Nokia 7215 IXS-A1 Interconnect System for SR Linux

Release 24

As part of the Nokia Data Center portfolio, the Nokia 7215 IXS-A1 Interconnect System is designed for leaf and spine data center fabric management connectivity in enterprise, service provider and webscale data center and cloud environments.

Overview

High-bandwidth servers are driving the need for greater port speeds and density in data center architectures. Similarly, the need for more power-efficient and state-of-the-art NOS design is driving the modernization of network aggregation and interconnect within data centers.

The high-performance, fixed-configuration 7215 IXS-A1 system is designed to meet data center leaf-spine requirements. It offers 10GE and 1GE interfaces for intra-fabric out-of-band connectivity.

The 7215 IXS-A1 delivers a robust and comprehensive set of capabilities, including IP routing, Layer 2, QoS, telemetry and model-driven management.

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

It is an integrated system, which supports redundant AC power supplies and both front-to-back and back-to-front airflow configurations.

7215 IXS-A1 48xGE RJ45 4SFP+

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 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 (MPBGP), EVPN, Virtual Extensible LAN (VXLAN), MPLS and segment routing protocols. By using field-proven protocol stacks, data center operators can immediately benefit from the stability, scalability and interoperability of a resilient NOS.

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.

Data center fabric automation

Nokia offers an intent-based data center fabric management and automation platform that delivers reliable operations, simplified life-cycle management and is adaptable to all data center and cloud environments.

For details see the web page.

Software features

The 7215 IXS-A1 supports, but is not limited to the following SR Linux software features.

For additional details about SR Linux, including NOS architecture and differentiators, see the Nokia Service Router Linux data sheet.

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
- Virtual routing and forwarding (VRF): MAC-VRF
- MAC access control lists (ACLs) with validation: accept, reject and log actions

Layer 3 features

- IPv4/v6 routing
- 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
- IS-IS v4/v6
- Open Shortest Path First: OSPFv2 and OSPFv3
- Static routes for IPv4/v6
- Equal cost multi-path
- IPv6 flow label hashing
- VRF: Multiple VRF support
- Maintenance modes
- Bi-directional forwarding detection (BFD), micro BFD (mBFD)
- 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

QoS

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

System management and automation

- Native model-driven architecture, configuration candidates, exclusive mode, checkpoints, rollbacks
  - Support for SR Linux and OpenConfig[1] data models
- Management interfaces: gNMI, gRPC Routing Information Base Interface (gRIBI), JSON-RPC and CLI (transactional, Python CLI and CLI plugins)
- gRPC network operations interface (gNOI)
- gRPC Network Security Interface (gNSI)
- Per-user configurable options for CLI
- 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 via privilege levels
- Password complexity policies and lockout management
- Access to common Linux utilities: Bash, cron and Python
- Syslog RFC 5424
- Telemetry:
  - Subscription-based telemetry for modeled data structures, either on change or sampled
  - sFlow
  - Logging infrastructure
- 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
- Interactive mirroring
- Unified Forwarding Tables (UFT) profiles

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

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.

1 Future software release

Technical specifications

Feature	7215 IXS-A1
System throughput Full duplex (FD)	88 Gb/s
Ports	4 x SFP+ 48 x 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
SSD	16GB eMMC
Power	Fixed redundant AC AC: 90V to 240V 100 W each
Integrated redundant power supplies	Yes
Fan modules	Fixed redundant Front-to-back or back-to-front airflow
Integrated redundant fans	Yes
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)
4-post mounting	Yes; 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

Standards compliance[2]

Environmental and NEBS

- 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 300 386
- 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

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 Low LVD
- CE Mark: Europe
- CRoHS: China RoHS
- KC Mark: South Korea
- RCM Mark: Australia
- UKCA Mark: United Kingdom
- VCCI Mark: Japan
- BSMI Mark: Taiwan

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

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.

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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