

Nokia 7250 IXR-e series Interconnect Routers

Release 21

Routers in the Nokia 7250 Interconnect Router (IXR)-e series¹ are used for access and aggregation and as 5G multi-access edge computing (MEC) leaf nodes. They are ideal for IP anyhaul and fixed-mobile convergence.

Ready for growth

The 7250 IXR-e series features high system throughput and a variety of interfaces. 100GE ports used for high-speed uplinks enable cost-effective 100GE ring architectures.

5G mobile and telco cloud infrastructures are moving toward 25GE interfaces. On the 7250 IXR-e series, the native 25GE ports are capable of supporting 1GE,² 10GE or 25GE transceivers. Combined with support for GE SFPs in all SFP+ cages, the 7250 IXR-e allows for seamless migrations from 1GE to 10GE to 25GE rates without the need to replace the router.

Compact and power saving

The 7250 IXR-e's compact (1RU) size and extended temperature range make it ideal for outside cabinet applications. It is ETSI 300-mm compliant, with all-up-front access and side-to-side air flow. A fan filter and redundant fans increase system lifetime and reduce maintenance costs.

7250 IXR-e systems consume approximately 20-25 percent less power than equivalent competing systems. Mass deployments for 5G will benefit significantly from this green design.



7250 IXR-e 2QSFP28 8SFP28 24SFP+



7250 IXR-e 14SFP+ 4RJ45



7250 IXR-ec 6SFP+ 20SFP 4RJ45

Differentiated service support

The 7250 IXR-e series supports low-latency applications while providing a large buffer memory for delay-tolerant applications. Very granular per-service and per-forwarding class policing and queuing features support differentiated quality of service (QoS), making the 7250 IXR-e series ideal for any-G aggregation and fixed-mobile network convergence.

¹ The 7250 IXR-e series is part of the 7250 IXR product family. Additional data sheets are available for other models in the product family.

² Future software deliverable

Automation

To simplify and automate network operations, the 7250 IXR-e series enables model-driven network management features through the Nokia Service Router Operating System (SR OS) and is managed by the Nokia Network Services Platform (NSP), which offers a rich set of service management features that automate end-to-end service provisioning and operations, administration and maintenance (OAM) to enhance end-user experience and reduce operating costs.

Standards-based software-defined networking (SDN) interfaces enable best-path computation to be offloaded to path computation elements (PCEs) such as the Nokia NSP. 7250 IXR-e-series routers operating as path computation clients (PCCs) collect and report per-link and per-service delay, jitter and loss metrics together with port utilization levels, for efficient path computation.

Software features

The 7250 IXR-e series supports, but is not limited to, the following features.

Services

- Point-to-point Ethernet pseudowires/virtual leased line (VLL)
- Ethernet Virtual Private Network (EVPN)
 - Virtual Private Wire Service (EVPN-VPWS)
 - Virtual Private LAN Services (EVPN-VPLS): IPv4 and IPv6 support, including Virtual Router Redundancy Protocol (VRRP)
 - Multihoming with single active or active/active modes
- Multipoint Ethernet VPN services with VPLS based on Targeted Label Distribution Protocol (T-LDP) and Border Gateway Protocol (BGP)
- Routed VPLS with Internet Enhances Services (IES)/IP-VPN IPv4 and IPv6
- Ingress and egress VLAN manipulation for L2 services
- IP VPN Virtual Private Routed Network (VPRN), Inter-Autonomous System (Inter-AS) Option A, B, and C
- IPv6 VPN Provider Edge (6VPE)

Network protocols

- Segment routing
 - Intermediate System-to-Intermediate System (SR-ISIS) and Open Shortest Path First (SR-OSPF)
 - Traffic engineering (SR-TE) IPv4, IPv6
- MPLS label edge router (LER) and label switching router (LSR) functions
 - LDP
 - Resource Reservation Protocol with traffic engineering (RSVP-TE)
- BGP Labeled Unicast (LU) (RFC 3107) route tunnels
- IP routing
 - Dual-stack Interior Gateway Protocol (IGP)
 - Multi-topology, multi-instance IS-IS
 - Multi-instance OSPF
 - Multiprotocol BGP (MP-BGP)
 - BGP-LU support in edge, area border router (ABR) and autonomous system boundary router (ASBR) roles
 - Usage-triggered download of BGP label routes to Label - Forwarding Information Base (L-FIB)
 - Accumulated IGP (AIGP) metric for BGP
 - BGP monitoring protocol (BMP)
 - BGP route-reflector for EVPN and IP-VPN with VPNv4 and VPNv6 address families (AFs)
 - BGP confederations
 - IGP and BGP shortcuts
- Layer 3 Multicast - base routing
 - Internet Group Management Protocol (IGMP)
 - Protocol Independent Multicast – Sparse Mode (PIM-SM), Source Specific Multicast (SSM)
 - Multicast Listener Discovery (MLD)
- Layer 3 Multicast - VPRN
 - Next-generation multicast VPNs (NG-MVPN)
 - SSM with multicast LDPv4 (mLDPv4)
 - IGMP/MLD
 - IGMP/MLD on Routed VPLS Interface
- Layer 2 Multicast
 - IGMP/MLD snooping

SDN

- SR-TE LSPs, RSVP-TE LSPs
 - PCC initialized, PCC controlled
 - PCC initialized, PCE computed
 - PCC initialized, PCE controlled
- SR-TE LSPs: PCE initialized, PCE controlled
- Topology discovery: BGP-Link State (BGP-LS) IPv4 and IPv6
- Telemetry: streaming interface statistics, service delay and jitter metrics
- Netflow/cflowd

Load balancing and resiliency

- Segment routing topology independent loop-free alternate (TI-LFA) and remote loop-free alternate (rLFA)
- LDP LFA and rLFA
- IEEE 802.3.ad Link Aggregation Group (LAG) and multi-chassis (MC) LAG
- Pseudowire and LSP redundancy
- IP and MPLS load balancing by equal-cost multipath (ECMP)
- Weighted LAG hash
- VRRP
- Ethernet Ring Protection Switching ITU-T G.8032v2
- Configurable polynomial and hash seed shift
- Entropy label (RFC 6790)
- RSVP-TE Fast Reroute (FRR)
- BGP Edge and Core Prefix Independent Convergence (BGP PIC)

Platform

- Ethernet IEEE 802.1Q (VLAN) and 802.1ad (QinQ) with 9K jumbo frames
- Detailed forwarded and discarded counters for service access points (SAPs) and network interfaces in addition to port-based statistics: per Virtual Output Queue (VoQ) packet and byte counters

- High-scale, per-policer, detailed counters on a per-state basis
- VLAN range-based SAPs
- Dynamic Host Configuration Protocol (DHCP server for IPv4 IES, VPNv4)
- DHCP relay, IPv4 and IPv6, IES, IP-VPN, EVPN-VPLS
- Accounting records

QoS and traffic management

- Hierarchical QoS (H-QoS)
 - Hierarchical egress schedulers and shapers per forwarding class, SAP, network interface, port or LAG
 - Port sub-rate
- Intelligent packet classification, including media access control (MAC), IPv4, IPv6 match-criteria-based classification
- Granular rate enforcement with up to 32 policers per SAP/VLAN, including broadcast, unicast, multicast and unknown policers
- Hierarchical policing for aggregate rate enforcement
- Strict priority, weighted fair queuing schedulers
- Congestion management via weighted random early discard (WRED)
- Egress marking or re-marking

System management

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

Operations, administration and maintenance

- IEEE 802.1ag, ITU-T Y.1731: Ethernet Connectivity Fault Management (CFM) for both fault detection and performance monitoring, including delay, jitter and loss tests
- Ethernet bandwidth notification (ETH-BN) with egress rate adjustment
- IEEE 802.3ah: Ethernet in the First Mile (EFM)
- ITU-T Y.1564 Service Activation Test
- Bidirectional Forwarding Detection (BFD) IPv4, IPv6
- Micro-BFD - per member link
- Two-Way Active Measurement Protocol (TWAMP), TWAMP Light
- A full suite of MPLS OAM tools, including LSP and virtual circuit connectivity verification (VCCV) ping
- Service assurance agent
- Mirroring with slicing support
 - Port
 - VLAN
 - Filter output: MAC, IPv4/IPv6 filters
 - Local/remote

- Port and VLAN loopback with MAC-swap
- Configuration rollback
- Zero Touch Provisioning (ZTP) capable

Security

- Remote Authentication Dial-In User Service (RADIUS), Terminal Access Controller Access Control System Plus (TACACS+), and comprehensive control-plane protection capabilities
- MAC-, IPv4- and IPv6-based access control lists and criteria-based classifiers
- Secure Shell (SSH)
- MACsec (7250 IXR-e small)

Technical specifications

Optical breakout solution available on QSFP28/QSFP+ ports: 4 x 25GE and 4 x 10GE

Table 1. 7250 IXR-e series specifications

Feature	7250 IXR-e 2QSFP28 8SFP28 24SFP+ (2 variants)	7250 IXR-e 14SFP+ 4RJ45 (2 variants)	7250 IXR-ec 6SFP+ 20SFP 4RJ45
System throughput: Half duplex (HD) IMIX traffic	600 Gb/s	240 Gb/s	128 Gb/s
Service interfaces	<ul style="list-style-type: none"> • 2 x QSFP28/QSFP+ 100/40GE • 8 x SFP28/SFP+/SFP 25/10/1GE³ • 24 x SFP+/SFP 10/1GE 	<ul style="list-style-type: none"> • 14 x SFP+/SFP 10/1GE • 4 x RJ-45 100/1000 Mb/s 	<ul style="list-style-type: none"> • 6 x SFP+/SFP 10/1GE • 20 x SFP 1GE • 4 x RJ-45 100/1000 Mb/s
Control interfaces	Console, management, USB, 1PPS out, SD slot, reset button		Console, management, 1PPS out, SD slot, alarm inputs

Feature	7250 IXR-e 2QSFP28 8SFP28 24SFP+ (2 variants)	7250 IXR-e 14SFP+ 4RJ45 (2 variants)	7250 IXR-ec 6SFP+ 20SFP 4RJ45
Timing and synchronization	<ul style="list-style-type: none"> Includes Stratum 3E oscillator ITU-T Synchronous Ethernet (SyncE) <ul style="list-style-type: none"> ITU-T G.8262.1 (eEEEC) IEEE 1588v2 <ul style="list-style-type: none"> Boundary clock Slave clock (GNSS variant) Grandmaster clock (GNSS variant) Profile: ITU-T G.8275.1 Profile: ITU-T G.8275.2 with PTS and APTS (GNSS variant) Profile ITU-T G.8265.1 (GNSS variant) Profile IEEE 1588-2008 (GNSS variant) Ethernet encapsulation UDP/IP4 encapsulation (GNSS variant) ITU-T G.8273.2 Class C⁴ RFC 5905 Network Time Protocol (NTP) Pulse-per-second (1PPS) output timing Support for GNSS SFP Integrated GNSS receiver, GPS supported (GNSS variant) 		<ul style="list-style-type: none"> Includes Stratum 3E oscillator ITU-T Synchronous Ethernet (SyncE) <ul style="list-style-type: none"> ITU-T G.8262.1 (eEEEC) IEEE 1588v2 <ul style="list-style-type: none"> Boundary clock Profile: ITU-T G.8275.1 Profile: ITU-T G.8265.1 Ethernet encapsulation UDP/IP4 encapsulation ITU-T G.8273.2 Class C⁴ RFC 5905 Network Time Protocol (NTP) Pulse-per-second (1PPS) output timing Support for GNSS SFP
Indicators	<ul style="list-style-type: none"> Management, power status (1 & 2) LEDs Per port link and activity status LEDs System (Stat), fan, remote management (LOC) status LEDs 		<ul style="list-style-type: none"> Power status (Batt A and Batt B) LEDs Per port link and activity status LEDs System (Stat), fan status LEDs
Memory buffer size	3 GB	1 GB	1 GB
Hardware redundancy	Power supplies, cooling fans N+1		
Dimensions	<ul style="list-style-type: none"> Height: 1RU, 4.5 cm (1.75 in) Depth: 25.4 cm (10.0 in) Width: 43.8 cm (17.25 in) Rack-mountable in a 48.2-cm rack, 30-cm depth (standard 19-in equipment rack, 12-in depth) ETSI 300-mm compliant 		<ul style="list-style-type: none"> Height: 1RU, 4.5 cm (1.75 in) Depth: 23.5 cm (9.3 in) Width: 43.8 cm (17.25 in) Rack-mountable in a 48.2-cm rack, 30-cm depth (standard 19-in equipment rack, 12-in depth) ETSI 300-mm compliant
Power supply options	<ul style="list-style-type: none"> Two feeds: Modular AC and DC power supplies Supports concurrent use of AC and DC power supplies 		Dual DC power inputs (Batt A/B)
Power requirements	<ul style="list-style-type: none"> AC input (rated): 100 V to 240 V, 50 Hz to 60 Hz DC input (rated): 24 V DC/-48 V DC 		DC input (rated): -48 V to -60V
Conformal coating	All variants of 7250 IXR-e		
Cooling	<ul style="list-style-type: none"> Internal non-replaceable fans Replaceable filter Right-to-left airflow 		
Normal operating temperature range	-40°C to +65°C (-40°F to +149°F) sustained		
Shipping and storage temperature	-40°C to +70°C (-40°F to +158°F)		
Normal humidity	5% to 95%, non-condensing		

3 GE on SFP28 ports is a future software deliverable

4 For noise generation. Please contact Nokia for implementation details.

Standards compliance⁵

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, 3.3
- ETSI EN 300 753 Acoustic Noise Class 3.2
- GR-63-CORE
- GR-3108-CORE
- VZ.TPR.9203 (CO)
- VZ-TPR-9205

Safety

- AS/NZS 60950.1/62368.1
- IEC/EN 60825-1
- IEC/EN 60825-2
- IEC/EN/UL/CSA 60950-1 Ed2
- IEC/EN/UL/CSA 62368-1 Ed2

Electromagnetic compatibility

- AS/NZS CISPR 32 Class A
- BSMI CNS13438 Class A
- BT GS-7
- EN 55024
- EN 55032 Class A
- EN 55035
- ETSI EN 300 132-2
- ETSI EN 300 132-3
- ETSI EN 300 386
- ETSI ES 201 468
- FCC Part 15 Class A

- FTZ 1 TR9 (Deutsche Telekom)
- GR-1089-CORE
- ICES-003 Class A
- IEC CISPR 24
- IEC CISPR 35⁷
- IEC CISPR 32 Class A
- IEC/EN 61000-3-2, 3-3
- IEC/EN 61000-6-2, 6-4
- 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/EN 61000-4-11 Voltage Interruptions
- ITU-T K.20
- KCC Korea-Emissions & Immunity (in accordance KN32/KN35)
- VCCI Class A

Power utility substations⁶

- IEC 61000-6-5⁷
- IEC 61850-3⁷
- IEEE 1613 / 1613.1⁷

Railway⁶

- EN 50121-4⁷
- IEC 62236-4⁷

Directives, regional approvals and certifications

- DIRECTIVE 2011/65/EU Restriction of the use of certain Hazardous Substances in Electrical and Electronic Equipment (Recast) Directive (RoHS2)
- DIRECTIVE 2012/19/EU Waste Electrical and Electronic Equipment (WEEE)
- DIRECTIVE 2014/30/EU Electromagnetic Compatibility (EMC)

⁵ System design intent is according to the listed standards. Certifications vary on different models. Refer to product documentation for detailed compliance status.

⁶ Applicable to specific models

⁷ Certification pending



- DIRECTIVE 2014/35/EU Low Voltage Directive (LVD)
- MEF CE 3.0 certified
- NEBS Level 3
 - Australia: RCM Mark
 - China RoHS: CRoHS
 - Europe: CE Mark
 - Japan: VCCI Mark
 - South Korea: KC Mark

Other certifications

- MEF CE 3.0 certified

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Adhering to the highest standards of integrity and security, we help build the capabilities needed for a more productive, sustainable and inclusive world.

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