



Product Overview

With the current growth in artificial intelligence (AI) and machine learning (ML) developments, networks are expected to perform at their best to support heavy workloads. Combine this requirement with the already mature containerized workload requirement, and it's clear why networks are hitting capacity. Higher bandwidth requirements between the server and the top-of-rack switch result in higher 400G radix requirements at the spine and super-spine layer of the IP fabric multitier architecture.

Juniper Networks QFX5230-64CD switch is aimed at supporting these high-speed, high-density, spine-and-leaf IP fabrics. Supporting 400GbE, 200GbE, 100GbE, 50GbE, 40GbE, 25GbE, and 10GbE connections and offering advanced L2 and L3 features, and Secure ZTP, the QFX5230-64CD enables network operators to build large, next-generation IP fabrics based on a proven, Internet-scale software suite with best-in-class automation capabilities.

QFX5230-64CD DATASHEET

Product Description

Juniper Networks® QFX5230-64CD switch is a high-radix class switch, dedicated for high-bandwidth network switching devices supporting up to 64 × 400GbE, 128 × 200GbE, 256 × 100GbE, 64 × 40GbE, 256 × 25GbE, 256 × 10GbE ports in 2 U form factor. This makes the QFX5230-64CD optimal for a spine and super-spine role within IP and Ethernet VPN-Virtual Extensible LAN (EVPN-VXLAN) fabrics. The additional Remote Direct Memory Access over Converged Ethernet (RoCEv2) capabilities of the QFX5230-64CD support IP storage deployments where instead of relying on deep buffer switching, the QoS mechanisms such as priority-based flow control-distributed services code point (PFC-DSCP) and explicit congestion notification (ECN) deliver high performance for the storage workloads. Support for ZR/ZR-M optics makes it suitable for edge and data center interconnect (DCI) use cases.

Automation and Monitoring

[Juniper® Apstra®](#) intent-based networking delivers full Day 0 through Day 2+ capabilities for IP/EVPN fabrics with closed-loop assurance in the data center. Apstra is a fabric management solution that empowers organizations to automate and manage their networks across virtually any data center design, vendor, and topology, making private data center as easy as cloud. Apstra provides full Day 2+ operations assurance with multiple built-in intent-based analytics probes to assure your network is running as designed. In addition, Apstra provides a simple UI workflow to create custom intent-based analytics to capture, enrich, and visualize data from the managed devices. Apstra also provides the capability to capture and analyze flow data to provide complete network visibility.

For additional automation, Junos® OS Evolved supports a robust API set to support HashiCorp® Terraform®, Ansible, zero-touch provisioning (ZTP), operations and event scripts, automatic rollback, and Python scripts. The QFX5230-64CD supports Junos Telemetry Interface, a modern telemetry streaming tool that provides performance monitoring in complex, dynamic data centers.

Features and Benefits

Software

- Operating System: Junos OS Evolved (recommended releases)
- MAC addresses per system: 128,000
- VLAN IDs: 4,000
- Number of link aggregation groups (LAGs): 128
- Number of ports per LAG: 64
- Firewall filters: 9,000
 - Ingress: 3,000 Routed ACL(RACL), 768 VLAN ACL(VACL) and 3,000 Port ACL (PACL) rules
 - Egress: 2,000 RACL; 512 VACL; 2,000 PACL rules

- IPv4 unicast routes: 850,000 prefixes; 850,000 host routes (shared b/w host and LPM table)
- IPv6 unicast routes: 360,000 prefixes; 360,000 host routes (shared b/w host and LPM table)
- Address Resolution Protocol (ARP) entries: 32,000
- Generic routing encapsulation (GRE) tunnels: 1,000
- Jumbo frame: 9216 bytes
- Traffic mirroring
 - Mirroring destination ports per switch: 4
 - Maximum number of mirroring sessions: 8
 - Mirroring destination VLANs per switch: 4

Layer 2 Features

- STP—IEEE 802.1D (802.1D-2004)
- Rapid Spanning Tree Protocol (RSTP) (IEEE 802.1w); MSTP (IEEE 802.1s)
- Bridge protocol data unit (BPDU) protect
- Loop protect
- Root protect
- VLAN—IEEE 802.1Q VLAN trunking
- Routed VLAN interface (RVI)
- Static MAC address assignment for interface
- Global MAC learning disable
- Link Aggregation and Link Aggregation Control Protocol (LACP) (IEEE 802.3ad)
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)

Layer 3 Features

- Static routing
- OSPF v2/v3
- Filter-based forwarding
- Virtual Router Redundancy Protocol (VRRP/VRRPv3)
- IPv6
- Virtual routers
- Loop-free alternate (LFA)
- BGP
- IS-IS
- Dynamic Host Configuration Protocol (DHCP) v4/v6 relay(stateless)
- VRF-aware DHCP
- IPv4/IPv6 over GRE tunnels

Multicast

- Internet Group Management Protocol (IGMP) v1/v2/v3
- Multicast Listener Discovery (MLD) v2
- IGMP proxy, querier

- IGMP v1/v2/v3 snooping
- Intersubnet multicast using IRB interface
- MLD snooping
- Protocol Independent Multicast PIM-SM, PIM-SSM, PIM-DM, PIM-Bidir
- Multicast Source Discovery Protocol (MSDP)

Quality of Service (QoS)

- L2 and L3 QoS: Classification, rewrite, queuing
- Rate limiting:
 - Ingress policing: 1 rate 2 color, 2 rate 3 color
 - Egress policing: Policar, policar mark down action
 - Egress shaping: Per queue, per port
- 10 hardware queues per port (8 unicast and 2 multicast)
- Strict priority queuing (LLQ), shaped-deficit weighted round robin (SDWRR)
- Layer 2 classification criteria: Interface, MAC address, Ether type, 802.1p, VLAN
- Congestion avoidance capabilities: WRED, ECN
- Trust IEEE 802.1p
- Configurable shared buffer and buffer monitoring
- Congestion Notification Profile
- Priority-based flow control (PFC)—IEEE 802.1Qbb

High Availability

- Bidirectional Forwarding Detection (BFD)

Visibility and Analytics

- Switched Port Analyzer (SPAN)
- Remote SPAN (RSPAN)
- Encapsulated Remote SPAN (ERSPAN)
- sFlow v5
- Junos Telemetry Interface management and operations
- Role-based CLI management and access
- Junos OS Evolved configuration rescue and rollback
- Image rollback
- SNMP v1/v2/v3
- Junos OS Evolved XML management protocol
- Automation and orchestration
- Zero-touch provisioning (ZTP)
- Python
- Junos OS Evolved event, commit, and OP scripts

Junos Telemetry Interface

Streaming data to a performance management system lets network administrators measure trends in link and node utilization and troubleshoot issues such as network congestion in real time.

Junos Telemetry Interface provides:

- Application visibility and performance management by provisioning sensors to collect and stream data and analyze the application and workload flow path through the network
- Capacity planning and optimization by proactively detecting hotspots and monitoring latency and microbursts
- Troubleshooting and root cause analysis via high-frequency monitoring and correlating overlay and underlay networks



Specifications

Hardware Specifications

Table 1: QFX5230-64CD System Capacity

Parameter	Specification
System throughput	Up to 25.6 Tbps
Forwarding capacity	10.6 billion packets per second
Port density	64 ports of QSFP56-DD 400GbE
Maximum ports with breakout	128 × 200GbE, 256 × 100GbE, 64 × 40GbE, 256 × 25GbE, or 256 × 10GbE
Dimensions (W x H x D)	17.4 x 3.43 x 25.6
Rack units	2 U
Weight	55 lbs (25 kg) with power supplies and fans installed
Operating system	Junos OS Evolved
CPU	Intel Hewitt Lake (6 core)
Memory	32GB (16GBx2) of DDR4
Storage	2x100GB
Power	Redundant (1+1) hot-pluggable 3000 W AC/2400W DC power supplies
Cooling	Ports-to-FRUs (AFO) and FRUs-to-ports (AFI) cooling Redundant (5x2+1) +1 hot-pluggable fan modules
Total packet buffer	112 MB
Warranty	Juniper standard one-year warranty

Environmental Ranges

Table 2: QFX5230-64CD operating parameters

Parameter	Specification
Operating temperature	0° to 40°C @6000 ft for AFO system, 0° to 40°C @sea level for AFI systems.
Storage temperature	-40° to 70° C
Operating altitude	AFO: 6000 ft AFI: Sea level
Relative humidity operating	5 to 90% non-condensing

Parameter	Specification
Relative humidity nonoperating	5 to 90% non-condensing
Seismic	Zone 4 earthquake rating
Typical power draw	580 W (50% traffic with DACs @ [25C-31C])

Safety and Compliance

- UL 60950-1:2007 R5.19 Information Technology Equipment – Safety
- CAN/CSA-C22.2 No. 60950-1-07+A1:2011+A2:2014 Information Technology Equipment–Safety
- IEC 62368-1:2014 Audio/Video, Information and Communication Technology Equipment–Safety (All country deviations): CB Scheme
- IEC 62368-1:2018 Audio/Video, Information and Communication Technology Equipment–Safety (All country deviations): CB Scheme
- EN 62368-1:2014+A11:2017 Audio/Video, Information and Communication Technology Equipment–Safety
- UL 62368-1:2019 R10.21 Audio/Video, Information and Communication Technology Equipment–Safety
- CSA C22.2 No. 62368-1:19, Audio/Video, Information and Communication Technology Equipment–Safety
- IEC/EN 60825-1 Safety of Laser Products–Part 1: Equipment Classification and Requirements
- IEC/EN 60825-2 Safety of Laser Products–Part 2: Safety of Optics Fibre Communication Systems

Electromagnetic Compatibility

- FCC 47 CFR Part 15
- ICES-003 / ICES-GEN
- BS EN 55032
- BS EN 55035
- EN 300 386 V1.6.1
- EN 300 386 V2.2.1
- BS EN 300 386
- EN 55032
- CISPR 32
- EN 55035
- CISPR 35
- IEC/EN 61000 Series
- IEC/EN 61000-3-2
- IEC/EN 61000-3-3
- AS/NZS CISPR 32
- VCCI-CISPR 32
- BSMI CNS 15936
- KS C 9835 (Old KN 35)
- KS C 9832 (Old KN 32)

- KS C 9610
- BS EN 61000 Series
- NEBS GR-1089-Core Issue 8 EMC and Electrical Safety for Network Telecommunications Equipment

ETSI

- ETSI EN 300 019: Environmental Conditions & Environmental Tests for Telecommunications Equipment
- ETSI EN 300 019-2-1 –Storage (ETSI EN 300 019 -2-1), Class 1.2
- ETSI EN 300 019-2-2 –Transportation (ETSI EN 300 019-2-2), Class2.3
- ETSI EN 300 019-2-3 –Stationary Use at Weather protected Locations, non-condensing. Class 3.2
- ETSI 300753 (1997) –Acoustic noise emitted by telecommunications equipment

Environmental Compliance

- Restriction of Hazardous Substances (RoHS)
- Toxic Substances Control Act (TSCA)
- Persistent Organic Pollutants (POPs)
- Recycled Material Waste Electronics and Electrical Equipment (WEEE)
- Registration, Evaluation, Authorization and Restriction of Chemicals (REACH)
- Substances of Concern in Products (SCIP)

Telco

- Common Language Equipment Identifier (CLEI) code

Ordering Information

Hardware SKU	Description
QFX5230-64CD-AFO	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports, redundant fans, 2 AC power supplies, front-to-back airflow
QFX5230-64CD-AFI	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports, redundant fans, 2 AC power supplies, back-to-front airflow
QFX5230-64CD-D-AFO	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports, redundant fans, 2 DC power supplies, front-to-back airflow
QFX5230-64CD-D-AFI	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports, redundant fans, 2 DC power supplies, back-to-front airflow
QFX5230-64CD-CHAS	QFX5230-64CD (hardware with base software), 2U, 64 QSFP56-DD ports w/o PSU & Fans
JNP-3000W-AC-AFO	QFX5230-64CD-AFO 2U AC power supply unit
JNP-3000W-DC-AFO	QFX5230-64CD-D-AFO 2U DC power supply unit
JNP-2700W-AC-AFI	QFX5230-64CD-AFI 2 U AC power supply unit

Hardware SKU	Description
JNP-2400W-DC-AFI	QFX5230-64CD-D-AFI 2U DC power supply unit
QFX5230-64CD-FANA1	Airflow out (AFO) front-to-back airflow fans for QFX5230-64CD
QFX5230-64CD-FANA0	Airflow in (AFI) back-to-front airflow fans for QFX5230-64CD
QFX5230-2RU-4PRMK	4-Post Rack Mount Kit for QFX5230-64CD

Software	
S-QFX5K-C4-A1-X	Advanced 1 Software Subscription (X=Term Lengths (1,3,5,P): 1-year, 3-year, 5-year, Perpetual) License for QFX5230-64CD
S-QFX5K-C4-A2-X	Advanced 2 Software Subscription (X=Term Lengths (1,3,5,P): 1-year, 3-year, 5-year, Perpetual) License for QFX5230-64CD
S-QFX5K-C4-P1-X	Premium Software Subscription (X=Term Lengths (1,3,5,P): 1-year, 3-year, 5-year, Perpetual) License for QFX5230-64CD

Optics and Transceivers

Table 3. 64xQSFP-DD ports, supported optics and cables without breakout

Application Type	Specification	SKU
400GBASE-CR8	QSFP-DD to QSFP-DD, passive copper, 1/2.5m	QDD-400G-DAC-xM
400GBASE-AOC	QSFP-DD to QSFP-DD, active optical cable, 1/3/5/7/10/15/20/30m	QDD-400G-AOC-xM
400GBASE-SR4.2	QSFP-DD, up to 70m with OM3 and 100m with OM4 MMF, MPO-12	QDD-400G-SR4P2
400GBASE-DR4	QSFP-DD, up to 500m, SMF, MPO-12	QDD-400G-DR4
400GBASE-FR4	QSFP-DD, up to 2km, SMF, duplex LC	QDD-400G-FR4
400GBASE-LR4	QSFP-DD, up to 10km, SMF, duplex LC	QDD-400G-LR4-10
400GBASE-ZR	QSFP-DD, up to 80km without amplifier, 120km with amplifier, SMF, duplex LC	QDD-400G-ZR
400GBASE-ZR+	QSFP-DD, up to 300km, SMF, duplex LC	QDD-400G-ZR-M
100GBASE-CR4	QSFP28 to QSFP28, passive copper, 1/3/5m	JNP-100G-DAC-xM
100GBASE-AOC	QSFP28 to QSFP28, active optical cable, 1/3/5/7/10/15/20/30m	JNP-100G-AOC-xM
100GBASE-SR4	QSFP, up to 70m with OM3 and 100m with OM4 MMF, MPO-12	QSFP-100G-SR4-C
100G SR1.2	QSFP, up to 70m with OM3 and 100m with OM4 MMF, LC	QSFP-100G-SR1P2
100GBASE-DR	QSFP, up to 500m, SMF, LC	QSFP-100G-DR
100GBASE-CWDM4	QSFP, up to 2km, SMF, LC	QSFP-100G-CWDM-C
100GBASE-FR	QSFP, up to 2km, SMF, LC	QSFP-100G-FR
100GBASE-LR4	QSFP, up to 10km, SMF, LC	QSFP-100G-LR4-C
100GBASE-LR	Up to 10km, SMF, LC	QSFP-100G-LR
100G 4WDM-40	Up to 40km, SMF, LC	QSFP-100G-4WDM40
100G ZR4	Up to 60km, SMF, LC	QSFP-100G-ZR4

40G-CR4	QSFP+ to QSFP+, passive copper, 1/3/5m	QFX-QSFP-DAC-xM
40G-AOC	QSFP+ to QSFP+, active optical cable, 1/3/5/7/10/15/20/30m	JNP-40G-AOC-xM
40GBASE-SR4	QSFP, up to 100m with OM3 and 150m with OM4 MMF, MPO-12	QFX-QSFP-40G-SR4
40G BiDi	QSFP, up to 100m with OM3 and 150m with OM4 MMF, LC	JNP-QSFP-40G-BXSXR
40G ESR4	QSFP, up to 300m with OM3 and 150m with OM4 MMF, MPO-12	QSFP-4X10GE-SR
40G LX4	QSFP, up to 100m with OM3 and 150m w/OM4 MMF, 2km SMF, LC	JNP-QSFP-40G-LX4
40G IR4	QSFP, up to 2km, SMF, LC	JNP-QSFP-40GE-IR4

Application Type	Specification	SKU
40GBASE-LR4	QSFP, up to 10km, SMF, LC	QSFPP-40G-LR4-C

Useful links

[Feature Explorer](#)

[Hardware Compatibility tool](#)

[Recommended Releases](#)

Table 4. 64xQSFP-DD ports, supported breakout optics and cables

Application Type	Specification	SKU
200GBASE-CR4	QSFP56-DD to 2xQSFP56, passive copper, 1/2/2.5m	QDD-2X200G-xM
100GBASE-CR4	QSFP28-DD to 2xQSFP28, passive copper, 1/2/3m	QDD-2X100G-xM
100GBASE-CR2	QSFP56-DD to 4xQSFP56, passive copper, 1/2/2.5m	QDD-4X100G-xM
100G SR1.2	QSFP-DD, 4x100G, up to 70m with OM3 and 100m with OM4 MMF, MPO-12	QDD-400G-SR4P2
100GBASE-DR	QSFP-DD, 4x100G, up to 500m, SMF, MPO-12	QDD-400G-DR4
100GBASE-FR	QSFP-DD, 4x100G, up to 2km, SMF, MPO-12	QDD-4X100G-FR
100GBASE-LR	QSFP-DD, 4x100G, up to 10km, SMF, MPO-12	QDD-4X100G-LR

About Juniper Networks

At Juniper Networks, we are dedicated to dramatically simplifying network operations and driving superior experiences for end users. Our solutions deliver industry-leading insight, automation, security and AI to drive real business results. We believe that powering connections will bring us closer together while empowering us all to solve the world's greatest challenges of well-being, sustainability and equality.

50G CR2	QSFP to 2xQSFP, passive copper, 1/2/3/5m	JNP-100G-2X50G-xM
25GBASE-CR	QSFP28 to 4xSFP28, passive copper, 1/3/5m	JNP-100G-4X25G-xM
25GBASE-SR	QSFP, 4x25G, up to 70m with OM3 and 100m with OM4 MMF, MPO-12	QSFP-100G-SR4-C
10GBASE-CR	QSFP+ to 4xSFP+, passive copper, 1/3m	QFX-QSFP-DACBO-xM
10GBASE-SR	QSFP, 4x10G, up to 300m with OM3 and 150m with OM4 MMF, MPO-12	QSFP-4X10GE-SR
10GBASE-LR	QSFP, 4x10G, up to 10km, SMF, MPO-12	JNP-QSFP-4X10GE-LR

Table 5: 2xSFP+ ports, supported optics and cables

Application Type	Specification	SKU
10G USR	SFP, up to 30m with OM2 and 100m with OM3 MMF, LC	SFPP-10G-USR-C
10GBASE-SR	SFP, up to 300m with OM3 and 400m with OM4 MMF, LC	SFPP-10G-SR-C
10GBASE-LR	SFP, up to 10km, SMF, LC	SFPP-10G-LRT2-C
10GBASE-ER	SFP, up to 40km, SMF, LC	SFPP-10G-ER-C

Note: This information is provided on an as-is basis and can be changed in the future.

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