The Nokia 7750 Service Router (SR) series of IP routers deliver high performance, intelligence and resiliency. Designed to stay ahead of the evolving service demands driven by the cloud, 5G and the Internet of Things (IoT), the Nokia 7750 SR product family consists of the Nokia 7750 SR-s series, the Nokia 7750 SR series, the Nokia 7750 SR-a series and the Nokia 7750 SR-e series.

Versatile and scalable
For service providers, the Nokia 7750 SR enables delivery of advanced residential, enterprise and mobile services. For webscale companies, the 7750 SR enables data center aggregation, gateway and interconnect, point of presence (PoP) edge, internet peering and backbone router functions. For enterprises, the 7750 SR provides high-performance networking for cloud, data center and wide area networking applications.

The 7750 SR delivers high-performance routing and a full array of IP functions, services and applications. Available in four variants, the 7750 SR scales system capacity from 2.4 Tb/s half duplex (HD) to 21.6 Tb/s HD and is equipped with high-density Gigabit Ethernet (GE), 10GE, 25GE, 40GE and 100GE interfaces. At the heart of the 7750 SR is the highly programmable Nokia FP4 network processing (NP) silicon, an essential element in the quest for uncompromising high-speed intelligent services and applications that can adapt to evolving customer requirements.
Deterministic performance

The Nokia 7750 SR leverages the latest generation of Nokia IP routing silicon, the 2.4 Tb/s FP4, which combines a multichip architecture and intelligent memory design to provide deterministic packet forwarding performance even when complex processing-intensive operations are required. With the FP4 traffic manager, buffering is always deterministic and does not degrade or cause control plane discards if the buffer rate increases.

Intelligent fan-in/fan-out

To cost effectively meet the most stringent high-density aggregation scenarios, the 7750 SR-12e, 7750 SR-12, 7750 SR-7 and SR-1 support intelligent fan-in/fan-out capabilities. Intelligent fan-in/fan-out is a leading capability, with FP4 enabling the 7750 SR to handle much more aggregation than capacity in an exceptionally smart way. It ensures packet priority is always respected and delivers leading ingress buffering and shaping in a fully deterministic way. As a result, with FP4-based systems, the 7750 SR-12e supports up to 2.4 Tb/s FD per slot, the 7750 SR-12 and 7750 SR-7 supports up to 1.2 Tb/s FD per slot and the 7750 SR-1 supports up to 4.8 Tb/s HD.

Comprehensive features

With Nokia’s feature-rich 64-bit Service Router Operating System (SR OS) and extensive QoS, IP/MPLS and segment routing capabilities, the 7750 SR has the intelligent and comprehensive features and tools to define and deliver the most stringent SLAs and end-user quality of experience (QoE) requirements. With specialized application processing, the 7750 SR leverages embedded subscriber, service and application intelligence to enable deeper levels of integrated service capabilities. It supports tens of thousands of IP flows and access control lists (ACLs) with high performance and scale even when multiple advanced features are enabled concurrently. These platforms support a leading number of statistics counts per packet, enabling comprehensive statistics for existing and future applications.

Full array of IP routing functions

The 7750 SR supports a full array of IP network functions, services and applications.

For service providers, the 7750 SR supports multiple network functions, services and applications on a common platform, including: Broadband Network Gateway (BNG) for residential services; provider edge (PE) router for enterprise VPN, internet access, and cloud and data center interconnect services; and mobile applications, including as an aggregation router for 3G, LTE and LTE-A backhaul, a WLAN gateway for Wi-Fi® network aggregation, and a security gateway for securing backhaul networks; value-added services, including application assurance (AA) and carrier-grade Network Address Translation (NAT). It also functions as a mobile gateway supporting SGW/PGW/GGSN and PCEF for 2G/3G/4G access and ePDG/TWAG for Wi-Fi access plus TDF and SSG for enhanced subscriber services.

For webscale companies, the 7750 SR delivers leading features for data center aggregation, gateway and interconnect, PoP edge, internet peering and backbone router functions.

For enterprises, the 7750 SR provides high-performance IP routing, including connectivity to the data center, internet and wide area networking applications.

High availability

For always-on service delivery, the 7750 SR sets the benchmark for high availability. Moving beyond full system redundancy, the robust SR OS supports numerous features to maximize network stability, ensuring IP/MPLS protocols and services run without interruption. These features include innovative nonstop routing, nonstop services, in-service software upgrade (ISSU) and multi-chassis resiliency mechanisms.
Carrier SDN integration
The 7750 SR and the SR OS enable multivendor software-defined networking (SDN) control integration, which is enabled through OpenFlow, Path Computation Element Protocol (PCEP), Border Gateway Protocol with Link State (BGP-LS) and NETCONF/YANG interfaces. In combination with the Nokia Network Services Platform (NSP), the 7750 SR can be deployed as part of a Carrier SDN solution, supporting unified service automation and network optimization across IP, MPLS, Ethernet and optical transport layers.

IP/optical integration
Tunable 10G and integrated 100G coherent PM-QPSK tunable dense wavelength division multiplexing (DWDM) optics enable the 7750 SR to interface directly with the photonic transport layer without requiring optical transponders. A standards-based Generalized Multiprotocol Label Switching (GMPLS) user network interface (UNI) enables the 7750 SR to efficiently coordinate IP routing and transport requirements across administrative boundaries and dynamically provision and protect optical segments and end-to-end transport connections.

Network management
The 7750 SR is fully managed by the Nokia NSP, resulting in integrated network management across the network infrastructure of service providers, webscale companies and enterprises.

Hardware overview
The 7750 SR is available in four chassis variants—the 7750 SR-12e, 7750 SR-12, 7750 SR-7 and 7750 SR-1. It supports a wide range of interface adapters, integrated service adapters (ISAs) and common system modules optimized to address various network and application requirements. For details on the 7750 SR-s series, 7750 SR-e series and 7750 SR-a series, refer to the respective data sheets.

Switch Fabric Module (SFM6-12e)
The SFM6-12e enables 1.2 Tb/s FD connectivity between all slots of the 7750 SR-12e chassis. The fabric cards are 3+1 redundant with active-active load-sharing design and are hot-swappable. Two full-height SFM6-12e modules provide the switching functions for the system as well as housing the pluggable Control Processor Module 5 (CPM5). There are also two half-height Mini SFM6-12e modules providing exclusive switching functions for the system.

Switch Fabric Module (SFM6-7/12)
The SFM6-7/12 enable 800 Gb/s FD (non-redundant) or 400 Gb/s FD (redundant) line rate connectivity between all slots of the 7750 SR-7 and SR-12 chassis. The modular fabric cards are active-active load-sharing design and are hot-swappable. The full-height SFM6-7/12 modules control the switching functions for the system and house the pluggable CPM5 for investment protection.

Control Processor Module (CPM5)
The CPM5 is a pluggable, hot-swappable module housed in the SFM6-12e, SFM6-7/12, SFM5-7 and SFM5-12. The CPM5 provides the management, security and control plane processing for the 7750 SR-12e, SR-12 and SR-7. Redundant CPMs operate in a hitless, stateful failover mode. Central processing and memory are intentionally separated from the forwarding function on the interface modules to ensure system resiliency. Face plate interfaces include an RJ-45 BITS port, a 1PPS port and a 10/100/1000BASE (RJ-45) management interface port.

Input/Output Module (IOM)
IOMs are available in three hot-swappable types and are optimized for versatility in deploying a variety of Ethernet and multiservice applications. The IOM5-e supports up to two MDA-e-XP's. In the 7750 SR-12e it delivers up to 1.2 Tb/s FD per-slot capacity. In 7750 SR-12 and SR-7, it delivers up to 800 Gb/s FD (non-redundant) and up to 400 Gb/s FD (redundant) per-slot capacity. With intelligent fan-in/fan-out, it supports up to 2.4 Tb/s FD per-slot capacity in the SR-12e and up to 1.2 Tb/s FD per-slot capacity in the SR-12 and SR-7.
The IOM5-e offers a pay-as-you-grow licensing model with hardware capability-level and functional-level licensing options, with upgrade options enabled through software.

The IOM4-e delivers up to 200 Gb/s FD per-slot performance and the IOM3-XP supports up to 50 Gb/s FD per-slot performance. Both are supported on the 7750 SR-12e, SR-12 and SR-7.

### 7750 SR-1 compact system

Providing full SR OS capabilities in a compact 2RU form factor, the 2.4 Tb/s HD 7750 SR-1 has one integrated CPM and an integrated IOM5-e based on the Nokia FP4 NP silicon. It supports up to two MDA-e-XPs and supports up to 4.8 Tb/s HD capacity with 2:1 intelligent fan-in/fan-out. Similar to 7750 SR IOMs and IMMs, it provides full synchronization and Nokia 7210 Service Access Switch-S series (SAS-S) satellite system support for Ethernet port expansion. The SR-1 offers pay-as-you-grow hardware functional-level licenses, with upgrade options enabled through software. The AC variant has two rear-mounted modular power supplies. The DC variant comes with integrated dual feeds at the rear of the system. Both systems have modular rear-mounted fans.

### Media Dependent Adapter (MDA)

MDAs are available in four hot-swappable types. They provide modular interface connectivity along with a variety of interface types and density configurations. Ethernet types support ITU-T Sync-E and IEEE 1588v2 for synchronization requirements.

The MDA-e-XP provides up to 600 Gb/s FD performance, supports QSFP28 and QSFP+ optics with optical breakout options and is supported by the IOM5-e in the SR-12e, SR-12 and SR-7 and by the integrated IOM5-e of the SR-1.

The MDA-e provides up to 100 Gb/s FD performance and has variants that support MACsec and optical breakout options. It is supported by the IOM4-e, IOM4-e-B and IOM4-e-HS in the 7750 SR-12e, SR-12 and SR-7, and by the IOM-e in the 7750 SR-e series. The MDA-e supports a full range of SFP, cSFP, SFP+, CFPP2, CFPP4 and QSFP28 and QSFP+ optics. Optical transport network (OTN) support includes ITU-T G.709 and FEC.

The MDA-XP and MDA provide up to 25 Gb/s and 10 Gb/s respectively and support Ethernet and multiservice interfaces. They are supported in the 7750 SR-12e, SR-12 and SR-7 and are available in a variety of interface and density configurations.

### Integrated Media Module (IMM)

IMMs are line cards providing integrated processing and physical interfaces on a single module. IMMs are hot-swappable and provide high-capacity Ethernet interfaces, including variants with integrated tunable DWDM optics, and deliver up to 400 Gb/s FD per-slot performance. For synchronization requirements, they also support ITU-T Synchronous Ethernet (Sync-E) and IEEE 1588v2.

### Multiservice Integrated Service Module (MS-ISM)

The MS-ISM are hot-swappable, full-height resource modules. They provide specialized processing and buffering for deeper levels of integrated services and advanced applications. They leverage two embedded ISA2 general-purpose multicore processors and support up to 80 Gb/s of processing. Combination IMMs support Ethernet ports and an embedded ISA2, which supports up to 40 Gb/s of processing.

### Multiservice Integrated Service Adapter 2 (MS-ISA2)

The MS-ISA2s, common with the SR-12e, SR-12, and SR-7 and the 7750 SR-e series, are hot-swappable, half-height resource adapters. They provide specialized processing and buffering for deeper levels of integrated services and advanced applications. They deliver up to 40 Gb/s of processing and are supported by the IOM4-e.

### Integrated Service Module - Mobile Gateway (ISM-MG)

ISM-MGs are hot-swappable, full-height modules that fit into any 7750 SR I/O slot and provide the bearer functions for 2G/3G/4G and Wi-Fi access networks.

### Advanced Power Equalization Modules (APEQs)

APEQs provide power for the 7750 SR-12e. The low-voltage DC APEQs deliver up to 2,800 W each. The high-voltage DC APEQs take 260 V–400 V and provide 3,000 W each. AC APEQs take 200 V–240 V single phase and deliver 3,000 W each. APEQs support cost-effective modular expansion as required.
Power Entry Modules (PEMs)

PEMs provide low-voltage DC power for the 7750 SR-12 and 7750 SR-7 and support cost-effective modular expansion as required.

Power Supply Units (PSUs)

PSUs provide modular, redundant AC power for the 7750 SR-1.

Technical specifications

Table 1. Hardware specifications for the 7750 SR series

<table>
<thead>
<tr>
<th></th>
<th>7750 SR-12e</th>
<th>7750 SR-12</th>
<th>7750 SR-7</th>
<th>7750 SR-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>System capacity (HD, redundant)</td>
<td>21.6 Tb/s</td>
<td>8 Tb/s</td>
<td>4 Tb/s</td>
<td>2.4 Tb/s</td>
</tr>
<tr>
<td>Per-slot capacity (FD, redundant)</td>
<td>1.2 Tb/s</td>
<td>400 Gb/s</td>
<td>400 Gb/s</td>
<td>1.2 Tb/s</td>
</tr>
<tr>
<td>Per-slot intelligent fan-in/fan-out capacity (FD, redundant)</td>
<td>2.4 Tb/s</td>
<td>1.2 Tb/s (FD)</td>
<td>1.2 Tb/s (FD)</td>
<td>2.4 Tb/s</td>
</tr>
<tr>
<td>System capacity (HD, non-redundant)</td>
<td>—</td>
<td>16 Tb/s (HD)*</td>
<td>8 Tb/s (HD)*</td>
<td>—</td>
</tr>
<tr>
<td>Per-slot capacity (FD, non-redundant)</td>
<td>—</td>
<td>800 Gb/s (HD)*</td>
<td>800 Gb/s (HD)*</td>
<td>—</td>
</tr>
<tr>
<td>Number of MDA-e/MDA-e-XP/MDA/ISA2 adapters</td>
<td>18</td>
<td>20</td>
<td>10</td>
<td>2; MDA-e-XPs only</td>
</tr>
<tr>
<td>Number of IOMs/IMMs/ISMs</td>
<td>9</td>
<td>10</td>
<td>5</td>
<td>1; integrated IOM</td>
</tr>
<tr>
<td>Common equipment redundancy</td>
<td>SFM6-12e, Mini-SFM6-12e, SFM5-12e, Mini-SFM5-12e, CPMS, SF/CPM, PEQs, enhanced fan tray (EFT)</td>
<td>SFM6-7/12, SFM5-12, CPMS, SF/CPM, PEQs, EFT</td>
<td>SFM6-7/12, SFM5-7, CPMS, SF/CPM, PEQs, EFT</td>
<td>Fan module, PSU</td>
</tr>
<tr>
<td>Hot-swappable modules</td>
<td>SFM6-12e, Mini-SFM6-12e, SFM5-12e, Mini-SFM5-12e, IOM, IMM, ISM, MDA-e-XP, MDA-e, MDA-XP, MDA, ISA2, VSM, APEQ, EFT</td>
<td>SFM6-7/12, SFM5-12, CPMS, IOM, IMM, ISM, MDA-e-XP, MDA-e, MDAXP, MDA, ISA2, VSM, PEQ, EFT</td>
<td>SFM6-7/12, SFM5-7, CPMS, IOM, IMM, ISM, MDA-e-XP, MDA-e, MDAXP, MDA, ISA2, VSM, EFT, PEM</td>
<td>MDA-e-XP, fan module, PSU</td>
</tr>
<tr>
<td>Dimensions**</td>
<td>• Height: 97.8 cm (38.5 in), 22 RU</td>
<td>• Height: 62.2 cm (24.5 in), 14 RU</td>
<td>• Height: 35.6 cm (14.0 in), 8 RU</td>
<td>• Height: 9.53 cm (3.5 in), 2 RU</td>
</tr>
<tr>
<td></td>
<td>• Width: 44.5 cm (17.5 in)</td>
<td>• Width: 44.5 cm (17.5 in)</td>
<td>• Width: 44.5 cm (17.5 in)</td>
<td>• Width: 44.5 cm (17.5 in)</td>
</tr>
<tr>
<td></td>
<td>• Depth: 76.2 cm (30.0 in)</td>
<td>• Depth: 64.5 cm (25.4 in) (without cable management)</td>
<td>• Depth: 64.8 cm (25.5 in)</td>
<td>• Depth: 62.5 cm (24.6 in)</td>
</tr>
</tbody>
</table>

* Backplane dependent
** Dimensions and weights are approximate and subject to change. Refer to the appropriate installation guide for the current dimensions and weights.
Table 1. Hardware specifications for the 7750 SR series (continued)

<table>
<thead>
<tr>
<th>Weight</th>
<th>7750 SR-12e</th>
<th>7750 SR-12</th>
<th>7750 SR-7</th>
<th>7750 SR-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>**</td>
<td>Empty: 79.4 kg (175.0 lb)</td>
<td>Empty: 56.4 kg (124.3 lb)</td>
<td>Empty: 41 kg (90.4 lb)</td>
<td>Empty: 14.96 kg (33.0 lb)</td>
</tr>
<tr>
<td></td>
<td>Loaded: 249.5 kg (550.0 lb)</td>
<td>Loaded: 155.7 kg (343.3 lb)</td>
<td>chassis weight with factory-installed fan tray and air filter</td>
<td>Loaded: 21.9 kg (48.3 lb)</td>
</tr>
</tbody>
</table>

Power

<table>
<thead>
<tr>
<th>DC power</th>
<th>7750 SR-12e</th>
<th>7750 SR-12</th>
<th>7750 SR-7</th>
<th>7750 SR-1</th>
</tr>
</thead>
<tbody>
<tr>
<td>**</td>
<td>DC-40 V to -72 V, 60 A or 80 A per feed or DC 260 V to 400 V, 13 A per feed</td>
<td>DC-40 V to -72 V, 162 A max, 6,480 W or DC-46 V to -72 V, 175 A max, 8,050 W or DC-49 V to -55 V, 175 A max, 8,575 W or DC-50.5 V to -72 V, 175 A max, 8,837.5 W</td>
<td>DC-40 V to -72 V, 100 A, 4,000 W max or DC-46 V to -72 V, 100 A, 4,600 W max</td>
<td>DC-40 V to -72 V, 40 A max or DC-46 V to -72 V, 100 A, 4,600 W max</td>
</tr>
<tr>
<td>**</td>
<td>4+1 redundancy</td>
<td>1+1 redundancy</td>
<td>1+1 redundancy</td>
<td>Power feed redundancy</td>
</tr>
</tbody>
</table>

External AC power (option)

| Input voltage: 200 V AC to 240 V AC | 200 V DC to 56 V DC | Current: 50 A |

Cooling

<table>
<thead>
<tr>
<th>Front to back</th>
<th>Front to back</th>
<th>Side to back</th>
<th>Front to back</th>
</tr>
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</table>

Table 2. Nokia 7750 SR MDA-e-XP and MDA-e summary

<table>
<thead>
<tr>
<th>MDA type</th>
<th>Connectors / ports</th>
<th>Connector / port type</th>
<th>Maximum density</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7750 SR-12e</td>
<td>7750 SR-12*</td>
<td>7750 SR-7*</td>
</tr>
<tr>
<td>MDA-e-XP</td>
<td>100BASE/40GBASE/10GBASE **</td>
<td>12</td>
<td>QSFP28/QSFP+</td>
</tr>
<tr>
<td></td>
<td>100BASE/40GBASE/10GBASE **</td>
<td>6</td>
<td>QSFP28/QSFP+</td>
</tr>
<tr>
<td></td>
<td>100BASE</td>
<td>3</td>
<td>CFP2-DCO</td>
</tr>
<tr>
<td>MDA-e</td>
<td>100BASE/40GBASE/25GBASE/10GBASE (MACsec)</td>
<td>2</td>
<td>QSFP28/QSFP+</td>
</tr>
<tr>
<td></td>
<td>100BASE/40GBASE</td>
<td>2</td>
<td>QSFP28/QSFP+</td>
</tr>
<tr>
<td></td>
<td>100BASE</td>
<td>1, 2</td>
<td>CFP2, CFP4</td>
</tr>
<tr>
<td></td>
<td>10GBASE</td>
<td>10, 6</td>
<td>SFP+</td>
</tr>
<tr>
<td></td>
<td>10GBASE/1000BASE (MACsec)</td>
<td>12</td>
<td>SFP+/SFP</td>
</tr>
<tr>
<td></td>
<td>1000BASE</td>
<td>10</td>
<td>CSFP/SFP</td>
</tr>
</tbody>
</table>

* The new 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.
** Leverages intelligent fan-in/fan-out
Table 3. Nokia 7750 SR IMM summary

<table>
<thead>
<tr>
<th>IMM type</th>
<th>Ports</th>
<th>Connector type</th>
<th>Maximum density</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>7750 SR-12e</td>
</tr>
<tr>
<td>10/100/1000BASE</td>
<td>160</td>
<td>CSFP/SFP</td>
<td>1,440</td>
</tr>
<tr>
<td>10/100/1000BASE</td>
<td>48</td>
<td>SFP</td>
<td>432</td>
</tr>
<tr>
<td>10GBASE</td>
<td>40</td>
<td>SFP+</td>
<td>360</td>
</tr>
<tr>
<td>10GBASE</td>
<td>12, 20</td>
<td>SFP+</td>
<td>108, 180</td>
</tr>
<tr>
<td>40GBASE</td>
<td>6</td>
<td>QSFP+</td>
<td>54</td>
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<tr>
<td>100GBASE</td>
<td>4</td>
<td>CXP and CFP4</td>
<td>36</td>
</tr>
<tr>
<td>100GBASE</td>
<td>1, 2</td>
<td>CFP</td>
<td>9, 18</td>
</tr>
<tr>
<td>100GBASE IMM (DWDM tunable optics)</td>
<td>1</td>
<td>LC</td>
<td>9</td>
</tr>
<tr>
<td>10GBASE + 100/1000BASE</td>
<td>10/20</td>
<td>SFP+/SFP</td>
<td>90/180</td>
</tr>
<tr>
<td>10GBASE + 7x50 ISA2</td>
<td>10</td>
<td>SFP</td>
<td>90</td>
</tr>
<tr>
<td>40GBASE + 100/1000BASE</td>
<td>3/20</td>
<td>QSFP+/SFP</td>
<td>27/180</td>
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<tr>
<td>100GBASE + 10GBASE</td>
<td>1/10</td>
<td>CFP/SFP+</td>
<td>9/90</td>
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<tr>
<td>100GBASE + 7x50 ISA2</td>
<td>1</td>
<td>CFP</td>
<td>9</td>
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Table 4. Nokia 7750 SR MDA-XP and MDA summary

<table>
<thead>
<tr>
<th>MDA type</th>
<th>Ports</th>
<th>Connector type</th>
<th>Maximum density</th>
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<tbody>
<tr>
<td></td>
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<td>7750 SR-12e</td>
</tr>
<tr>
<td>Ethernet MDA-XP</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10/100/1000BASE-TX</td>
<td>48</td>
<td>8 x mini RJ-21</td>
<td>864</td>
</tr>
<tr>
<td>1000BASE</td>
<td>10, 12, 20</td>
<td>SFP</td>
<td>180, 216, 360</td>
</tr>
<tr>
<td>10GBASE (LAN/WAN PHY)</td>
<td>1, 2, 4</td>
<td>XFP</td>
<td>18, 36, 72</td>
</tr>
<tr>
<td>10GBASE + 1000BASE (LAN/WAN PHY)</td>
<td>2/12</td>
<td>XFP/SFP</td>
<td>36/216</td>
</tr>
<tr>
<td>Any Service Any Port (ASAP) MDA</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Channelized DS3/E3 ASAP</td>
<td>4, 12</td>
<td>1.0/2.3 connectors</td>
<td>72, 216</td>
</tr>
<tr>
<td>Channelized OC-3/STM-1 ASAP</td>
<td>4</td>
<td>SFP</td>
<td>72</td>
</tr>
<tr>
<td>Channelized OC-12/STM-4 ASAP</td>
<td>SFP</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Versatile Service Module-XP</td>
<td>—</td>
<td></td>
<td>√</td>
</tr>
</tbody>
</table>

Table 5. Nokia 7750 SR ISA support summary

<table>
<thead>
<tr>
<th>ISA type</th>
<th>7750 SR-12e</th>
<th>7750 SR-12</th>
<th>7750 SR-7</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multiservice Integrated Service Adapter 2 (MS-ISA2)</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Multiservice Integrated Service Module (MS-ISM)</td>
<td>√</td>
<td>√</td>
<td>√</td>
</tr>
<tr>
<td>Integrated Service Module - Mobile Gateway (ISM-MG)*</td>
<td>—</td>
<td>√</td>
<td>√</td>
</tr>
</tbody>
</table>

* See the ISM-MG data sheet for details. Support requires the SR OS-MG.
Feature and protocol support highlights
Feature and protocol support within the 7750 SR series includes, but is not limited to, the following.

IP and MPLS routing features
- IP unicast routing: Routing Information Protocol (RIP), Intermediate System-to-Intermediate System (IS-IS), Open Shortest Path First (OSPF), Multiprotocol Border Gateway Protocol (MBGP), Unicast Reverse Path Forwarding (uRPF), comprehensive control plane protection features for security, and IPv4 and IPv6 feature parity
- IP multicast routing: Internet Group Management Protocol (IGMP), Multicast Listener Discovery (MLD), Protocol Independent Multicast (PIM), Multicast Source Discovery Protocol (MSDP), and IPv4 and IPv6 feature parity
- MPLS: Label edge router (LER) and label switch router (LSR) functions with support for seamless MPLS designs, MPLS-Transport Profile (MPLS-TP), Label Distribution Protocol (LDP) and Resource Reservation Protocol (RSVP) for MPLS signaling and traffic engineering and includes GMPLS UNI, Point-to-Point (P2P) and Point-to-Multipoint (P2MP) label switched paths (LSPs) with Multicast LDP (MLDP), P2MP RSVP and weighted Equal-Cost Multi-Path (ECMP)

Segment routing and SDN features
- Multiple instance IS-IS and OSPF Segment Routing support with shortest path tunnel, Segment Routing - Traffic Engineering (SR-TE) LSP, and static and BGP SR policy. The implementation provides LFA, remote LFA and Topology-Independent LFA (TI-LFA) protection for all types of tunnels. PCEP allows the delegation of the SR-TE LSP to the Nokia NSP or a third-party PCE function.
- Programmable forwarding tables via gRPC-based RIB API feature and MPLS forwarding policy
- Extensive set of capabilities using ACL logic to steer routes/flows towards various target types, such as IP next-hop, SR-TE/RSVP-TE/MPLS-TP LSP and VRF, and in a wide range of routing and service contexts such as Global Routing table, VPRN, VPLS and E-PIPE service; supports control interfaces such as OpenFlow, FlowSpec, CLI and NETCONF
- Multivendor SDN control integration through OpenFlow, PCEP, BGP-LS and BGP SR Policy support

Layer 2 features
- Ethernet LAN (E-LAN): BGP-VPLS (Virtual Private LAN Service), Provider Backbone Bridging for VPLS (PBB-VPLS), Ethernet VPN (EVPN) and PBB-EVPN
- E-Line: BGP-VPWS (Virtual Private Wire Service), EVPN-VPWS and PBB-EVPN
- E-Tree: EVPN and PBB-EVPN
- EVPN: EVPN-VXLAN (Virtual eXtensible LAN) to VPLS/EVPN-MPLS gateway functions

Layer 3 features
- IP-VPN, enhanced internet services, EVPN for Layer 3 services with integrated routing and bridging (EVPN-IRB), and Multicast VPN (MVPN), which includes Inter-AS MVPN and Next Generation MVPN (NG-MVPN)

System features
- Ethernet satellites: Port expansion through local or remote Nokia 7210 SAS-S series GE, 10GE, 100GE and SONET/SDH satellite variants, offering 24/48 x GE ports, 64 x GE/10GE ports or legacy SONET/SDH ports over GE, 10GE and 100GE uplinks
- OAM: Extensive fault and performance Operations, Administration and Maintenance (OAM) includes Ethernet Connectivity Fault Management (CFM) (IEEE 802.1ag, ITU-T Y.1731), Ethernet in the First Mile (EFM) (IEEE 802.3ah), Bidirectional Forwarding Detection (BFD), Cflowd, Two-Way Active Measurement Protocol (TWAMP), and a full suite of MPLS OAM tools
- Timing: ITU-T Synchronous Ethernet (SyncE), IEEE 1588v2 (PTP), Network Time Protocol (NTP), BITS ports (T1, E1, 2M), and 1PPS
- QoS: Flexible intelligent packet classification; ingress and egress hierarchical QoS with multilayered shaping and two-tiered, class fair hierarchical policing; advanced, scalable network and service QoS, and end-to-end consistent QoS regardless of oversubscription or congestion

1 Requires CPM5, an appropriate chassis mode and an uplink via an FP2-based IOM/IMM at a minimum
High availability: Nonstop routing\(^1\), nonstop services\(^1\), in-service software upgrade (ISSU)\(^1\), fast reroute for IP, RSVP, LDP and segment routing, pseudowire redundancy, ITU-T G.8031 and G.8032, weighted ECMP, and weighted, mixed-speed link aggregation

Management features
- Model-driven network element management through CLI, NETCONF and gRPC/gNMI using YANG models
- Full SNMP management support, including configuration
- Comprehensive network and node management through the Nokia NSP

Standards support\(^2\)

Environmental specifications
- Operating temperature: 5°C to 40°C (41°F to 104°F)
- Operating relative humidity:
  - 5% to 85% (SR-12e, SR-12, SR-7)
  - 5% to 95% (non-condensing) (SR-1)
- Operating altitude: Up to 4,000 m (13,123 ft) at 30°C (86°F)

Safety
- AS/NZS 60950.1
- IEC/EN 60825-1
- IEC/EN 60825-2
- IEC/EN/UL/CSA60950-1 Ed2 Am2

EMC emission
- AS/NZS CISPR 32 (Class A)
- CISPR 32 (Class A)
- EN 55032 (Class A)
- EN 61000-3-2
- EN 61000-3-3
- FCC Part 15 (Class A)
- ICES-003 (Class A)
- IEC 61000-6-4
- KN 32 (Class A)
- VCCI (Class A)

EMC immunity
- BT GS-7
- EN 55024
- ES 201 468 (7750 SR-1 only)
- ETSI EN 300 386
- IEC 61000-6-2
- KN 35

EMC radio
- EN 301 489-1 (7750 SR-1 only)
- EN 301 489-17 (Bluetooth; 7750 SR-1 only)

Telecom standards
- ANSI T1.105.03
- ANSI T1.105.06
- ANSI T1.105.09
- ANSI T1.404, DS3
- ITU-T G.703
- ITU-T G.707
- ITU-T G.813
- ITU-T G.823
- ITU-T G.824
- ITU-T G.825
- ITU-T G.957
- Telcordia GR-253-CORE

Environmental
- ETSI EN 300 019-2-1 Storage Tests, Class 1.2
- ETSI EN 300 019-2-2 Transportation Tests, Class 2.3
- ETSI EN 300 019-2-3 Operational Tests, Class 3.2
- ETSI EN 300 019-2-3 Earthquake
- ETSI EN 300 132-2 DC Power Supply Interface
- ETSI EN 300 132-3-1 HVDC Power Supply Interface
- ETSI EN 300 132-3 AC Systems
- ETSI 300 753 Acoustic Noise, Class 3.2 (7750 SR-1 only)

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\(^1\) Requires redundant CPM modules
\(^2\) System design intent is according to the listed standards. Refer to product documentation for detailed compliance status.
Directives, regional approvals and certifications

- CE Mark - Common Europe
- EU Directive 2011/65/EU Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment (Recast) Directive (RoHS2)
- EU Directive 2012/19/EU Waste Electrical and Electronic Equipment (WEEE)
- EU Directive 2014/30/EU Electromagnetic Compatibility (EMC)
- KC Mark - South Korea
- NEBS Level 3
- RCM Mark - Australia
- VCCI Mark - Japan

Network Equipment Building System (NEBS)

- ATIS-0600010.03
- ATIS-0600015
- ATIS-0600015.03
- ATT-TP-76200
- GR-63-CORE
- GR-1089-CORE
- VZ.TPR.9205 TEEER
- VZ.TPR.9305

MEF certifications

- CE 1.0 (MEF 9 and MEF 14)
- CE 2.0
  - Certified (on E-LAN, E-Line, E-Tree and E-Access MEF service types)
  - 100G certified (on E-Line and E-Access MEF service types)