Nokia 7220 IXR-H series Interconnect Routers

Release 26

The Nokia 7220 IXR-H series platforms are designed for the leaf and spine layers of data center fabrics, delivering up to 102.4 Tb/s full duplex (FD) capacity and up to 1.6TE interfaces, providing high-scale interconnectivity for AI and cloud providers, telecommunication providers, and mission-critical enterprise environments.

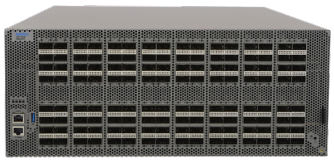
Overview

AI, high-performance computing (HPC), cloud and other data-intensive workloads are transforming data center networks, driving demand for greater speed, scalability, efficiency and automation. Network operators need reliable, high-capacity switching platforms with high-speed interfaces to support today's requirements and scale for future network growth.

The Nokia 7220 IXR-H series provides powerful platforms to create of high-capacity, lossless, low-latency hyperscale networks for AI and machine-learning clusters and workloads. It is well suited for spine- and leaf- deployments in back-end and front-end networks of CLOS data center architectures.

The 7220 IXR-H series is available in eight variants, each distinguished by its optical interfaces and system-throughput capabilities. Powered by Nokia Service Router (SR) Linux, it delivers a comprehensive set of advanced features that support scalable multi-tenant solutions in data centers.

Scaling from 12.8 Tb/s full duplex (FD) to 102.4 Tb/s FD, the 7220 IXR-H series provides high density 1.6TE, 800GE, 400GE, 200GE, 100GE, 50GE, 40GE and 10GE interfaces. It supports a wide range of optics — including 1.6T OSFP, 800G OSFP, 800G QSFP-DD, 400G QSFP-DD, 100G QSFP28, 25G SFP28 and 10G SFP+ —with flexible optical breakouts for intra-fabric and workload connectivity.



7220 IXR-H2



7220 IXR-H5-64D



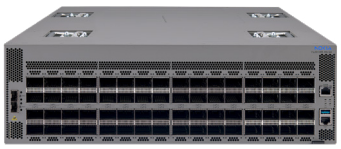
7220 IXR-H3



7220 IXR-H5-64O



7220 IXR-H4-32D



7220 IXR-H6-64



7220 IXR-H4



7220 IXR-H5-32D

The 7220 IXR-H series is available in seven variants, each distinguished by its optical interfaces and system-throughput capabilities. Powered by Nokia Service Router (SR) Linux, it delivers a comprehensive set of advanced features that support scalable multi-tenant solutions in data centers.

Supported platforms

7220 IXR-H2

The 7220 IXR-H2 is 4 RU high with a system capacity of 12.8 Tb/s full duplex (FD). It is equipped with 128 x 100G QSFP28 ports. All QSFP28 connectors include hardware support for native 100GE interfaces, enabling high-performance intra-fabric uplinks, storage and server connectivity.

The 7220 IXR-H2 supports four power supplies with 2+2 redundancy using either AC or DC power options. It supports both front-to-back and back-to-front airflow configuration with eight N+1 hot-swappable fans.

7220 IXR-H3

The 7220 IXR-H3 is 1 RU high with a system capacity of 12.8 Tb/s FD. It is equipped with 32 x 400G QSFP-DD connectors supporting 4 x 100G, 2 x 200G, 2 x 100G, 4 x 25G and 4 x 10G optical breakouts, along with 2 x 1/10G SFP+ ports.

All QSFP-DD connectors include hardware support for native 400GE, 200GE, 100GE, 50GE and 40GE interfaces, enabling exceptional flexibility in a variety of leaf or spine deployment configurations. The SFP+ ports include hardware support for native 10GE interfaces.

The 7220 IXR-H3 supports two power supplies with 1+1 redundancy using either AC or DC power options.

The system supports both front-to-back and back-to-front airflow configuration with six N+1 hot-swappable fans.

7220 IXR-H4-32D

The 7220 IXR-H4-32D is 1 RU high with a system capacity of 12.8 Tb/s FD. It is equipped with 32 x 400G QSFP-DD connectors supporting 4 x 100G, 2 x 200G, 2 x 100G, 4 x 25G and 4 x 10G optical breakouts, along with 1 x 1/10G SFP+ port.

All QSFP-DD connectors include hardware support for native 400GE, 200GE, 100GE, 50GE and 40GE interfaces, enabling high-performance intra-fabric uplinks, storage and server connectivity. The SFP+ port includes hardware support for native 10GE interfaces.

The 7220 IXR-H4-32D supports two power supplies with 1+1 redundancy using either AC or DC power options. The system supports back-to-front airflow configuration with seven N+1 hot swappable fans.

7220 IXR-H4

The 7220 IXR-H4 is 2 RU high with a system capacity of 25.6 Tb/s FD. It is equipped with 64 x 400G QSFP-DD ports supporting 4 x 100G, 2 x 200G, 2 x 100G, 4 x 25G and 4 x 10G optical breakouts, along with 2 x 1/10G SFP+ ports.

All QSFP-DD connectors include hardware support for native 400GE, 200GE, 100GE, 50GE and 40GE interfaces, enabling high-performance intra-fabric uplinks, storage and server connectivity. The SFP+ ports include hardware support for native 10GE interfaces.

The 7220 IXR-H4 supports two power supplies with 1+1 redundancy using either AC or DC power options. The system supports front-to-back airflow configuration with four N+1 hot swappable fans.

7220 IXR-H5-32D

The 7220 IXR-H5-32D is 1 RU high with a system capacity of 25.6 Tb/s FD. It is equipped with 32 x 800G QSFP-DD connectors supporting 8 x 100G, 2 x 400G, 4 x 100G, 4 x 200G, 2 x 100G and 2 x 50G optical breakouts, along with 2 x 10G SFP+ ports.

All QSFP-DD connectors include hardware support for native 800GE, 400GE, 200GE, 100GE, and 50GE interfaces, enabling high-performance intra-fabric uplinks, storage and server connectivity. The SFP+ ports include hardware support for native 10GE interfaces.

The 7220 IXR-H5-32D supports two power supplies with 1+1 redundancy using either AC or DC power options. The system supports front-to-back airflow configuration with seven N+1 hot swappable fans.

The 7220 IXR-H5-32D supports Linear pluggable optics (LPO) which enable lower power consumption compared to traditional optical modules. This is critical for AI and HPC use cases where low power consumption is critical.

7220 IXR-H5-64D and 7220 IXR-H5-64O

The 7220 IXR-H5-64D and 7220 IXR-H5-64O are 2RU high with a system capacity of 51.2 Tb/s FD. They are equipped with 64 x 800G QSFP-DD or 800G OSFP112 connectors supporting 8 x 100G, 2 x 400G, 4 x 100G, 4 x 200G, 2 x 100G and 2 x 50G optical breakouts, along with 2 x 10G SFP+ ports. The 7220 IXR-H5-64O is available in two variants, one supporting 320 logical ports and the other supporting 512 logical ports.

All QSFP-DD connectors include hardware support for native 800GE, 400GE, 200GE, and 50GE interfaces, enabling high-performance intra-fabric uplinks, storage and server connectivity. The SFP+ ports include hardware support for native 10GE interfaces.

The 7220 IXR-H5-64D and 7220 IXR-H5-64O support two power supplies with 1+1 redundancy using either AC or DC power options. Both systems support a front-to-back airflow configuration with four N+1 hot-swappable fans.

The 7220 IXR-H5-64D and 7220 IXR-H5-64O support LPO, which enable lower power consumption compared to traditional optical modules. This is critical for AI and HPC use cases where low power consumption is critical.

7220 IXR-H6-64

The 7220 IXR-H6-64 is a 3RU high with a system capacity of 102.4 Tb/s FD. It is equipped with 64 x 1.6T OSFP224 connectors supporting 2 x 800G, 4 x 400G, 8 x 200G, 8 x 100G, 2 x 400G, 4 x 100G, 4 x 200G and 2 x 200G optical breakouts, along with 2 x 25G SFP28 ports. All OSFP connectors include hardware support for native 1.6TE, 800GE, 400GE, 200GE and 100GE. The SFP28 ports include hardware support for native 25GE and 10GE interfaces. The 7220 IXR-H6-64 is air-cooled from front-to-back and supports redundant AC and DC power supplies with eight N+1 redundant fans.

Nokia Service Router Linux

Nokia SR Linux is a Linux®-based open, extensible and resilient NOS that enables scalability, flexibility and efficiency in data center and cloud environments. The Nokia 7220 IXR-H series implements Nokia SR Linux.

SR Linux is a key component of the Nokia Data Center Fabric solution, which also includes the Nokia Event-Driven Automation (EDA) and the Nokia Data Center platforms.

Ground-up, model-driven architecture delivers extensibility

In cloud-scale data center networks, the primary challenges are scalability and ease of operations. SR Linux is designed from the ground up with a management architecture that meets the demands of a model-driven world where visibility—and the scalability and granularity of that visibility—are paramount.

SR Linux features a completely model-driven architecture for flexible and simplified management and operations. SR Linux delivers an extensible and open infrastructure that allows applications to define and declare their own schemas, enabling the retrieval of fine-grained system state and setting of configuration.

Modular, state-sharing architecture

SR Linux uses an unmodified Linux kernel as the foundation on which applications share state via a publish/subscribe (pub/sub) architecture. The Nokia pub/sub architecture is implemented using generalized Remote Procedure Call (gRPC), protocol buffers (protobufs) and the Nokia Impart Database (IDB).

The Nokia IDB is a lightweight database that is optimized to handle high volumes of messages while protecting against any one application slowing down the whole system.

Field-proven protocol stacks

SR Linux leverages field-proven protocol stacks from the Nokia Service Router Operating System (SR OS), which has a strong pedigree in IP routing.

Enterprise, service provider and webscale data centers are increasingly adopting leaf-spine fabric designs using enhanced IP routing with Multiprotocol-Border Gateway Protocol (MP-BGP), EVPN, Virtual Extensible LAN (VXLAN), MPLS and segment routing protocols. By using field-proven protocol stacks, data center planning and operations teams can immediately benefit from the stability, scalability and interoperability of a resilient NOS.

Scalable streaming telemetry

SR Linux was built with an open, scalable telemetry framework at its core, internally using gRPC, gRPC Network Management Interface (gNMI) and protobufs. Because SR Linux is natively model driven, it is immediately ready for streaming telemetry without requiring any translation layers.

Superior CLI programmability and integration of third-party applications

Operations teams can leverage command line interface (CLI) plugins to completely customize the way the CLI operates, plugging in Linux commands or pulling the state/configuration from various locations.

SR Linux allows third-party applications to be fully integrated into the system and given all the same benefits as Nokia applications. This includes consistent configuration via YANG, telemetry support, life-cycle management and visibility of system resources.

SR Linux offers a state-of-the-art NetOps Development Kit (NDK) for data center teams to develop new applications and operational tools in the language of their choice with deep programmatic access to, and control of, the entire system.

AI data center networking

The Nokia AI data center networking solution provides the reliability, simplicity and flexibility you need to build and deploy network infrastructures that can meet the requirements of current and future AI workloads.

Nokia is at the forefront of defining and testing the evolution of Ethernet for AI. Nokia is an active member of the Ultra Ethernet Consortium (UEC) which is bringing enhancements that make Ethernet the best choice for AI network infrastructures. Nokia's solution is AI-ready and UEC-compatible with support for Remote Direct Memory Access over Converged Ethernet (RoCEv2) and Data Center Quantized Congestion Notification (DCQCN). Nokia is also implementing key features within the latest UEC spec.

Nokia also follows and participates in Open Compute Project (OCP) which is driving various new standards for Ethernet. One notable specification is Multipath Reliable Connection (MRC) that builds upon the existing RoCEv2 Ethernet framework to enable scalable, high-performance AI/ML workloads over multipath best-effort networks by specifying architectural extensions for multipath load balancing, reliability, and congestion control.

Nokia Event-Driven Automation

The Nokia Event-Driven Automation (EDA) is a Kubernetes-native, declarative, intent-based automation platform that automates the entire data center fabric lifecycle—from Day 0 design through to Day 2+ operations.

Built on a cloud-native microservices architecture, the EDA continuously reconciles desired and observed state using real-time streaming telemetry to ensure the network operates as intended. It abstracts multivendor complexity, enables network-wide transactional changes with rollback, and embeds a real-time Digital Twin for safe validation before deployment.

The declarative, intent-based framework and the automation capabilities of the EDA framework are only made possible by leveraging a modern NOS that offers an open, model-driven, stream-anything foundation.

By using Nokia SR Linux modern streaming telemetry approach for the NOS, the EDA framework has timely and efficient access to more granular data across the entire fabric. This data can then be used to understand the state of the network, which is essential for event-driven applications to determine if the network is behaving according to their intent. This approach is also highly scalable, which is essential in today's networks.

Nokia EDA complements SR Linux, supporting advanced management and automation capability to help design, deploy and operate back-end and front-end networks for AI workloads.

Technical specifications

Table 1. 7220 IXR-H series specifications (part 1)

Feature	7220 IXR-H2	7220 IXR-H3	7220 IXR-H4-32D	7220 IXR-H4
System throughput: Full duplex (FD)	12.8 Tb/s	12.8 Tb/s	12.8 Tb/s	25.6 Tb/s
Connectors	• 128 x 100G QSFP28	• 32 x 400G QSFP-DD • 2 x 10G SFP+	• 32 x 400G QSFP-DD • 1 x 10G SFP+	• 64 x 400G QSFP-DD • 2 x 10G SFP+
Optical breakouts	—	4 x 100G, 2 x 200G, 2 x 100G, 4 x 25G, 4 x 10G	4 x 100G, 2 x 200G, 2 x 100G, 4 x 25G, 4 x 10G	4 x 100G, 2 x 200G, 2 x 100G, 4 x 25G, 4 x 10G
Hardware support (maximum ports per chassis)				
400GE	NA	32	32	64
200GE	NA	64	64	128
100GE	128	128	128	256
50GE*	128	128	128	256
40GE	128*	32	32	64
25GE	128*	128	128*	128*
10GE	128*	128	128*	256*
Management ports	1 x 1000BASE-T	1 x 1000BASE-T	1 x 1000BASE-T	1 x 1000BASE-T
USB ports	1 x USB2.0	1 x USB2.0	1 x USB2.0	1 x USB2.0
Console port	1 x RJ45	1 x RJ45	1 x RJ45	1 x RJ45
Processor	4-core x86	4-core x86	8-core x86	8-core x86
Memory	32G DDR4	32G DDR4	32G DDR4	32G DDR4
Memory buffer size	64 MB	64 MB	113.5 MB	113.5 MB
Storage	32G MLC	32G MLC	32G MLC	128G MLC
Power	2+2 redundant AC: 100V to 240V DC: -48V / -60V 1300 W AC 1300 W DC	1+1 redundant AC: 100V to 240V DC: -48V / -60V 1600 W AC 1600 W DC	1+1 redundant AC: 100V to 240V DC: -48V / -60V 1600 W AC 1600 W DC	1+1 redundant AC: 200V to 240V DC: -48V / -60V 2400 W AC 2100 W DC
Hot-swappable power supplies	Yes	Yes	Yes	Yes
Fan modules	8 (N+1) Front-to-back or back-to-front airflow	6 (N+1) Front-to-back or back-to-front airflow	7 (N+1) Front-to-back or back-to-front airflow	4 (N+1) Front-to-back airflow
Hot-swappable fan modules	Yes	Yes	Yes	Yes
Dimensions	Height: 17.4 cm (6.85 in); 4 RU Width: 43.85 cm (17.26 in) Depth: 55 cm (21.65 in) Fits in standard 19-in mounting rack	Height: 4.35 cm (1.75 in); 1 RU Width: 43.85 cm (17.26 in) Depth: 55 cm (21.65 in) Fits in standard 19-in mounting rack	Height: 4.35 cm (1.75 in); 1 RU Width: 43.85 cm (17.26 in) Depth: 55 cm (21.65 in) Fits in standard 19-in mounting rack	Height: 8.7 cm (3.43 in); 2 RU Width: 44 cm (17.32 in) Depth: 64.92 cm (25.56 in) Fits in standard 19-in mounting rack
Weight	24.6 kg (54.23 lb) (unpopulated) 29.84 kg (65.78 lb) (fully populated)	8.53 kg (18.80 lb) (unpopulated) 11.18 kg (24.64 lb) (fully populated)	9.3 kg (20.50 lb) (unpopulated) 12.5 kg (27.56 lb) (fully populated)	6.5 kg (36.37 lb) (unpopulated) 21.50 kg (47.39 lb) (fully populated)
Discrete Trusted Platform Module (TPM 2.0)	TPM 2.0			
Normal operating temperature range	0°C to +40°C (32°F to +104°F) sustained			
Shipping and storage temperature	-40°C to +70°C (-40°F to +158°F)			
Normal humidity	5% to 95%, non-condensing			

* Future software deliverable

Table 2. 7220 IXR-H series specifications (part 2)

Feature	7220 IXR-H5-32D	7220 IXR-H5-64D/64O	7220 IXR-H6-64
System throughput: Full duplex (FD)	25.6 Tb/s	51.2 Tb/s	102.4 Tb/s
Connectors	• 32 x 800G QSFP-DD • 2 x 10G SFP+	IXR-H5-64D: • 64 x 800G QSFP-DD • 2 x 10G SFP+ IXR-H5-64O (320 variant) and IXR-H5-64O (512 variant) • 64 x 800G OSFP112 • 2 x 10G SFP+	• 64 x 1.6T OSFP224 • 2 x 25G SFP28
Logical ports	160	IXR-H5-64D: 320 IXR-H5-64O: 320 or 512	512
Optical breakouts	8 x 100G, 2 x 400G, 4 x 100G, 4 x 200G, 2 x 100G, 2 x 50G	2 x 400G, 4 x 200G, 8 x 100G, 4 x 100G, 2 x 100G, 2 x 50G	2 x 800G, 4 x 400G, 2 x 400G, 8 x 200G, 4 x 200G, 2 x 200G, 8 x 100G, 4 x 100G, 2 x 50G
Hardware support (maximum ports per chassis)			
1.6TE	—	—	64
800GE	32	64	128
400GE	64	128	256
200GE	128	256	256
100GE	160	IXR-H5-64D: 320 IXR-H5-64O: 288 IXR-H5-64O (512): 512	256
50GE	64	128	128
25GE	—	—	2
10GE	2	2	—
Management ports	1 x 1000BASE-T	1 x 1000BASE-T	1 x 1G RJ45 OOB
USB ports	1 x USB3.0	1 x USB3.0	1 x USB 3.0 Type A
Console port	1 x RJ45	1 x RJ45	1 x RJ45
Processor	8-core x86 with dual boot SPI	8-core x86 with dual boot SPI	8-core, 16-thread x86 with dual boot SPI
Memory	32G DDR5	32G DDR5	64G DDR5
Memory buffer size	165.2 MB	165.2 MB	267 MB
SSD	32G iSLC	32G iSLC	32GB iSLC
Power	1+1 redundant AC: 200V to 240V DC: -48V / -60V 2400 W AC 2400 W DC	1+1 redundant AC: 200V to 240V DC: -48V / -60V 3000 W AC 3200 W DC	2+2 redundant AC: 200V to 240V DC: -48V / -60V 2700 W AC 3200 W DC
Hot-swappable power supplies	Yes	Yes	Yes
Fan modules	7 (N+1) Front-to-back	4 (N+1) Front-to-back	8 (N+1) Front-to-back
Hot-swappable fan modules	Yes	Yes	Yes
Dimensions	Height: 4.35 cm (1.75 in); 1RU Width: 43.85 cm (17.26 in) Depth: 65 cm (25.5 in) Fits in standard 19-in mounting rack	Height: 8.7 cm (3.43 in); 2RU Width: 43.85 cm (17.26 in) Depth: 63 cm (24.8 in) Fits in standard 19-in mounting rack	Height: 13.16 cm (5.18in); 3RU Width: 43.85 cm (17.26 in) Depth: 64.82 cm (25.52 in) Fits in standard 19-in mounting rack

Table 2. 7220 IXR-H series specifications (part 2) Continued

Feature	7220 IXR-H5-32D	7220 IXR-H5-64D/H5-64O	7220 IXR-H6-64
Weight	12.45 kg (27.44 lb) (unpopulated) 16.37 kg (36.09 lb) (fully populated)	H5-64D: 18.46 kg (40.7 lb) (unpopulated) 25 kg (55.11 lb) (fully populated) H5-64O: 19.84 kg (43.74 lb) (unpopulated) 25.2 kg (55.55 lb) (fully populated)	21.77 kg (48 lb) (Unpopulated) 29 kg (64 lb) (Populated)
Discrete Trusted Platform Module (TPM 2.0)	Yes		
Normal operating temperature range	0°C to +40°C (32°F to +104°F) sustained		
Shipping and storage temperature	-40°C to +70°C (-40°F to +158°F)		
Normal humidity	5% to 95%, non-condensing		

Software features

The 7220 IXR-H series supports, but is not limited to, the following SR Linux software features:[1]

Open Linux support

- Support for unmodified Linux kernel
- Access to Linux tools, patching and packaging
- Third party containers running on SR Linux
- Linux control groups (cgroupsv2)

Platform features

- Unified Forwarding Tables (UFT) profiles

Layer 2 features

- Dot1q and untagged sub-interfaces
- Ethernet IEEE 802.1Q (VLAN) with support for jumbo frames
- Link aggregation: Link Aggregation Group (LAG) and Link Aggregation Control Protocol (LACP)
- Link Layer Discovery Protocol (LLDP) on all interfaces
- Media access control (MAC) loop prevention
- MAC Virtual routing and forwarding (VRF): MAC-VRF
- MAC-VRF network instance with IRB interface[2]
- Internet Group Management Protocol (IGMP) snooping and Multicast Listener Discovery (MLD) snooping in Layer 2 broadcast domains

Layer 3 features

- IPv4/v6 routing
  - Static, aggregate routes for IPv4/v6
  - IP unnumbered interfaces
  - Dual-stack Interior Gateway Protocol (IGP)
  - Multi-topology IS-IS v4/v6
  - Open Shortest Path First (OSPFv2 and OSPFv3)
  - Multiprotocol BGP (MP-BGP)
- BGP with iBGP/eBGP: Support for IPv4/v6, including:
  - Core Prefix independent convergence
  - 4-byte autonomous system number
  - Route reflector
  - Dynamic BGP
  - BGP unnumbered
  - eBGP multi-hop
  - Add-paths for IPv4 and IPv6 routes

1 This section provides an overview of key features supported. Some platforms may have feature exclusions or exceptions. Consult Nokia documentation for detailed feature support and interdependencies.

2 Supported on 7220 IXR-H5 and IXR-H6 platforms

- Equal cost multi-path with consistent and resilient hashing and configurable hash fields
- IPv6 flow label hashing
- VRF: Multiple VRF support
- Maintenance modes
- Routing policy:
  - Structured rules for accepting, rejecting and modifying routes that are learned and advertised to routing peers.
  - Routes can be matched based on prefix lists, AS path regular expressions, BGP communities, Address Family Indicator/Subsequent Address Family Indicator (AFI/SAFI) protocol, etc.
  - Route leaking between network instances
- Layer 3/Layer 4 access control lists (ACLs) with validation; accept, reject and log actions
- BCM Dynamic Load Balancing (DLB) hashing option[3]

Network virtualization

- EVPN with VXLANv4 encapsulation
- EVPN Layer 2 and Layer 3 connectivity
- EVPN all-active multi-homing; single-active multi-homing for Layer 2 and Layer 3
- EVPN Anycast Multi-Homing (draft-rabnag-bess-evpn-anycast-aliasing)
- EVPN host route mobility
- Provider edge-to-customer edge (PE-CE) BGP path attribute propagation in EVPN
- EVPN IP aliasing
- Gateway-IP based load balancing for EVPN IP Prefix route

Segment routing

- SRv6 uSID-based source routing

QoS

- Intelligent packet classification, including IPv4, IPv6 match-criteria-based classification
- Queuing/scheduling:
  - Strict priority
  - Weighted Round Robin (WRR)
  - Weighted Random Early Detection (WRED)
  - Explicit Congestion Notification (ECN)
- QoS classification and marking based on DiffServ Code Point (DSCP)
- QoS classification and marking based on IEEE 802.1p
- Priority Flow Control (PFC)

Flow monitoring

- sFlow

Operations, Administration and Maintenance (OAM)

- Bi-directional forwarding detection (BFD), micro BFD (mBFD)
- Link Layer Discovery Protocols (LLDP)

System management and automation

- Native model-driven architecture, configuration candidates, exclusive mode, checkpoints, rollbacks
  - Support for SR Linux and OpenConfig[4] data models
- Management interfaces: gNMI, gRPC Routing Information Base Interface (gRIBI), NETCONF, JSON-RPC and CLI (transactional, Python CLI and CLI plugins)
- YANG modeled actions (CLI, NETCONF, gRPC and JSON-RPC)
- gRPC network operations interface (gNOI)
- gRPC Network Security Interface (gNSI)
- Global and per-user CLI environment configuration
- Local Authentication, Authorization and Accounting (AAA) with Role Based Access Control (RBAC)
- Remote Authentication Dial-In User Service (RADIUS) support for AAA
- Terminal Access Controller Access Control System (TACACS+) AAA with VSAs or privilege levels

3 Supported on 7220 IXR-H4, 7220 IXR-H5-64D, and 7220 IXR-H5-64O

4 Future software release

- Password complexity policies and lockout management
- Access to common Linux utilities: Bash, cron, and Python
- Logging infrastructure for local and remote logs including Syslog RFC 5424 support
- Facility alarms for equipment status
- Telemetry:
  - Subscription-based telemetry for modeled data structures, either on change or sampled
  - sFlow
- Telemetry-driven event management
- Python-based Zero Touch Provisioning (ZTP)
- Address management: Dynamic Host Configuration Protocol (DHCP) v4/v6 relay
- DHCP v4/v6 server with static allocations

NetOps Development Kit (NDK)

- gRPC and protobuf-based interface for tight integration
- Leverages SR Linux model-driven architecture
- Direct access to other application functionality, e.g., forwarding information base (FIB), Link LLDP and BFD
- Native support for streaming telemetry

Resiliency

- Support for redundant fan and power configurations in data center hardware platforms

Security

- Distributed and aggregated ACLs and policers for control and management plane
- Layer 3, Layer 4 Control Plane Policing (CoPP)
- IPv6 router advertisements guard
- Secure boot

Timing and synchronization

- RFC 5905 Network Time Protocol (NTP)

AI backend data center networking[5]

- RDMA over converged Ethernet (RoCEv2)
- Explicit Congestion Notification (ECN)
- Packet trimming
- Priority Flow Control (PFC)
- Data Center Quantized Congestion Notification (DCQCN)
- Per packet Dynamic Load Balancing (DLB)
- Compatibility with evolving UEC and OCP capabilities

System scale and performance

Platform-specific scale and performance information is available and can be provided on request.

Learn more

To learn more about the Nokia Data Center Fabric solution, see the web page.

Standards compliance[6]

Environmental and NEBS

- ATIS 0600015.03
- 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
- GR-63 CORE Level 2
- GR-3160-CORE
- VZ.TPR.9205

Safety

- AS/NZS 62638-1
- FDA CDRH 21-CFR 1040
- IEC/BS/EN 60825-1
- IEC/BS/EN 60825-2
- IEC/UL/CSA/BS/EN 62368-1

5 Some platforms may have feature exclusions or exceptions.
6 System design intent is according to the listed standards. Refer to product documentation for detailed compliance status.

Electromagnetic compatibility

- AS/NZS CISPR 32 Class A
- BSMI CNS 13438 Class A
- BSMI CNS 15936 Class A
- BT GS-7
- EN/BS 55035
- EN/BS 55032 Class A
- ETSI EN 300 132-1 (AC)
- ETSI EN 300 132-2 (LVDC)
- 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 32 Class A
- IEC CISPR 35
- IEC/EN/BS 61000-3-2
- IEC/EN/BS 61000-3-3
- 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
- IEC/EN 61000-6-2
- IEC/EN 61000-6-4
- ITU-T K.20
- KCC Korea - Immunity KS C 9835
- KCC Korea - Emissions KS C 9832
- VCCI-CISPR 32

Directives and regional approvals

- Directive 2011/65/EU RoHS
- Directive 2012/19/EU WEEE
- Directive 2014/30/EU EMC
- Directive 2014/35/EU LVD
- ISO 14001
- ISO 9001
- BSMI Mark: Taiwan
- CE Mark: Europe
- CRoHS: China RoHS
- KC Mark: South Korea
- RCM Mark: Australia
- UKCA Mark: United Kingdom
- VCCI Mark: Japan
- TL9000

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.

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.

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