

Nokia 7750 Service Router

Input/Output Modules

Delivering up to 4.0 Tb/s full duplex (FD) per-slot capacity, Nokia 7750 Service Router (SR) Input/Output Modules (IOMs) provide highly scalable IP routing and enhanced packet processing capabilities, supporting the full array of demanding IP applications in evolving network environments.

Nokia IOMs perform enhanced packet processing functions, including classification, forwarding, QoS queuing and scheduling, traffic policing and shaping, filtering and service enablement. Using highly programmable Nokia FP network processing silicon, IOMs deliver line-rate performance that does not degrade, even at full scale with demanding processing-intensive applications enabled. By distributing routing and processing on a per-slot basis, overall Nokia 7750 SR system performance scales linearly with the addition of each IOM to the system.

The modularity provided by the combination of Nokia IOMs and media dependent adapters (MDAs) provides exceptional flexibility and investment protection. It enables operators to mix and match IOMs with different MDA types to meet diverse networking requirements in a single chassis, while supporting the full array of IP networking applications. Additionally, operators can take advantage of FP programmability and licensing to rapidly respond to evolving requirements, with minimal impact and capital outlay.

The Nokia IOM-s is based on the Nokia FP4 network processing silicon. It is available in two variants and delivers up to 3.0 Tb/s FD per-slot performance in the Nokia 7750 SR-2s, SR-7s and SR-14s. With intelligent aggregation (IA) capacity scales up to 4 Tb/s FD. The Nokia 7750 SR-1s is available in



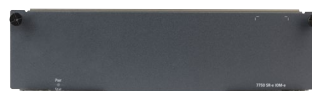
IOM-s



IOM5-e



IOM4-e



IOM-e



IOM-a



a modular variant. It has an integrated 3.0 Tb/s FD IOM-s based on the Nokia FP4. The SR-1s is software upgradable through in-place feature upgrades, without hardware replacement.

The Nokia IOM5-e leverages the Nokia FP4 to deliver up to 1.5 Tb/s FD (non-redundant) and 1.2 Tb/s FD (redundant) per-slot performance on the Nokia 7750 SR-12e. On Nokia 7750 and SR-12 systems, the Nokia IOM5-e supports up to 400 Gb/s FD (redundant) and up to 800 Gb/s FD (non-redundant) per-slot performance. The Nokia 7750 SR-1 has an integrated Nokia IOM5-e based on the Nokia FP4 and delivers up to 1.5 Tb/s FD performance. The Nokia IOM5-e and SR-1 licenses are software upgradable through in-place feature upgrades, without hardware replacement.

Nokia IOM4-e variants leverage the 400 Gb/s FP3 to deliver up to 200 Gb/s FD per-slot performance and are supported on the Nokia 7750 SR-7, SR-12 and SR-12e systems.

The Nokia IOM-e and IOM-a are also FP3-based and deliver up to 200 Gb/s and 100 Gb/s per-slot capacity, respectively, for the Nokia 7750 SR-e and 7750 SR-a. Their innovative design provides direct interconnect to other IOM-e and IOM-a modules, enabling a fabricless system.

Features and benefits

Deterministic performance

Nokia IOMs leverage Nokia FP network processing silicon, which combines a disaggregated, fully buffered chipset architecture and intelligent memory design to provide deterministic packet forwarding performance at scale, without compromise, even when complex processing-intensive operations are required. With the FP traffic manager, buffering is always deterministic, ensuring consistent system performance even when IP, MPLS, QoS and access control list (ACL) capabilities are scaled concurrently. IOMs deliver line-rate performance that does not degrade as advanced capabilities and applications are enabled.

By contrast, performance of products with partially buffered chipset architectures typically results in non-deterministic behavior and unpredictable system operation as the scale on the chipset increases.

Versatile configurations

Nokia IOMs insert into the Nokia 7750 SR chassis slot to deliver a single, versatile platform capable of satisfying multiple roles in a network. The modular 7750 SR system architecture enables operators to mix and match Nokia IOMs with a broad range of compact MDA types to meet diverse networking requirements with reduced TCO and investment protection.

Nokia IOMs enable the full complement of the Nokia Service Router Operating System (SR OS) capabilities to support the full array of applications required for IP networking in any slot.

For service providers, Nokia IOMs are deployed in WAN, data center and aggregation networks to support IP edge, core, peering, data center gateway/interconnect, broadband edge gateways (Multi-Access Gateway (MAG), Broadband Network Gateway (BNG) and Fixed-Wireless Gateway (FWG)), IPsec gateway and multi-service aggregation applications.

For webscale operators looking to maximize application performance, Nokia IOMs support IP edge, data center gateway/interconnect, core and peering applications.

For enterprises, Nokia IOMs provide high-performance IP routing, including connectivity to the data center, internet and WAN applications.

Flexible licensing

IOM licenses add flexibility for tailoring and tuning the 7750 SR to customers' evolving needs. As a result, operators pay only for the functionality they require. This flexibility also allows for seamless growth options through simple in-place feature upgrades without changing IOM hardware.

With the FP4-based IOM5-e, a pay-as-you-grow license model is available. Capacity licenses provide bandwidth, connector and intelligent aggregation mode options. Functional licenses scale services through control options on egress hardware queues and egress policers. Each IOM-s and IOM5-e supports multiple combinations of these licenses to scale all attributes of capacity and functionality while protecting hardware investments. The IOM-s and IOM5-e can be operationalized without the need to ever upgrade licenses.

Advanced feature licenses for Nokia IOM4-e variants, the IOM-e and the IOM-a offer tiered levels of functionality for Layer 2- and Layer 3-based services. IOMs with Layer 3 feature licenses can add optional virtual private routed network (VPRN) licenses that determine IP VPN scaling supported on the IOM. Advanced feature licensing also includes security gateway, WLAN gateway, data center gateway, telemetry and application assurance applications.

Energy efficiency for sustainability

Energy-efficient design innovations of the Nokia 7750 SR-s and 7750 SR increases the sustainability of IP networks through reduced emissions.

The FP4 chipset architecture enables line card designs with fewer FP4 complexes and fewer components on each board to lower power consumption. The FP4 memory architecture is also exceptionally power-efficient. Power consumption scales with licensing level to drastically reduce power when only a fraction of a line card is in use. With Nokia FP4, these and other mechanisms are dynamic, enabling each Nokia 7750 SR-s and 7750 SR system to quickly and automatically adapt to lower power consumption.

The Nokia IOM-s and MDA2-s and MDA-s combination has dedicated air cooling channels, dual-sided circuit boards and no stacked optical cages. This design improves energy efficiency with reduced component pre-heating and even cooling to all cages to support coherent optics. The IOM5-e and MDA2-e-XP and MDA-e-XP also combine for an energy efficient design and has ample cooling to support coherent optics.

Intelligent aggregation

Intelligent aggregation allows the Nokia 7750 SR-s and 7750 SR to cost-effectively aggregate port capacity beyond the forwarding capacity of a line card in a deterministic way while guaranteeing QoS and packet priority. An FP4-based MDA provides full packet pre-classification and pre-buffering to enable much more aggregation than capacity in an exceptionally smart way.

Proven OS, simplified integration

Running the Nokia SR OS, Nokia delivers a single OS across all 7750 SR platforms. Common across all Nokia IP routing platforms, the Nokia SR OS leverages 20 years of software innovation, field validation and maintenance. Ground-breaking reliability features such as nonstop routing and services were first introduced in the SR OS and set new industry standards on availability.

Operators familiar with the Nokia SR OS will find qualification and operational integration of other Nokia variants effortless. The Nokia Network Services Platform (NSP) enables operators to minimize operational costs and complexity with a converged and consistent management and a software-defined networking (SDN) solution that spans the entire IP routing portfolio and select products in optical transport, access and wireless.

Technical specifications

IOM overview

Table 1 provides a technical overview and summarizes IOM support on the 7750 SR*.

Table 1. Nokia 7750 SR IOM summary

	7750 SR	7750 SR	7750 SR	7750 SR-e	7750 SR-a
	IOM-s	IOM5-e	IOM4-e	IOM-e	IOM-a
IOM capacity (FD)	SR-2s/7s/14s: • 1.5 Tb/s IOM-s: 1.5 Tb/s • 3.0 Tb/s IOM-s: 3.0 Tb/s	Redundant: • SR-7/12: 400 Gb/s • SR-12e: 1.2 Tb/s Non-redundant: • SR-7/12: 800 Gb/s • SR-12e: 1.5 Tb/s	200 Gb/s	200 Gb/s	100 Gb/s
IOM capacity with IA (FD) (Max)	• 1.5 Tb/s IOM-s: 4.0 T/bs • 3.0 Tb/s IOM-s: 4.0 Tb/s	• SR-7/12: 1.2 Tb/s • SR-12e: 4.0 Tb/s	400 Gb/s	400 Gb/s	100 Gb/s
Network processing technology	FP4	FP4	FP3	FP3	FP3
Supported chassis	SR-2s, SR-7s, SR-14s	SR-7, SR-12, 12e	SR-7, SR-12, SR-12e	SR-1e, SR-2e, SR-3e	SR-a4, SR-a8
Adapters per IOM	2	2	2	4	4
Hot swappable	Yes	Yes	Yes	Yes	Yes
MDA types supported	MDA2-s and MDA-s	MDA2-e-XP and MDA-e-XP	MDA-e	MDA-e	MDA-a-XP and MDA-a
ITU-T Sync-E/ IEEE 1588v2	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes	Yes/Yes
Dimensions	• Height: 6.01 cm (2.37 in) • Width: 40.6 cm (16.0 in) • Depth: 39.14 cm (15.41 in)	• Height: 3.6 cm (1.4 in) • Width: 42.5 cm (16.7 in) • Depth: 43.2 cm (17 in)	• Height: 3.6 cm (1.4 in) • Width: 42.5 cm (16.7 in) • Depth: 43.2 cm (17 in)	• Height: 7.11 cm (2.8 in) • Width: 25.91 cm (10.2 in) • Depth: 29.21 cm (11.5 in)	• Height: 3.6 cm (1.4 in) • Width: 38.9 cm (15.3 in) • Depth: 22.9 cm (9.0 in)
Weight	9.1 kg (20.0 lb)	6.12 kg (13.5 lb)	5.08 kg (11.2 lb)	4.0 kg (8.82 lb)	2.84 kg (6.25 lb)

* The IOM4-e, IOM4-e-B, and IOM3-XP-C are permitted for use in 7450 ESS-7 and ESS-12 systems. The new 7450 ESS-system-type BOF option allows a 7750 SR-7-B or SR-12-B chassis to operate as a 7450 ESS-7 or ESS-12 chassis.

Table 2. Nokia 7750 SR-s IOM-s variant and capacity licencing overview

	7750 SR-1s (modular)* Slot capacity licenses (FD)	7750 SR-2s Slot capacity licenses (FD)	7750 SR-7s Slot capacity licenses (FD)	7750 SR-14s Slot capacity licenses (FD)
3.0 Tb/s IOM-s	1.6 Tb/s with IA up to 4.0 Tb/s	1.6 Tb/s with IA up to 4.0 Tb/s	1.6 Tb/s with IA up to 4.0 Tb/s	1.6 Tb/s with IA up to 4.0 Tb/s
	2.4 Tb/s with IA up to 4.0 Tb/s	2.4 Tb/s with IA up to 4.0 Tb/s	2.4 Tb/s with IA up to 4.0 Tb/s	2.4 Tb/s with IA up to 4.0 Tb/s
	3.0 Tb/s with IA up to 4.0 Tb/s	3.0 Tb/s with IA up to 4.0 Tb/s	2.4 Tb/s with IA up to 4.0 Tb/s	2.4 Tb/s with IA up to 4.0 Tb/s
1.5 Tb/s IOM-s	—	800 Gb/s with IA up to 4.0 Tb/s	800 Gb/s with IA up to 4.0 Tb/s	800 Gb/s with IA up to 4.0 Tb/s
	—	1.5 Tb/s with IA up to 4.0 Tb/s	1.5 Tb/s with IA up to 4.0 Tb/s	1.5 Tb/s with IA up to 4.0 Tb/s

* Integrated IOM-s

Table 3. Nokia IOM5-e licencing overview

Type	System	Capabilities
		Capacity licenses - per slot (FD)
IOM5-e 400G	SR-7/SR-12	400 Gb/s with IA of 1.2 Tb/s (redundant)
	SR-12e	400 Gb/s with IA of 4.0 Tb/s (redundant)
IOM5-e 800G	SR-7/SR-12	800 Gb/s with IA of 1.2 Tb/s (non-redundant)
	SR-12e	800 Gb/s with IA of 4.0 Tb/s (redundant)
IOM5-e	SR-7/SR-12 SR-12e	800 Gb/s with IA of 1.2 Tb/s (non-redundant)
		1.2 Gb/s with IA of 4.0 Tb/s (redundant)
		1.5 Gb/s with IA of 4.0 Tb/s (non-redundant)

- Functional licenses
- Core routing
 - Edge routing
 - High-scale edge routing
 - Core routing
 - Edge routing
 - High-scale edge routing
 - Core routing
 - Edge routing
 - High-scale edge routing

Table 4. Nokia 7750 SR IOM feature licenses*

Feature license	Description	Notes
L3BQ	Layer 3 Basic Queuing	• Full IPv4/IPv6 routing with 8 ingress/8 egress queues per port
L2HQ	Layer 2 High Queuing	• Full queuing; policing support for Layer 2 features
L3HQ	Layer 3 High Queuing	• Full queuing and hierarchical policing with full IPv4/IPv6 routing

* Layer 3 routing and services capabilities supported in mixed mode on the 7450 ESS

Table 5. Nokia 7750 SR IOM VPRN feature licenses*

Feature license	Notes
Infrastructure VPRN	Support for up to 8 VPRN instances per IOM licensed with L3BQ or L3HQ
Service VPRN	Support for fully scaled VPRN instances per IOM licensed with L3BQ or L3HQ

* Layer 3 routing and services capabilities supported in mixed mode on the 7450 ESS

Note: Refer to the 7750 SR product and release documentation for system details on dimensions, weights, hardware, safety standards, compliance agency certifications and protocol support.



About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

Nokia operates a policy of ongoing development and has made all reasonable efforts to ensure that the content of this document is adequate and free of material errors and omissions. Nokia assumes no responsibility for any inaccuracies in this document and reserves the right to change, modify, transfer, or otherwise revise this publication without notice.

© 2025 Nokia

Nokia OYJ
Karakaari 7
02610 Espoo
Finland
Tel. +358 (0) 10 44 88 000

Document code: (July) CID156721