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Overview

The QFX5120 Switch delivers rich, low latency Layer 2/Layer 3 features and advanced EVPN-VXLAN capabilities, making it an ideal data center top-of-rack and aggregation switch for campus enterprise deployments.

Featuring L3 gateway capabilities for routing between virtualized and bare-metal servers, the QFX5120 is designed for extremely agile data centers that require support for overlay/underlay network architectures. Native 25GbE with 100GbE uplink ports on the QFX5120-48Y and QFX5120-48YM, 10GbE/1GbE copper with 100GbE uplink ports on the QFX5120-48T, and 32 100GbE ports on the QFX5120-32C make the QFX5120 family ideal for spine-and-leaf network deployments.

Quick Spec

Table 1 shows the quick spec.

Product Code	QFX5120-48Y-AFO
Switching Capacity	4 Tbps (bidirectional)/1.31 Bpps
Weight	QFX5120-48Y: 23.7 lb (10.75 kg)
Dimensions (H x W x D)	1.72 x 17.36 x 20.48 in. (4.37 x 44.09 x 52.02 cm)
Power Consumption	* Max load: 450 W * Typical load: 260 W
Airflow	* Front-to-back (airflow out) for hot aisle deployment * Back-to-front (airflow in) for cold aisle deployment
Telco	Common Language Equipment Identifier (CLEI) code
Environmental Ranges	* Operating temperature: 32° to 104° F (0° to 40° C) * Storage temperature: -40° to 158° F (-40° to 70° C) * Operating altitude: Up to 6000 ft (1829 m) * Relative humidity operating: 5% to 90% (noncondensing) * Relative humidity nonoperating: 0% to 95% (noncondensing)

Product Details

The QFX5120-48Y-AFO provides these features and benefits:

- * **Automation:** The QFX5120 supports a number of network automation and plug-and-play operational features, including ZTP and event scripts, automatic rollback, and Python scripting.
- * **Flexible forwarding table:** The QFX5120 includes a unified forwarding table, which allows the hardware table to be carved into configurable partitions of L2 media access control (MAC), L3 host, and longest prefix match (LPM) tables. In a pure L2 environment, the QFX5120 supports 288,000 MAC addresses. In L3 mode, the table can support 208,000 host entries. In LPM mode, it can support 351,000 prefixes. Junos OS provides configurable options through a CLI that can optimize the QFX5120 for various deployment scenarios.
- * **Intelligent buffer management:** The QFX5120 features a total of 32 MB of shared buffers. While 25% of the total buffer space is dedicated, the rest is shared among all ports and is user configurable. The intelligent buffer mechanism in the QFX5120 effectively absorbs traffic bursts while providing deterministic performance, significantly increasing performance over static allocation.
- * **MPLS:** A broad set of MPLS features, including L3 VPN, IPv6 provider edge router (6PE), RSVP traffic engineering, and LDP allow standards-based network segmentation and virtualization, enabling the QFX5120 to be deployed as a low latency MPLS label-switching router (LSR).
- * **VXLAN overlays:** The QFX5120 switch is capable of both L2 and L3 gateway services. Customers can deploy overlay networks to provide L2 adjacencies for applications over L3 fabrics. The overlay networks use VXLAN in the data plane and EVPN or Open vSwitch Database (OVSDB) for programming the overlays.
- * **MACsec and hop-by-hop encryption:** The QFX5120-48YM supports IEEE 802.1AE MACsec AES-256, providing link-layer data confidentiality, data integrity, and data origin authentication. The MACsec feature enables the QFX5120-48YM to support 2 Tbps of near line-rate hardware-based traffic encryption on all 100GbE, 40GbE, 25GbE, 10GbE, and 1GbE ports. Defined by IEEE 802.1AE, MACsec provides secure, encrypted communication at the link layer that is capable of identifying and preventing threats from denial-of-service (DoS) and intrusion attacks, as well as man-in-the-middle, masquerading, passive wiretapping, and playback attacks launched from behind the firewall. When MACsec is deployed on switch ports, all traffic is encrypted on the wire, but traffic inside the switch is not. This allows the switch to apply network capabilities such as quality of service (QoS) and sFlow to each packet without compromising the security of packets on the wire.

In addition, Ethernet-based WAN networks can use MACsec to provide link security over long haul connections. MACsec is transparent to Layer 3 and higher layer protocols and is not limited to IP traffic; it works with any type of wired or wireless traffic carried over Ethernet links.

* **Virtual Chassis:** The QFX5120 supports Juniper Networks unique Virtual Chassis technology, which enables up to four interconnected switches to operate as a single, logical device with a single IP address. This technology allows campus enterprises to eliminate STP and efficiently utilize network links.

Get more information

Do you have any question about the QFX5120-48Y-AFO?

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Specification

QFX5120-48Y-AFO Specification	
Switching Capacity	4 Tbps (bidirectional)/1.31 Bpps
Weight	23.7 lb (10.75 kg)
Dimensions (H x W x D)	1.72 x 17.36 x 20.48 in. (4.37 x 44.09 x 52.02 cm)
Power Consumption	* Max load: 450 W * Typical load: 260 W
Airflow	* Front-to-back (airflow out) for hot aisle deployment * Back-to-front (airflow in) for cold aisle deployment
Interface Options	* 2 management ports: 2 x RJ-45 ports * 1GbE SFP: 48 (24 copper 1GbE) * 10GbE SFP+: 48/80 (with breakout cable) * 25GbE SFP: 48/80 (with breakout cable) * 40GbE QSFP+: 8 (each QSFP+ port can be configured as a 4 x 10GbE interface or as a 40 Gbps port) * 100GbE QSFP28: 8 (each QSFP28 port can be configured as a 4 x 25GbE interface or as a 100 Gbps port) * SFP GbE optical and copper module * SFP+ 10GbE optical modules * SFP+ direct attach copper (DAC) cables: 1/3/5 m twinax copper and 1/3/5/7 m active twinax copper * SFP28 DAC cables: 1/3 m twinax copper * SFP28 optics: Short reach (SR), long reach (LR) * QSFP+ to SFP+: 10GbE direct attach breakout copper (1/3 m twinax copper cable)
Power Supply and Fan Modules	* Dual redundant (1+1) and hot-pluggable 650 W AC/DC power supplies * 100-240 V single phase AC power * -48 to -60 V DC power supply * Redundant 4+1 (QFX5120-48Y/YM and QFX5120-48T) or 5+1 (QFX5120-32C) and hot-pluggable fan modules for front-to- back or back-to-front airflow
Performance Scale (Unidimensional)	* MAC addresses per system: 288,000 * VLAN IDs: 4093 * Number of link aggregation groups (LAGs): 80 (QFX5120-48Y/YM, QFX5120-32C) 64 (QFX5120-48T) * Number of ports per LAG: 64 * IPv4 unicast routes: 351,000 prefixes; 208,000 host routes; 64 ECMP paths * IPv4 multicast routes: 104,000 * IPv6 unicast routes: 168,000 prefixes; 104,000 host routes * IPv6 multicast routes: 52,000 * Address Resolution Protocol (ARP) entries: 64,000 * Jumbo frame: 9216 bytes * Spanning Tree Protocol (STP) * Multiple Spanning Tree Protocol (MSTP) instances: 64 * VLAN Spanning Tree Protocol (VSTP) instances: 509 * Traffic mirroring Mirroring destination ports per switch: 4 Maximum number of mirroring sessions: 4 Mirroring destination VLANs per switch: 4

Layer 2 Features	<ul style="list-style-type: none"> * 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 * RSTP and VSTP running concurrently * VLAN—IEEE 802.1Q VLAN trunking * Routed VLAN interface (RVI) * Port-based VLAN * Private VLAN (PVLAN) * VLAN translation * Static MAC address assignment for interface * Per VLAN MAC learning (limit) * MAC learning disable * Link Aggregation and Link Aggregation Control Protocol (LACP) (IEEE 802.3ad) * MACsec with AES256 (QFX5120-48YM only) * Virtual Chassis—up to 4 members
Link Aggregation	<ul style="list-style-type: none"> * MC-LAG * LAG load sharing algorithm—bridged or routed (unicast or multicast) traffic * IP: Session Initiation Protocol (SIP), Dynamic Internet Protocol (DIP), TCP/UDP source port, TCP/UDP destination port * Layer 2 and non-IP: MAC SA, MAC DA, Ethertype, VLAN ID, source port
Layer 3 Features (IPv4)	<ul style="list-style-type: none"> * Static routing * Routing protocols (RIP, OSPF, IS-IS, BGP) * Virtual Router Redundancy Protocol (VRRP) * Virtual router * Dynamic Host Configuration Protocol (DHCP) relay * Proxy Address Resolution Protocol (ARP)
EVPN-VXLAN Features	<ul style="list-style-type: none"> * MAC virtual routing and forwarding (MAC-VRF) multiple EVPN instances (EVI) with service-types vlan-based, vlan-aware, vlan-bundle * Symmetric inter-IRB routing with anycast gateway and EVPN type-5 instances * Proxy IGMPv2—EVPN route types 6/7/8 * ARP/ND proxy/suppression * ESI-LAG A/A multihoming using Enterprise and SP-style interfaces * Enhanced Ethernet loop detection * Filter-based forwarding on IRB.VGA * EVPN advanced route policing * VLAN-id overlapping using SP-style interfaces
Multicast Features	<ul style="list-style-type: none"> * Internet Group Management Protocol (IGMP): v1, v2, v3 * IGMP snooping: v1, v2, and v3 (Layer 2 only) * IGMP filter * Protocol Independent Multicast-Sparse Mode (PIM-SM), PIM-Source-Specific Multicast (PIM-SSM), PIM-Dense Mode (PIM-DM) in pure IP fabric use case * Multicast Source Discovery Protocol (MSDP)
Security and Filters	<ul style="list-style-type: none"> * Secure interface login and password * RADIUS * TACACS+ * Ingress and egress filters: Allow and deny, port filters, VLAN filters, and routed filters, including management port filters * Filter actions: Logging, system logging, reject, mirror to an interface, counters, assign forwarding class, permit, drop, police, mark * SSH v1, v2 * Static ARP support in pure IP fabric * Storm control, port error disable, and autorecovery * Source MAC address filtering on the port * DHCP snooping in pure IP fabric use case
Quality of Service (QoS)	<ul style="list-style-type: none"> * L2 and L3 QoS: Classification, rewrite, queuing * Rate limiting: Ingress policing: Single-rate two-color policer, two-rate three-color policer Egress policing: Policer, policer mark down action Egress shaping: Per queue on each port * 10 hardware queues per port (8 unicast and 2 multicast) * Strict-priority queue (SPQ), shaped-deficit weighted round-robin (SDWRR), weighted random early detection (WRED), weighted tail drop * 802.1p remarking * Layer 2 classification criteria: Interface, MAC address, Ethertype, 802.1p, VLAN * Congestion avoidance capabilities: WRED * Trust IEEE 802.1p (ingress) * Remarking of bridged packets * Default inner to outer DiffServ code point (DSCP) copy for EVPN-VXLAN

IP Storage	<ul style="list-style-type: none"> * Priority-based flow control (PFC)—IEEE 802.1Qbb, DCBX * PFC using DSCP and explicit congestion notification (ECN) for ROCEv2
High Availability	<ul style="list-style-type: none"> * Bidirectional Forwarding Detection (BFD) * Uplink failure detection
MPLS	<ul style="list-style-type: none"> * Static label-switched paths (LSPs) * RSVP-based signaling of LSPs * LDP-based signaling of LSPs * LDP tunneling (LDP over RSVP) * MPLS class of service (CoS) * MPLS LSR support * IPv6 tunneling (6PE) (via IPv4 MPLS backbone) * IPv4 L3 VPN (RFC 2547, RFC 4364)
Management and Operations	<ul style="list-style-type: none"> * Role-based CLI management and access * CLI via console, telnet, or SSH * Extended ping and traceroute * Junos OS configuration rescue and rollback * Image rollback * SNMP v1/v2/v3 * Junos XML management protocol * sFlow v5 * Beacon LED for port and system * ZTP * OpenStack Neutron Plug-in * Python * Junos OS event, commit, and OP scripts * JTI
Traffic Mirroring	<ul style="list-style-type: none"> * Port-based * LAG port * VLAN-based * Filter-based * Mirror to local * Mirror to remote destinations (L2 over VLAN)
IEEE Standard	<ul style="list-style-type: none"> * IEEE 802.1D * IEEE 802.1w * IEEE 802.1 * IEEE 802.1Q * IEEE 802.1p * IEEE 802.1ad * IEEE 802.3ad * IEEE 802.1AB * IEEE 802.3x * IEEE 802.1Qbb * IEEE 802.1Qaz
T11 Standards	INCITS T11 FC-BB-5

Supported RFCs

- * RFC 768 UDP
- * RFC 783 Trivial File Transfer Protocol (TFTP)
- * RFC 791 IP
- * RFC 792 ICMP
- * RFC 793 TCP
- * RFC 826 ARP
- * RFC 854 Telnet client and server
- * RFC 894 IP over Ethernet
- * RFC 903 RARP
- * RFC 906 TFTP Bootstrap
- * RFC 951 1542 BootP
- * RFC 1058 Routing Information Protocol
- * RFC 1112 IGMP v1
- * RFC 1122 Host requirements
- * RFC 1142 OSI IS-IS Intra-domain Routing Protocol
- * RFC 1256 IPv4 ICMP Router Discovery Protocol (IRDP)
- * RFC 1492 TACACS+
- * RFC 1519 Classless Interdomain Routing (CIDR)
- * RFC 1587 OSPF not-so-stubby area (NSSA) Option
- * RFC 1591 Domain Name System (DNS)
- * RFC 1745 BGP4/IDRP for IP—OSPF Interaction
- * RFC 1772 Application of the Border Gateway Protocol in the Internet
- * RFC 1812 Requirements for IP Version 4 Routers
- * RFC 1997 BGP Communities Attribute
- * RFC 7348 VXLAN—Virtual extensible Local Area Network
- * RFC 8365 NVO—Network Virtualization Overlay Solution Using Ethernet VPN (EVPN-VXLAN)
- * RFC 2030 SNTP, Simple Network Time Protocol
- * RFC 2068 HTTP server
- * RFC 2131 BOOTP/DHCP relay agent and Dynamic Host
- * RFC 2138 RADIUS Authentication
- * RFC 2139 RADIUS Accounting
- * RFC 2154 OSPF with Digital Signatures (Password, MD-5)
- * RFC 2236 IGMP v2
- * RFC 2267 Network ingress filtering
- * RFC 2328 OSPF v2 (edge mode)
- * RFC 2338 VRRP
- * RFC 2362 PIM-SM (edge mode)
- * RFC 2370 OSPF Opaque LSA Option
- * RFC 2385 Protection of BGP Sessions via the TCP MD5 Signature Option
- * RFC 2439 BGP Route Flap Damping
- * RFC 2453 RIP v2
- * RFC 2474 Definition of the Differentiated Services Field (DS Field) in the IPv4 and IPv6 Headers
- * RFC 2597 Assured Forwarding PHB (per-hop behavior) Group
- * RFC 2598 An Expedited Forwarding PHB
- * RFC 2697 A Single Rate Three Color Marker
- * RFC 2698 A Two Rate Three Color Marker
- * RFC 2796 BGP Route Reflection—An Alternative to Full Mesh IBGP
- * RFC 2918 Route Refresh Capability for BGP-4
- * RFC 3065 Autonomous System Confederations for BGP
- * RFC 3376 IGMP v3 (source-specific multicast include mode only)
- * RFC 3392 Capabilities Advertisement with BGP-4
- * RFC 3446 Anycast RP
- * RFC 3569 SSM
- * RFC 3618 MSDP
- * RFC 3623 Graceful OSPF Restart
- * RFC 4271 Border Gateway Protocol 4 (BGP-4)
- * RFC 4360 BGP Extended Communities Attribute
- * RFC 4456 BGP Route Reflection: An Alternative to Full Mesh Internal BGP (IBGP)
- * RFC 4486 Subcodes for BGP Cease Notification Message
- * RFC 4724 Graceful Restart Mechanism for BGP
- * RFC 4812 OSPF Restart Signaling
- * RFC 4893 BGP Support for Four-octet AS Number Space
- * RFC 5176 Dynamic Authorization Extensions to RADIUS
- * RFC 5396 Textual Representation of Autonomous System (AS) Numbers
- * RFC 5668 4-Octet AS Specific BGP Extended Community
- * RFC 5880 Bidirectional Forwarding Detection (BFD) Dynamic Host Configuration Protocol (DHCP) server

<p>Supported MIBs</p>	<ul style="list-style-type: none"> * RFC 1155 SMI * RFC 1157 SNMPv1 * RFC 1212, RFC 1213, RFC 1215 MIB-II, Ethernet-Like MIB and TRAPs * RFC 1850 OSPFv2 MIB * RFC 1901 Introduction to Community-based SNMPv2 * RFC 2011 SNMPv2 for Internet Protocol using SMIv2 * RFC 2012 SNMPv2 for the Transmission Control Protocol using SMIv2 * RFC 2013 SNMPv2 for the User Datagram Protocol using SMIv2 * RFC 2233 The Interfaces Group MIB using SMIv2 * RFC 2287 System Application Packages MIB * RFC 2570 Introduction to Version 3 of the Internet-standard Network Management Framework * RFC 2571 An Architecture for describing SNMP Management Frameworks (read-only access) * RFC 2572 Message Processing and Dispatching for the SNMP (read-only access) * RFC 2576 Coexistence between SNMP Version 1, Version 2, and Version 3 * RFC 2578 SNMP Structure of Management Information MIB * RFC 2579 SNMP Textual Conventions for SMIv2 * RFC 2580 Conformance Statements for SMIv2 * RFC 2665 Ethernet-like Interface MIB * RFC 2787 VRRP MIB * RFC 2790 Host Resources MIB * RFC 2819 RMON MIB * RFC 2863 Interface Group MIB * RFC 2932 IPv4 Multicast MIB * RFC 3410 Introduction and Applicability Statements for Internet Standard Management Framework * RFC 3411 An Architecture for Describing SNMP Management Frameworks * RFC 3412 Message Processing and Dispatching for the SNMP * RFC 3413 Simple Network Management Protocol (SNMP) Applications (all MIBs are supported except the Proxy MIB) * RFC 3414 User-based Security Model (USM) for version 3 of SNMPv3 * RFC 3415 View-based Access Control Model (VACM) for the SNMP * RFC 3416 Version 2 of the Protocol Operations for the SNMP * RFC 3417 Transport Mappings for the SNMP * RFC 3418 Management Information Base (MIB) for the SNMP * RFC 3584 Coexistence between Version 1, Version 2, and Version 3 of the Internet-standard Network Management Framework * RFC 3826 The Advanced Encryption Standard (AES) Cipher Algorithm in the SNMP User-based Security Model * RFC 4188 Definitions of Managed Objects for Bridges * RFC 4318 Definitions of Managed Objects for Bridges with Rapid Spanning Tree Protocol * RFC 4363b Q-Bridge VLAN MIB
<p>Safety</p>	<ul style="list-style-type: none"> * CAN/CSA-C22.2 No. 62368-1-14 Information Technology Equipment—Safety * UL 62368-1 Information Technology Equipment—Safety * EN 62368-1: 2014 Information Technology Equipment—Safety * IEC 62368-1: 2014 2nd Edition Information Technology Equipment—Safety (All country deviations): CB Scheme * IEC 60950-1:2005/A2:2013 Information Technology Equipment—Safety (All country deviations): CB Scheme
<p>EMC</p>	<ul style="list-style-type: none"> * EN 300 386 V1.6.1 (2012-09) Electromagnetic compatibility and radio spectrum matters (ERM) Telecommunication network equipment * EN 300 386 V2.1.1 (2016-07) Telecommunication network equipment; EMC requirements; Harmonized Standard covering the essential requirements of the Directive 2014/30/EU * EN 55032:2012 (CISPR 32:2012) Electromagnetic compatibility of multimedia equipment—Emission requirements * EN 55024:2010 (CISPR 24:2010) Information technology equipment—immunity characteristics—limits and methods of measurement * IEC/EN 61000 Immunity Test * AS/NZS CISPR 32:2015 Australia/New Zealand Radiated and Conducted Emissions * FCC 47 CFR Part 15 USA Radiated and Conducted Emissions * ICES-003 Canada Radiated and Conducted Emissions * VCCI-CISPR 32:2016 Japanese Radiated and Conducted Emissions * BSMI CNS 13438 Taiwan Radiated and Conducted Emissions (at 10 meters) * KN32/KN35 Korea Radiated Emission and Immunity Characteristics (at 10 meters) * KN61000 Korea Immunity Test * TEC/SD/DD/EMC-221/05/OCT-16 India EMC standard

Environmental Compliance	<ul style="list-style-type: none"> * Restriction of Hazardous Substances (ROHS) 6/6 * 80 Plus Silver PSU Efficiency * Recycled material * Waste Electronics and Electrical Equipment (WEEE) * Registration, Evaluation, Authorisation and Restriction of Chemicals (REACH) * China Restriction of Hazardous Substances (ROHS)
Telco	Common Language Equipment Identifier (CLEI) code
Environmental Ranges	<ul style="list-style-type: none"> * Operating temperature: 32° to 104° F (0° to 40° C) * Storage temperature: -40° to 158° F (-40° to 70° C) * Operating altitude: Up to 6000 ft (1829 m) * Relative humidity operating: 5% to 90% (noncondensing) * Relative humidity nonoperating: 0% to 95% (noncondensing)

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