPLS) enables efficient, source-routed traffic engineering and network slicing, critical for 5G and enterprise WAN applications.

- **High-Performance Fabric:** The platform provides a non-blocking, low-latency switching fabric with support for up to 12.8 Tbps of switching capacity, ensuring line-rate forwarding for all packet sizes and eliminating congestion bottlenecks in core network functions.

- **Deep Packet Buffering:** The architecture incorporates a sophisticated, shared packet buffer designed to absorb micro-bursts and maintain deterministic performance in highly dynamic and congested environments. The buffer management logic supports fine-grained quality of service (QoS) with multiple queues and hierarchical scheduling.

- **Telemetry and Analytics:** Hardware support for real-time monitoring and visibility is built-in. In-band Network Telemetry (INT) and sFlow/NetFlow capabilities allow the platform to stream granular performance data to a centralized analytics engine, facilitating proactive network management and troubleshooting.

- **Hardware-Based Security:** Integrated MACsec (IEEE 802.1AE) support at the physical layer ensures line-rate data confidentiality and integrity across all front-panel ports. This, combined with advanced ACL and control plane policing, provides robust protection against network threats.

COMPLIANCE & STANDARDS

This hardware platform is built to comply with the most rigorous industry standards. It is designed to fully support SDN frameworks and adheres to the principles of open networking, ensuring seamless interoperability in multi-vendor environments. Key compliance areas include:

- **Hardware Standards:** NEBS Level 3 (Network Equipment Building System) compliance ensures resilience and reliability in central office environments. ETSI and IEC safety standards are fully met for global deployment.
- **Ethernet Standards:** Full compliance with IEEE 802.3 for Ethernet interfaces, including 10/25/40/50/100/400 Gigabit Ethernet. Includes complete support for IEEE 802.1Q (VLANs), IEEE 802.1ad (QinQ), and IEEE 802.1AX (Link Aggregation).
- **Protocol & SDN Standards:** Conformance to the Open Networking Foundation (ONF) OpenFlow Switch Specification and the P4 Language Consortium for programmability. Full support for IETF routing standards,

including BGP, OSPF, IS-IS, and MPLS.

- **MEF Certification:** Carrier Ethernet 2.0 (CE 2.0) certified, validating adherence to strict performance, manageability, and service assurance metrics required for inter-carrier and business-class services.

TECHNICAL SPECIFICATIONS

Parameter	**Specification**
Form Factor	Modular Chassis (4-slot and 12-slot variants)
Switching Capacity	6.4 Tbps to 12.8 Tbps (scalable with fabric modules)
Power Supply	Dual Hot-Swappable Redundant AC/DC (2200W AC / 2500W DC)
Forwarding Rate	Up to 5.6 Billion Packets Per Second (Bpps)
Port Configurations	Up to 36 x 100GE QSFP28 or 48 x 25GE SFP56 per line card
CPU Complex	Dual x86 Cores for Control Plane and Telemetry Processing
Memory	64 GB DDR4 (Control Plane), 4 GB Dedicated Packet Buffer (Data Plane)

Dimensions (H x W x D)	8.7 x 17.5 x 28.5 inches (12-slot) / 5.2 x 17.5 x 28.5 inches (4-slot)
Operating Temperature	0°C to 45°C (Short-term up to 55°C)

ORDERING SKU INFORMATION

- **Base Chassis:** `CS-7K-12SLOT` (12-slot modular chassis), `CS-7K-4SLOT` (4-slot compact chassis).
- **Fabric Modules:** `FM-7K-12.8T` (12.8 Tbps fabric module), `FM-7K-6.4T` (6.4 Tbps fabric module).
- **Line Cards:** `LC-7K-36Q28` (36 x 100GE QSFP28 ports), `LC-7K-48SFP56` (48 x 25GE SFP56 ports).
- **Optics and Cables:** A full suite of 10GE, 25GE, 40GE, 100GE, and 400GE pluggable optics (SFP+, SFP28, QSFP+, QSFP28, QSFP-DD) are available, including SR, LR, ER, ZR, and DWDM variants.
- **Power Supplies:** `PSU-7K-2.2KW-AC` (2200W AC), `PSU-7K-2.5KW-DC` (2500W DC).
- **Software Licensing:** SDN controller licenses (e.g., `SLC-ENT-ADV`) are offered per chassis or port, unlocking advanced features such as SRv6, network slicing, and full programmability.


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