7750 Service Router - Official Technical Overview & Hardware Datasheet

PRODUCT IDENTIFICATION

The Nokia 7750 Service Router (SR) product family represents a portfolio of high-performance IP edge and core routing platforms engineered for the demanding environments of telecommunications providers, AI and cloud providers, and mission-critical enterprises. Leveraging breakthrough Nokia FP routing silicon and the highly reliable Service Router Operating System (SR OS), the 7750 SR family delivers deterministic packet forwarding to ensure consistent, reliable performance under all network loading conditions . With scalable system capacities ranging from 200 Gb/s to 230 Tb/s full duplex (FD), the 7750 SR provides a versatile foundation for modern, dynamic IP networks, supporting a comprehensive array of applications including edge routing, core routing, data center gateway, broadband network gateway (BNG), multi-access gateway (MAG), fixed-wireless gateway (FWG), and IPsec gateway functions .

SYSTEM HARDWARE TOPOLOGY & CHASSIS DESIGN

The 7750 Service Router is offered in multiple chassis variants designed to address diverse deployment scenarios, from compact edge locations to high-density core routing sites. The portfolio is structured into four primary series to optimize performance, density, and form factor for specific network roles:

- 7750 SR-s Series: Designed for locations demanding high-density 10GE to 800GE interfaces, the FP5- and FP4-based 7750 SR-s offers both fixed-configuration and modular chassis options. It scales from 2.4 Tb/s FD to 216 Tb/s FD, reaching up to 230 Tb/s FD with intelligent aggregation (IA). It features universal QSFP-DD and SFP-DD connectors, supporting a wide range of digital coherent optics (DCOs) and flexible optical breakouts .

- 7750 SR Series: The FP4-based 7750 SR is a modular platform designed for applications requiring 10GE to 800GE interfaces. It provides scalable capacity from 1.5 Tb/s FD to 13.5 Tb/s FD, and up to 36 Tb/s FD with IA. It offers a variety of connectors and ports, including QSFP-DD, QSFP28, SFP112, SFP28, SFP+, and cSFP, ensuring flexibility in media and optics selection .
- 7750 SR-e Series: The FP3-based 7750 SR-e is optimized for smaller locations requiring 1GE to 100GE interfaces. It scales capacity up to 600 Gb/s FD and features QSFP28, SFP28, and SFP+ ports. Its modular, mid-plane architecture offers control redundancy and a NEBS-compliant front-to-back thermal layout, making it ideal for small aggregation and IP edge applications .
- 7750 SR-a Series: The FP3-based 7750 SR-a is a compact, modular platform purpose-built to fit seamlessly into 300-mm-depth ETSI-compliant cabinets. It scales up to 200 Gb/s FD, offering SFP+, SFP, cSFP, and RJ-45 ports for small locations requiring 1GE to 100GE interfaces .

DATA & CONTROL PLANE CAPABILITIES

The 7750 SR family's performance is anchored by the Nokia FP (Flexible Forwarding) routing silicon, which delivers deterministic performance at scale. The platform supports per-slot capacities up to 4.0 Tb/s FD . Advanced capabilities are embedded in the hardware, including line-rate enhanced MACsec (ANYsec) cryptography for quantum-safe IP network security and

powerful DDoS mitigation tools, all without impacting forwarding performance .

The control plane is powered by the robust Service Router Operating System (SR OS), which provides a feature-rich environment for IP/MPLS, Segment Routing, and EVPN. SR OS supports model-driven management with YANG-based data modeling, NETCONF, gRPC (gNMI and gNOI), and a model-driven CLI (MD-CLI) for automation and programmability . The platform also supports advanced telemetry models to stream flow-level data and insights in near-real time for network automation .

COMPONENT BREAKDOWN

Key subsystems of the 7750 SR architecture include:

- Input/Output Modules (IOMs): These modules deliver scalable IP routing and enhanced packet processing. The IOMs host the Media Dependent Adapters (MDAs), which provide the physical interfaces. MDA options support a wide range of port speeds from 1GE to 800GE, including high-density 10GE, 25GE, 50GE, 100GE, 400GE, and 800GE interfaces .
- Control Processor Modules (CPMs): The system employs redundant CPMs to ensure high availability. Certain CPM variants feature integrated switch fabric

modules (SFMs), which are automatically provisioned for streamlined deployment .

- Power and Cooling: The chassis designs incorporate redundant, hot-swappable power supplies with 1+1 AC/DC redundancy and advanced thermal management. The 7750 SR-e series, for instance, features a NEBS-compliant front-to-back thermal layout for optimal cooling in various environments .

OPERATIONAL SPECS MATRIX

Parameter	**Specification**
Scaling Capacity (SR-s)	2.4 Tb/s FD to 230 Tb/s FD (with IA)
Scaling Capacity (SR)	1.5 Tb/s FD to 36 Tb/s FD (with IA)
Scaling Capacity (SR-e)	Up to 600 Gb/s FD
Scaling Capacity (SR-a)	Up to 200 Gb/s FD
Network Interfaces	10GE, 25GE, 40GE, 50GE, 100GE, 200GE, 400GE, 800GE, and up to 1.6T clear channel
Connector Types	QSFP-DD, QSFP28, SFP112, SFP28, SFP+, cSFP, SFP, RJ-45
Operating System	Service Router Operating System (SR OS)

Security Features	Line-rate MACsec/ANYsec, integrated DDoS mitigation, IPsec
Management & Automation	NETCONF, gRPC (gNMI, gNOI), MD-CLI, YANG-based data modeling
Form Factor	Modular chassis (SR-s, SR, SR-e), Compact chassis (SR-a)

REGULATORY COMPLIANCE & CERTIFICATIONS

The 7750 Service Router family is engineered to meet the stringent requirements of carrier-grade and mission-critical enterprise environments. The platform adheres to a comprehensive set of industry standards and regulatory compliances, including:

- NEBS (Network Equipment-Building System) compliance, as demonstrated by the 7750 SR-e series' thermal layout, ensuring reliability in telecommunications central offices .
- ETSI compliance, with the 7750 SR-a series designed for integration into 300-mm-depth ETSI-standard cabinets .
- IEEE 802.1AE MACsec for link-layer encryption, supporting quantum-safe cryptography (ANYsec) to protect data in transit .

- 3GPP compliance for IP Security Gateway applications, ensuring compatibility with mobile network standards .

- Comprehensive safety and electromagnetic compatibility (EMC) certifications required for global deployment.

The platform's multi-layer security approach, integrating hardware-embedded encryption and control, data, and management plane protections, supports a wide range of system attack mitigations .