Nokia 7705 Service Aggregation Router SAR-10x, SAR-Mx, and SAR-Hx

Release 26

The Nokia 7705 Service Aggregation Router (SAR)-10x, SAR-Mx, and SAR-Hx are next-generation routers that deliver versatile services and applications. As part of the Nokia 7705 SAR portfolio, they provide the reliability, flexibility, and performance required for mission-critical enterprise and telecommunication provider networks.

Overview

The Nokia 7705 SAR[1] is designed to deliver best-in-class capabilities, with a fully programmable datapath that provides enhanced features today and the flexibility to evolve with changing requirements. The 7705 SAR leverages the feature-rich Nokia Service Router Operating System (SR OS), built to power the most demanding and dynamic Ethernet and IP/MPLS networks. These routers are temperature-, EMC-, and surge-hardened and offer both passive and active cooling options.

The 7705 SAR provides support for multiservice Ethernet and legacy interfaces through fixed ports and modular media dependent adapters (MDAs), enabling network convergence and operational efficiency. The 7705 SAR provides robust timing capabilities, including built-in GNSS receivers for accurate timing distribution. In addition, comprehensive built-in security features help network operators protect against cybersecurity threats and safeguard sensitive data.



7705 SAR-Mx



7705 SAR-Hx



7705 SAR-10x

1 In this document 7705 SAR refers to 7705 SAR-10x, SAR-Hx, and SAR-Mx routers

Versatile capabilities

The Nokia 7705 SAR is built with a fully programmable datapath that enables it to meet current feature requirements while accommodating new services and standards as they evolve. This allows network operators to protect their investments by integrating new capabilities as they emerge and staying ahead of the innovation curve.

Industry-proven IP/MPLS multiservice functions, security, and reliability are delivered by SR OS, the operating system of the 7705 SAR. These capabilities support Ethernet, serial, teleprotection, and many other interface types.

The 7705 SAR inherits the reliability and continuous evolution of SR OS, supporting the industry's move toward greater automation, programmability, and agility for scalable and secure network connectivity.

Robust design

The Nokia 7705 SAR is designed to provide robustness in a wide range of operational scenarios and networking environments. Temperature hardening enables deployment in outside plant environments, including mobile and railway applications. In addition, EMC and surge hardening support deployment in power utility substations.

The platform also features PCB-Enhanced Plating (PEP) for internal boards and conformal coating for modular power supply units (PSUs) and fan modules, enhancing platform performance, durability, and reliability in challenging environments. Modular redundant power supplies with low-voltage DC (LVDC) or AC/high-voltage DC (HVDC) options, along with passively cooled designs and redundant fans or fan modules in actively cooled systems, make the 7705 SAR an ideal platform for a wide range of access network deployments.

Additionally, the 7705 SAR-10x is a fully redundant router engineered with no single point of failure and hot-swappable components for rapid, low-risk maintenance. It also supports non-stop routing (NSR), providing hitless control-plane failover that preserves routing adjacencies and services during a control processor switchover. The design maximizes uptime for mission-critical applications and supports modular upgrades, helping protect investments as bandwidth demands grow and applications migrate to Ethernet-based interfaces.

Multiservice evolution

The 7705 SAR is a full-fledged IP/MPLS router with advanced service capabilities and QoS features that support both modern and legacy applications over a single network. It offers a range of legacy interfaces for customers that continue to rely on TDM-based applications while planning a future migration to Ethernet. Tailored software features, such as asymmetric delay and jitter compensation, help ensure that legacy applications perform as they did on TDM networks.

Maintaining end-to-end Quality of Service (QoS) for different traffic types is critical because not all traffic has the same requirements. Hierarchical QoS, traffic classification, traffic management policies, and QoS statistics and monitoring are among the capabilities of the 7705 SAR. These features make it an excellent choice for mission-critical applications and for service providers seeking to deliver high-performance, SLA-compliant services while optimizing network resource utilization.

To achieve superior service reliability, the Nokia 7705 SAR is equipped with a comprehensive set of operations, administration, and maintenance (OAM) features. These capabilities enable rapid fault detection and efficient troubleshooting.

Network synchronization

Precise network synchronization is the foundation of many communication systems. The 7705 SAR is equipped with a built-in dual-band GNSS receiver that provides a comprehensive suite of time-synchronization solutions. The 7705 SAR supports time-sensitive packet transport that includes a Class D-based telecom boundary clock. In addition, it supports the IEEE 1588 Power Utility Profile for time distribution within utility substations and offers profile interworking capabilities.

Network security

The Nokia 7705 SAR offers a multifaceted approach to security. It ensures traffic encryption through various methods, including IPsec, NGE, and MACsec. Its NAT capabilities enhance security by obscuring internal addresses. In addition, it incorporates Trusted Platform Module (TPM) 2.0 technology, along with support for secure boot and measured boot, to strengthen system integrity.

Automation

The 7705 SAR simplifies and automates network operations by leveraging the model-driven management capabilities of SR OS. It is managed by the Nokia Network Services Platform (NSP), which provides a comprehensive suite of service management capabilities to automate end-to-end service provisioning, operations, administration, and maintenance. In addition, the system offers a Zero-Touch Provisioning (ZTP) solution that enables automatic node configuration. Together, these capabilities enhance the user experience while reducing operating costs.

The model-driven management capabilities of SR OS support configuration and state management through a YANG-based CLI, the NETCONF protocol, and gRPC/gNMI interfaces. They also enable real-time streaming telemetry using gRPC and gNMI subscriptions, helping ensure efficient and automated network operations.

Technical specifications

The Nokia 7705 SAR is available in a range of variants to suit a broad range of mission-critical, enterprise, communication service providers applications.

Please visit the 7705 SAR portfolio to learn more about other variants in the portfolio.

Table 1. Nokia 7705 SAR 10x, SAR-Mx and SAR-Hx specifications

Feature	7705 SAR-10x	7705 SAR-Mx	7705 SAR-Hx
System throughput: Full duplex (FD)	Up to 50 Gb/s		
MDA slots	8	1	1
MDA type	See table 2 for details		
Fixed data connector	None	• 2 x SFP28/SFP+ • 6 x SFP/SFP+ • 4 x GE/FE RJ45 10/100/1000 Mb/s All ports are MACsec-capable	
Control interfaces	• Console, management, USB, 1PPS out, alarm input/output, GNSS antenna • Audible alarm cutoff (ACO) button, fan module power and control	• Console, management, USB, 1PPS out, alarm input/output, GNSS antenna • SD slot	
Time and synchronization	• Includes Stratum 3E oscillator • ITU-T Synchronous Ethernet (SyncE) – ITU-T G.8262.1 (eEEC) • IEEE 1588v2 PTP Clock Types – Boundary – Slave – Grandmaster • IEEE 1588v2 PTP Profiles – ITU-T G.8275.1 – ITU-T G.8275.2 with PTS – ITU-T G.8275.2 with APTS – ITU-T G.8265.1 – IEEE 1588v2 Default – IEC/IEEE 61850-9-3 and C37.238-2017 Power Utility • IEEE 1588v2 PTP Encapsulations – Ethernet – UDP/IPv4 – UDP/IPv6 • PTP Profile Interworking • ITU-T G.8273.2 Class D performance* • Integrated GNSS receiver – ITU-T G.8272 PRTC-B dual-band GNSS receiver • RFC 5905 Network Time Protocol (NTP) • Pulse-per-second (1PPS) output port		
Indicators	• Management, power supply status LEDs • CP (control plane) act • System (Stat), alarm LED • GNSS stats LED • Per MDA stat LED • Per port link and activity status LEDs	• Management, power supply status LEDs • System (Stat), fan status LED • GNSS stats LED • Per port link and activity status LEDs	
RAM	32 GB	32 GB	16 GB
Memory buffer size	Up to 2 GB		

* Contact Nokia for implementation details. Performance class test completion on the SAR-10x is outstanding.

Table 1. Nokia 7705 SAR 10x, SAR-Mx and SAR-Hx specifications (continued)

Feature	7705 SAR-10x	7705 SAR-Mx	7705 SAR-Hx
Hardware redundancy	Control, switch fabric, power supply (2+2), cooling fans (on the optional fan module)	Power supplies, cooling fans	Power supplies
Dimensions	• Height: 17.78 cm (7 in); 4 RU • Width: 44.45 cm (17.5 in) • Depth: 24 cm (9.44 in) • Fits in standard 19-in rack	• Height: 4.3 cm (1.7 in); 1 RU • Width: 44.45 cm (17.5 in) • Depth: 24.0 cm (9.44 in) • Fits in standard 19-in rack	• Height: 4.3 cm (1.7 in); 1 RU • Width: 44.45 cm (17.5 in) • Depth: 26.5 cm (10.43 in) • Fits in standard 19-in rack
Power supply options	Four feeds: Modular AC/HVDC and/or DC power supplies	Two feeds: Modular AC/HVDC and/or DC power supplies	
Power requirements	• High voltage DC/AC input: 88 VDC to 300 VDC; 90 VAC to 264 VAC, • Low voltage DC input (rated): -48 V / -60V dc		
PCB enhanced plating (PEP)	Supported on the system with conformal coating on the power supply		
Cooling	• Passively cooled, optional fan module can be mounted on top of the chassis • bottom-to-side or bottom-to-back airflow	• Internal non-replaceable fans • replaceable Fan filter • Side-to-side airflow	Passively cooled
Normal operating temperature range*	-40C to +55C (–40°F to +131°F) -40C to +65C (–40°F to +149°F); with fan module	-40°C to +65°C (-40°F to +149°F)	
Shipping and storage temperature range	-40°C to +70°C (-40°F to +158°F)		
Normal humidity	5% to 95%, non-condensing		

Table 2. Nokia 7705 SAR 10x, SAR-Mx and SAR-Hx MDAs

Card name	Details
M4-RS232-RJ45+4-C3794-SFP	4-port RS232 + 4-port C37.94 SFP MDA • Serial and teleprotection • 4 ports RS232/RS485 (async) • 4 ports C37.94 SFP LC single-mode or multi-mode
M2-1G-SFP+2-10G-SFP+	2-port 1G SFP + 2-port 10/1G SFP+ MDA All ports are MACsec-capable
M8-1G-SFP	8-port 1G SFP MDA • All ports are MACsec-capable
M8-1G-RJ45	8-port 1G RJ45 MDA • All ports are MACsec-capable
M8-T1E1-RJ48	8-port T1/E1 RJ48 MDA • Supports T0/E0 channelization
M1-25G-SFP28	1-port 25/10/1G SFP28 MDA • Supported on the 7705 SAR-10x only • All ports are MACsec-capable
M8-C3794-SFP	8-port C37.94 SFP MDA • Teleprotection
M2-1G-SFP+2-25G-SFP28	2-port 1G SFP + 2-port 25/10/1G SFP28 MDA • All ports are MACsec-capable • The SFP28 connectors only support 25/10/1G operation on the 7705 SAR-10x • The SFP28 connectors are only capable of 10/1G operation on the 7705 SAR-Hx/Mx

* Refer to the Installation Guide on minimum airflow and traffic throughput restrictions with respect to these operating temperatures for the SAR-10x and SAR-Hx

Software features

The 7705 SAR-10x, SAR-Mx, and SAR-Hx supports, but is not limited to, the following SR OS software features:[2]

Services

- Eth PW and VPLS with tLDP over MPLS/GRE
- Eth PW and VPLS with BGP over MPLS/GRE
- EVPN-VPWS (including MH'ing, All Act, single Act)
- EVPN-VPLS (including MH'ing, All Act, single Act)
- R-VPLS
- Pseudowire redundancy
- Dual-homed VPWS/VLL
- STP, RSTP, MSTP
- IGMP/MLD snooping in VPLS services
- GRE termination on Interface IP Address
- Null, dot1q, and QinQ SAPs
- VPLS FDB management
  - Per Service, per SAP
  - MAC learning toggle
  - MAC limit
  - MAC discard-unknown destination
  - MAC protect
- Internet access (IES services)
- RFC 4364 IPv4 VPNs over MPLS / GRE
- RFC 4659 IPv6 VPNs over MPLS / GRE
- IPv6 Provider Edge (6PE)
- IP VPN inter-AS option B
- GRT lookup and VPRN-to-GRT route leaking
- VPRN and IES spoke-SDP IP interface
- DHCP client on VPRN SAP interfaces
- Asymmetric Delay Compensation
- Active Multipath Protection
- VLAN translation on L2 Services (including TLDP-based, BGP-based, and EVPNs)
- TDM PW with CESoPSN
- IP Transport for raw sockets
- L2CP tunneling

Tunnels

- LDP for IPv4 FECs
- LDP LFA, rLFA
- IPv4 SR-ISIS
- IPv4 SR-OSPF
- LFA, rLFA, ti-LFA for Segment Routing
- RSVP-TE LSPs with Fast Reroute (FRR) protection
- MPLS RSVP FRR
- LDP-over-RSVP
- IPv4 SR-TE LSPs
- IPv4 SR Policy
  - BGP signalled and static
- PHP for implicit-null or explicit-null
- Implicit-null label
- RSVP-TE LSP and LDP FEC
- BGP label-unicast IPv4 (BGP RFC 3107)
- IPv6 Provider Edge (6PE)
- BGP shortcuts to IPv4 indirect next-hop
- IGP Shortcuts
- LSP redundancy
  - primary, standby and secondary LSPs
- ECMP for MPLS
- LFA, Remote LFA, and TI-LFA
- Local CSPF for RSVP-TE and SR-TE LSPs
- Binding SID for RSVP-TE and SR-TE LSPs
- Advertising Link Delay to the IGP LSDB for RSVP-TE and SR-TE
- IS-IS SR-MPLS MT2
- µloop avoidance
- IGP delay normalization

2 This section provides an overview of key features supported. Consult Nokia documentation for detailed feature support, interdependencies, exclusions and exceptions.

Network synchronization

- ITU-T Synchronous Ethernet (SyncE)
  - ITU-T G.8262.1 (eEEC)
- IEEE1588v2 PTP for accurate time and frequency:
  - Grandmaster clock, boundary clock, slave clock
  - Ethernet/IP encap
  - Unicast/multicast addressing
  - Profile interworking
  - PTP monitoring
- IEEE 1588v2 PTP Profiles
  - ITU-T G.8275.1 FTS
  - ITU-T G.8275.2 PTS/APTS
  - ITU-T G.8265.1
  - IEC/IEEE 61850-9-3
  - IEEE C37.238-2017
  - IEEE1588 Default
- Ethernet Synchronization Message Channel (ESMC)/Synchronization Status Message (SSM) support
- Integrated dual-band Global Navigation Satellite Systems (GNSS)
- Global Positioning System (GPS) and Galileo
- PRC/PRS and PRTC-B performance for frequency and time
- Differential Clock Recovery for T1/E1

Quality of service (QoS)

- Up to 8 forwarding classes
- Ingress classification based on 802.1p, DSCP, MPLS TC (EXP), IP criteria-based
- Ingress hierarchical policing
  - Multi-tier
  - Flexible mapping to arbiters
- Egress marking of 802.1p, DSCP, or MPLS EXP
- Egress queuing and scheduling based on PIR and MBS
- Egress H-QoS with queue parenting to port scheduler and multi-tier aggregate scheduler
- Flexible mapping of queues to schedulers
- Strict priority and Weighted round robin (WRR) schedulers
- Eth-Bandwidth Notification (BN) driven egress-rate adjustment

Filters

- Ingress IPv4 and IPv6 filters
- Egress IPv4 and IPv6 filters
- IP filter override for R-VPLS services
- All common L3/L4 match criteria
- Ingress PBR actions
- Filter logging
- Filter Rate-Limit Action
- Management Access Filter
- dCPU policers including dynamic instantiation

IP security (IPsec)[3]

- IKEv1/v2 tunnels
- IKEv2 authentication methods
- Remote-access address assignment
- DES/3DES/AES encryption
- MD5/SHA authentication
- Diffie-Hellman groups

Network address translation 44[3]

- Source address and port translation
- NAT pools
- 1:1 NAT
- Traffic steering
- Port forwards
- Multiple NAT pools
- NAT mapping logs
- Interface IP-based NAT

3 Supported on the 7705 SAR-Mx and SAR-Hx only

Network Group Encryption

- SDP encryption
- VPRN encryption
- MP-BGP VPRN encryption
- L2 pseudo-wire template
- Service encryption over MPLS/GRE
- Router interface L3 encryption
- AES128/256
- SHA256/512

MACsec

- Multiple MKA sessions (CKN)
- MACSec[4]

IP routing

- Static routes
- OSPFv2/v3
- IS-IS
- RIP/RIPng
- BGP4 and MP-BGP
- Edge PIC
- ARP/ND
- ICMP/ICMPv6
- ECMP
- Weighted ECMP
- BGP routes over RSVP-TE
- VRRP
- IGMP v1/v2/v3
- MLDv1/v2
- PIM

Platform

- Local and remote mirroring
- NTP
- LAG
- LACP
- MC-LAG
- IEEE 802.1Q VLANs
- QinQ
- Jumbo frames
- Interface statistics
- Network port
- Hybrid port
- Access port

High availability[5]

- Non-stop routing (NSR)

OAM

- IEEE 802.1ab LLDP
- TWAMP/STAMP reflector
- TWAMP-light/STAMP launch and reflector
- OAM tools - lsp-ping/trace, sdp-ping/sdp-mtu, sdp-keepalive, icmp-ping/traceroute
- IEEE 802.1ag/Y.1731 ETH-CFM FM and PM functions:
  - Down MEPs, up MEPs
  - CCM
  - Link trace, Loopback
  - AIS and ETH-TST on down MEPs
  - ITU-T Y.1731 ETH-SLM
  - ITU-T Y.1731 ETH-DM
- ITU-T Y.1731 ETH-BN
- IEEE 802.3ah EFM-OAM
- Link Loss Forwarding
- Down-when-looped
- LSP BFD
- Single-hop BFD
- Multi-hop BFD
- BFD with 10ms timers, single-hop, multi-hop

4 On encryption capable ports and MDAs
5 Supported on the 7705 SAR-10x only

System management

- Simple Network Management Protocol (SNMP)
- Model-driven (MD) management interfaces[6]
  - NETCONF
  - MD CLI
  - Remote Procedure Call (gRPC)
- Model-driven (MD) management interfaces
- Comprehensive management with Nokia NSP

Standards compliance[7]

Environmental specifications

- ATIS-0600015.03
- ATT-TP-76200
- 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 300 753 Acoustic Noise Class 3.2
- GR-63-CORE
- GR-3108-CORE
- VZ-TPR-9205
- VZ.TPR.9203 (CO)

Safety

- AS/NZS 62368.1
- IEC/EN 60825-1
- IEC/EN 60825-2
- IEC/EN/UL/CSA 62368-1
- IEC 60529 IP20

Electromagnetic compatibility

- AS/NZS CISPR 32 Class A
- ATIS-0600315
- BSMI CNS15936 Class A
- BT GS-7
- EN 300 386
- EN 301 489-1
- EN 301 489-19 (GNSS)
- EN 55032 Class A
- EN 55035
- ES 201 468
- ETSI EN 300 132-1 (AC)
- ETSI EN 300 132-2 (DC)
- FCC Part 15 Class A
- GR-1089-CORE
- ICES-003 Class A
- IEC 61000-3-2
- IEC 61000-3-3
- IEC 61000-6-2
- IEC 61000-6-4
- IEC CISPR 35
- IEC CISPR 32 Class A
- IEC/EN 61000-4-2 ESD
- IEC/EN 61000-4-3 Radiated Immunity
- IEC/EN 61000-4-4 EFT
- IEC/EN 61000-4-5 Surge
- IEC/EN 61000-4-6 Conducted Immunity
- IEC 61000-4-8 Power frequency magnetic field immunity
- IEC 61000-4-9 Pulse magnetic field immunity
- IEC 61000-4-10 Damped oscillatory magnetic field immunity
- IEC/EN 61000-4-11 Voltage Interruptions
- IEC 61000-4-12 Ring wave immunity test
- IEC 61000-4-16 Immunity to conducted, common mode disturbances
- IEC 61000-4-17 Ripple on d.c. input power port immunity
- IEC 61000-4-18 Damped oscillatory wave immunity

6 Excludes TDM ports and CES services
7 System design intent is according to the listed standards. Refer to product documentation for detailed compliance status..

- IEC 61000-4-29 Voltage dips, variations on d.c. input
- KCC Korea-Emissions & Immunity (KS C9832/KS C9835)
- VCCI CISPR32 Class A
- ITU-T K.20

Radio

- EN 303 413 (GNSS)

Power utility substations

- IEEE 1613 -2023[8]
- IEC 61000-6-5
- IEC 61850-3 (normal environmental conditions)
- IEC/AS 60870.2.1

Railway

- EN 50121-4
- IEC 62236-4
- AREMA (Class C, D, E)

Telecom

- IC CS-03 Issue 9 (T1 – Canada)
- ACTA TIA-968-B (T1 – USA)
- AS/ACIF S016 (E1- Australia)
- ITU-T G.703 (E1)
- ITU-T V.24 (RS-232)

Directives, regional approvals and certifications

- Directive 2011/65/EU RoHS (including Commission Delegated Directive (EU) 2015/863)
- DIRECTIVE 2012/19/EU Waste Electrical and Electronic Equipment (WEEE)
- DIRECTIVE 2014/30/EU Electromagnetic Compatibility (EMC)
- DIRECTIVE 2014/35/EU Low Voltage Directive (LVD)
- DIRECTIVE 2014/53/EU Radio Equipment Directive (RED)
- NEBS Level 3
- BSMI Mark - Taiwan
- CE Mark - Common Europe
- CRoHS - China RoHS
- KC Mark - South Korea
- RCM Mark - Australia
- VCCI Mark – Japan
- UKCA Mark – United Kingdom

8 7705 SAR-Mx is a forced air system, uses fans



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, which is celebrating 100 years of innovation.

With truly open architectures that seamlessly integrate into any ecosystem, our high-performance networks create new opportunities for monetization and scale. 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.

© 2026 Nokia

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

Document code: (November) CID214951