Nokia 7215 IXS-A1 Interconnect System

Release 26

The high-performance, fixed-configuration Nokia 7215 Interconnect system (IXS)-A1 system is designed to manage data center leaf and spine connectivity requirements for AI and cloud providers, telecommunication providers, and mission-critical enterprise environments. It offers 10GE and 1GE interfaces for intra-fabric out-of-band management.

Overview

AI and cloud infrastructure are driving the need for high-performance, reliable and efficient data center connectivity. As these environments scale, flexible leaf and spine connectivity and dedicated out-of-band management are increasingly important for simplifying network operations and maintaining reliable access to critical infrastructure.

The 7215 IXS-A1 is optimized for management connectivity in data center designs. It delivers a robust and comprehensive set of capabilities, including IP routing, Layer 2, QoS, telemetry and model-driven management.

The 7215 IXS-A1 is 1RU high with a system capacity of 88 Gb/s full duplex (FD). It is equipped with 48 x 10/100/1000 Mb/s RJ45 connectors and 4 x 1/10G SFP+ connectors.

The 7215 IXS-A1 is offered in distinct integrated variants, each configured with either redundant AC or redundant DC power supplies and with front-to-back or back-to-front airflow.



7215 IXS-A1

The 7215 IXS-A1 supports an optional Modular GPU Accelerated Server (MGX) rack adapter, enabling seamless integration with MGX-accelerated computing racks and speeding up the deployment of GPU-based AI and high-performance computing infrastructure.

Nokia Service Router Linux (SR Linux)

Nokia Service Router Linux (SR Linux) is a Linux®-based open, extensible and resilient NOS that enables scalability, flexibility and efficiency in data center and WAN environments. The Nokia 7215 IXS-A1 implements Nokia SR Linux.

SR Linux is a key component of the Nokia Data Center Fabric solution, which also includes the Nokia Fabric Services System and the Nokia Data Center hardware 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 routing protocol technologies developed over decades of large-scale IP networking from the Nokia Service Router Operating System (SR OS), bringing a strong pedigree of reliability and performance to modern data center environments.

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.

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 networkwide 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.

Software features

The Nokia 7215 IXS-A1 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
- Linux control groups (cgroupsv2)

Layer 2 features

- Dot1q and untagged sub-interfaces on bridged 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 storm control
- MAC virtual routing and forwarding (VRF): MAC-VRF
- MAC-VRF network instance with IRB interface
- MAC access control lists (ACLs) with validation: accept, reject and log actions
- MAC access control lists (ACLs) with validation: accept, reject and log actions

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
- Equal cost multi-path with consistent and resilient hashing and configurable hash fields
- IPv6 flow label hashing
- VRF: Multiple VRF support
- Maintenance modes
- Interfaces: Loopback interfaces, Integrated Routing and Bridging (IRB)
- 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, autonomous system (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 ACLs with validation; accept, reject and log actions

1 This section provides an overview of key features supported. The platform may have feature exclusions or exceptions. Consult Nokia documentation for detailed feature support.

QoS

- QoS classification and marking based on DiffServ Code Point (DSCP)
- QoS classification and marking based on IEEE 802.1p

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 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 configurable options for 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
- 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), LLDP and BFD
- Native support for streaming telemetry

Resiliency

- Support for redundant fan and power configurations
- Graceful restart client for BGPv4/v6

Security

- Distributed and aggregated ACLs and policers for control and management plane
- Layer 2 through Layer 4 Control Plane Policing (CoPP)
- IPv6 router advertisements guard
- Secure boot

Timing and synchronization

- RFC 5905 Network Time Protocol (NTP)

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 Data Center Fabric solution, see the web page.

Technical specifications

Table 1. Nokia 7215 IXS-A1 specifications

Feature	Parameter
System throughput (FD)	88 Gb/s
Connectors	4 x 10G SFP+ 48 x 10/100/100M RJ45
Hardware support (maximum ports per chassis)	
10GE	4
1GE	4
1000/100/10 Mb/s	48
Management ports	1 x 1000Base-T
USB ports	1 x USB 2.0
Console ports	1x RJ45
Processor	4-core ARM
Memory	4GB DDR4
Memory buffer size	3 MB
Storage	16GB eMMC
Power	Integrated; Fixed, redundant AC power or redundant DC power systems (orderable variants) AC: 100V to 240V DC: -48 V/ -60V 100 W AC 100 W DC
Fan modules	Integrated; Fixed, redundant front-to-back or back-to-front airflow systems (orderable variants)
Dimensions	Height: 4.37 cm (1.72 in); 1 RU Width: 43.85 cm (17.26 in) Depth: 25.38 cm (9.99 in)
Weight	3.54 kg (7.8 lb)
Mounting options	2-post; 4-post with rail kit option
Discrete Trusted Platform Module (TPM)	Yes
Normal operating temperature range (sustained)	0°C to +40°C (32°F to +104°F)
Shipping and storage temperature range	-20°C to +70°C (-4°F to +158°F)
Normal humidity	5% to 95%, non-condensing

Table 2. MGX rack adapter specifications (optional)

The MGX rack adapter is designed for use in an MGX-accelerated computing rack. The adapter includes an airflow vent, a DC bus-bar connector, a power switch, DC power connectors, and an integrated ground cable with an attachment lug. The Nokia 7215 IXS-A1 and the MGX rack adapter are installed in the rack using sliding rails.

Feature	Parameter
Adapter without system and slide rails installed	
Dimensions	Height: 1.67 in. (4.25 cm) Width: 17.26 in. (43.85 cm) Depth: 23 in. (58.45 cm)
Weight	7.58 lb (3.42 kg)
Adapter with system and slide rails installed	
Dimensions	Height: 1.72 in. (4.37 cm) Width: 19.07 in. (48.45 cm) Depth: 33.46 in. (85 cm)
Weight	Excluding outer rack rails: 16.19 lb (7.33 kg) Including outer rack rails: 22.24 lb (10.08 kg)

Standards compliance[2]

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 300 753; Acoustic Noise, Class 3.2
- GR-3160-CORE

Electromagnetic compatibility

- AS/NZS CISPR 32 Class A
- BSMI CNS 15936 Class A
- BT GS-7
- EN 55035
- EN 55032 Class A
- ETSI EN 300 132-1 (AC)
- ETSI EN 300 132-2 (DC)
- ETSI EN 300 386
- ETSI ES 201 468
- FCC Part 15 Class A
- ICES-003 Class A
- IEC CISPR 32 Class A
- IEC CISPR 35
- IEC/ EN 61000-3-2
- IEC/EN 61000-3-3
- IEC/EN 61000-6-2
- IEC/EN 61000-6-4
- KCC Korea - Immunity KS C 9835
- KCC Korea - Emissions KS C 9832
- VCCI Class A

Safety

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

2 System design intent is according to the listed standards. Refer to product documentation for detailed compliance status.

Directives and regional approvals

- Directive 2011/65/EU RoHS (including Commission Delegated Directive EU 215/863)
- Directive 2012/19/EU WEEE
- Directive 2014/30/EU EMC
- Directive 2014/35/EU LVD
- CE Mark: Europe
- CRoHS: China RoHS
- KC Mark: South Korea
- RCM Mark: Australia
- UKCA Mark: United Kingdom
- VCCI Mark: Japan
- BSMI Mark: Taiwan

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.

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