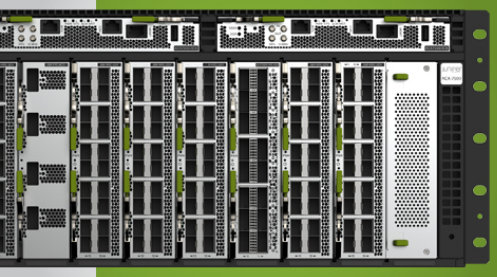

ACX7509 CLOUD METRO ROUTER DATASHEET

Product Overview

Network operators are finding incredible opportunities with 5G, IoT, and cloud, along with daunting challenges to support increasingly complex services and applications. The ACX7509 provides eight usable slots of high-density, low-speed fan-out, 1GbE to 400GbE port flexibility and scale in a reliable and compact 5 U, 60 cm deep footprint. Operational simplicity and an innovative fabric-less, centralized chassis architecture use fewer components, no fabric cards, and silicon-free line cards. This produces standout power efficiency, extended MTBF, and exceptional value for service provider, enterprise, wholesale, data center, residential, IoT, and 4G/5G use cases.

Product Description

The Juniper Networks® ACX7500 line multiservice routers is designed to help operators achieve their capital, operational, and differentiated user experience goals. Part of the Juniper Networks ACX7000 Family of routers, the ACX7509 delivers exceptional TCO, investment protection, and support for Juniper® Cloud Metro and 5G solutions, IoT, and cloud applications, making it ideal for service provider, large enterprise, data center, and residential deployments that require extremely power-efficient, high-density, and high availability (HA) platforms.

ACX7000 Family Overview

The ACX7000 Family of routers, purposely built for the IP service fabric underlay of a Juniper Cloud Metro, leverages the industry's fastest chipset, provides a unique balance of system design, and delivers the most sustainable high-performance portfolio available in the market. Managed by Junos® OS Evolved and Juniper® Paragon Automation, ACX7000 routers are embedded with Paragon Active Assurance and Zero Trust security, enabling operators to deliver highly differentiated customer experiences. Available in hardened, fixed, fixed-plus-modular, and modular designs, these energy and footprint efficient, multiservice routers support high-precision timing technologies and are engineered for service provider, enterprise, residential (including PON with the Juniper® Unified PON Solution), IoT, and 4G/5G mobile applications.

Figure 1. Juniper Networks ACX7000 Family—engineered for the IP service fabric of a Juniper Cloud Metro

The ACX7509, from the ACX7500 line, is an 8-slot, 4.8 Tbps, modular, high-density multiservice router engineered to offer best-in-class performance, footprint, power efficiency, and scale. The innovative design approach includes centralized architecture for operational simplification and bandwidth flexibility, opening new possibilities for network transformation. The ASIC-free interface modules provide 1GbE, 10GbE, 25GbE, 40GbE, 50GbE, 100GbE, 200GbE, and 400GbE build-as-you grow port speed flexibility—ideal for high fan-out aggregation services and legacy network support use cases.

Its breakthrough compact design with fabric-less architecture and fewer components, ICs, and ASICs sets new benchmarks for extremely low power consumption and TCO savings. Efficient cooling advances enable unrestricted use of high-power dense ZR/ZR+ transceivers on all supported ports in this fully redundant and high availability (HA) platform. Operators gain extended mean time between failures (MTBF) on an exceptionally small footprint consuming only 5 U and 60 cm deep of rack space, and a comparably simpler and less costly migration path to next-generation ASICs. ACX7905 platforms can realize a path to higher density, higher scale, higher port speeds, multiples of throughput, and future capabilities without a forklift or needing to change line cards, power supplies, and fans—as is necessary in competitive distributed chassis architectures. These improvements facilitate operational efficiency, investment protection, and radical capital and operational savings. ACX7509 capabilities also include Media Access Control Security (MACsec) on all ports, and the ability to seamlessly integrate with emerging distributed edge compute architectures.

ACX7509 supports three types of field replaceable FPCs for packet forwarding. These are installed vertically in the front slots of chassis and function as port extenders.

- **ACX7509-FPC20Y, a 500 Gbps throughput FPC** that provides 20 ports of 1GbE, 10GbE, 25GbE, and 50GbE
- **ACX7509-FPC-16C, a 1.6 Tbps throughput FPC** that provides 16 ports of 40GbE and 100GbE
- **ACX7509-FPC-4CD, a 1.6 Tbps throughput FPC** that provides 4 ports of 200GbE and 400GbE

Each FPC supports a variety of Ethernet port rates with different optics types. The ASIC-free port extenders deliver standout power efficiency and high value with port variety to meet growing network demands.

Designed for service providers, wholesale, large enterprise, and data center use cases, the ACX7509 is also a foundational building block of an IP services fabric in a Juniper® Cloud Metro solution.

Features and Benefits

The ACX7509 is engineered for sustainability that changes the challenges of evolving service requirements and relentless traffic growth imposed by the 5G, IoT, and cloud era into opportunities for providers to thrive.

Feature	Benefits
Junos® OS Evolved and Embedded Active Assurance	Managed by Junos OS Evolved, Juniper Paragon Active Assurance test agents are embedded into all ACX7000 platforms, enabling automated monitoring, diagnosis, remediation, and optimization of service delivery, service performance, and user experience.
Rugged, Resilient, and Efficient Design	Multiservice, high-density, HA, 8-slot access and aggregation router delivers uninterrupted services and operational efficiencies through power supply, fan, and Routing Engine (RE) and Packet Forwarding Engine (PFE) redundancy. The innovative centralized design with fewer components allows less power draw and unrestricted high-power dense ZR/ZR+ transceiver use across all supporting ports.
Build-As-You-Grow Operational Simplicity	Cloud-inspired 1GbE, 10GbE, 25GbE, 40GbE, 50GbE, 100GbE, 200GbE, and 400GbE build-as-you-grow ports scale to accommodate service growth and delivery. The dense fan-out ports offer a mix of low-speed and high-speed ports for high-end aggregation services and legacy network support.
Next-Gen Capabilities	Leading protocols are supported, including segment routing, SRv6, MPLS, Ethernet VPN-Virtual Extensible LAN (EVPN-VXLAN), advanced programmability, telemetry, leading network slicing and support for any overlay, underlay, or service.
Zero-Trust Security	Enhanced security capabilities include MACsec encryption, secure boot, integrated tamper-proof design, and trust anchor with DevID, enabling device attestation and enhanced security through a unique cryptographic digital identity.
Cloud Metro-Ready	Deep buffering for end-to-end service delivery assurance and precision-timing capabilities include Synchronous Ethernet, Precision Time Protocol (PTP), and advanced Class C timing for latency-optimized 5G service experiences. An ideal choice for service provider, enterprise, and residential use cases, including support for Juniper Unified PON, IoT, and 4G/5G mobile applications.

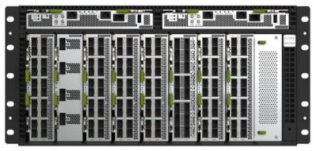

Figure 2. Juniper ACX7509—engineered for the IP service fabric of a Juniper Cloud Metro

Table 1. Maximum Port Count per Speed

FPC Model	1GbE	10GbE	25GbE	40GbE	50GbE	100GbE	200GbE	400GbE
ACX7509-FPC-20Y	120	160	160		100			
ACX7509-FPC-16C		256[1]	256[1]	127		79		
ACX7509-FPC-4CD					64[1]	32[1]	8	8

[1]With breakout: FPC Slot 7, one port cannot be used for 40GbE/100GbE due to PTP functionality.

Table 2. FPC Optical Module Technology Support

FPC Model	SFP	SFP+	SFP28	QSFP+	SFP56	QSFP56-DD	QSFP28	QSFP28-DD	QSFP56
ACX7509-FPC-20Y	Yes	Yes	Yes		Yes				
ACX7509-FPC-16C				Yes			Yes		
ACX7509-FPC-4CD						Yes	Yes	Yes	Yes

Note: All ports on ACX7509 platforms support breakout options.

Table 3. ACX7509 Platform Feature Matrix

Feature[2]	ACX7509
System	
Throughput	4.8 Tbps
Forwarding capacity	2 billion packets per second
Layer 2 Bridging	
IEEE 802.1ad (Q-in-Q)	Yes
Integrated routing and bridging (IRB)	Yes
IEEE 802.1Q VLAN encapsulation	Yes
Link Aggregation Control Protocol (LACP): IEEE 802.3ad	Yes
Static Media Access Control (MAC)	Yes
Jumbo frames	Yes
Layer 2 Tunneling Protocol (L2TP)	Yes
Layer 2 ingress access control list (ACL)	Yes
MPLS	
LDP	Yes
LDP: Tunneling (LDP over RSVP)	Yes
RSVP	Yes
IP	
IPv4/IPv6	Yes
Unicast reverse-path forwarding (unicast RPF)	Yes
128-way equal-cost multipath (ECMP)	Yes
RIP/RIPng	Yes
OSPF v2/v3	Yes
IS-IS	Yes
BGP	Yes
Layer 3 ingress and egress ACL	Yes
Virtual Router Redundancy Protocol (VRRP)	Yes
Basic segment routing	Yes
Path Computation Element Protocol (PCEP)	Yes
MPLS Service (Layer 2 and Layer 3)	
L2VPN	Yes
L3VPN	Yes
Virtual private LAN service (VPLS)	Yes
Timing and Synchronization	
PTP transparent clock	Yes
PTP master/client capabilities	Yes
IEEE 1588v2 boundary clock	Yes
Synchronous Ethernet Enhanced (G.8262.1)	Yes
G.8275.1 and G.8275.2 along with G.8273.2 (Class C)	Yes
Operation, Administration, and Maintenance	
Connectivity fault management (CFM)	Yes
Link fault management (LFM)	Yes
Security	
MACsec	Yes (all ports)
Secure boot	Yes
SSH	Yes
Authentication, authorization, and accounting (AAA)	Yes
Quality of Service	
Behavior aggregate (BA) classification	Yes
Rewrite	Yes
Multifield classification	Yes
8 queues for traffic	Yes
Ingress policer	Yes
Automation	
Zero-touch provisioning (ZTP)	Yes
Network Configuration Protocol (NETCONF)	Yes
Yet Another Next Generation (YANG)	Yes
OpenConfig	Yes
Python scripts	Yes

[2]Note: Features listed here are part of consecutive software releases following first release shipping.

Specifications

This section lists basic specifications for the ACX7509 router. For further detail, please refer to the hardware installation manuals at www.juniper.net/techpubs.

Hardware

Table 4. ACX7509 System Specifications

Specification	ACX7509
Dimensions (W x H x D)	Metal-to-metal: 19.0 x 10.5 x 23.6 in. (48.2 x 26.7 x 60.0 cm) Including cabling: 19.0 x 10.5 x 31.5 in. (48.2 x 26.7 x 80.0 cm)
Weight (lb/kg) fully configured	150 lb (68 kg)
Operating system	Junos OS Evolved
CPU	Intel Hewitt Lake, 64 GB DDRAM
Power (DC)	-48 VDC through -60 VDC
Power (AC)	240 VAC
Mounting	Rack and cabinet mounting options
Interfaces	The following line cards support MACsec on all ports: • 20 x 1GbE/10GbE/25GbE/50GbE • 4 x 200GbE/400GbE • 16 x 40GbE/100GbE
Synchronization interfaces	• 1x RJ45 Management • 1x RJ-45 Console + time of day (TOD) • 1PPS and 10 MHz input and output • 1x RJ45 BITs interface
Cooling	• Two hot-swappable fan trays with four counter rotating fans in each fan tray; N+1 fan rotor redundancy at chassis level • Front to back air cooling
PSU redundancy	• Premium bundle—4 power supply units (2+2) • Base bundle—2 power supply units (1+1)
Recommended software version	Junos OS Evolved 21.4R1 or later

Table 5. ACX7509 Environmental Ranges

Parameters	ACX7509
Operating temperature	32° to 104°F (0-40° C), short term 32° to 131° F (0-55° C) GR-63 NEBS-LE
Storage temperature	-40° through 158° F (-40° to 70° C)
Operating altitude	Up to 6000 feet (1828.8 meters)
Relative humidity operating	5% to 90% (noncondensing)

Table 6. ACX7509 Typical and Maximum Thermal Output

Parameters	ACX7509	Heat Dissipation
Redundant System: Typical power (without optics)[3]	1605 W	5476.48 BTU/hour
Redundant System: Maximum power (without optics)[4]	2180 W	7438.46 BTU/hour
Non-Redundant System: Typical power (without optics)[3]	1193 W	4070.51 BTU/hour
Non-Redundant System: Maximum power (without optics)[4]	1626 W	5548.13 BTU/hour

[3]Typical power consumption measured at 25° C ambient with 50% load on all ports (Internet Mix traffic)

[4]Maximum power consumption measured at 40° C ambient with 100% load on all ports (Internet Mix traffic)

Exact power consumption is subject to operating conditions and unit-to-unit variations.

Approvals

	ACX7509
Safety Approvals	
CAN/CSA-C22.2 No. 60950-1 Information Technology Equipment—Safety	Yes
UL 60950-1 (2nd Edition) Information Technology Equipment—Safety	Yes
EN 60950-1: 2006/A2:2013 Information Technology Equipment—Safety	Yes
IEC 60950-1: 2005/A2:2013 Information Technology Equipment—Safety (All country deviations): CB Scheme	Yes
CAN/CSA-C22.2 No. 62368-1-14 Information Technology Equipment—Safety	Yes
UL 62368-1 Information Technology Equipment—Safety	Yes
EN 62368-1: 2014 Information Technology Equipment—Safety	Yes
IEC 62368-1: 2014 2nd Edition Information Technology Equipment—Safety (All country deviations): CB Scheme	Yes
EN 60825-1 Safety of Laser Products—Part 1: Equipment classification and requirements	Yes
Electromagnetic Capability (EMC)	
EN 300 386 V1.6.1 Class A Telecom Network Equipment—EMC requirements	Yes
EN 300 386 V2.1.1 Class A Telecom Network Equipment—EMC requirements	Yes
FCC 47 CFR Part 15 Class A USA Radiated and Conducted Emissions	Yes
EN 55032 Class A European Radiated and Conducted Emissions	Yes
AS/NZS CISPR 32 Class A Australia/New Zealand Radiated and Conducted Emissions	Yes
ICES-003 Class A Canada Radiated and Conducted Emissions	Yes
VCCI- CISPR 32 Class A Japanese Radiated and Conducted Emissions	Yes
BSMI CNS 13438 and NCC C6357 Taiwan Radiated and Conducted Emissions (at 10 meters)	Yes
KN32 Korea Radiated and Conducted Emission (at 10 meters)	Yes
TEC/EMI/TEL-001/FEB-09	Yes
TEC-SD-DD-EMC-221-05-OCT-16	Yes
Network Equipment Building Systems (NEBS)	
SR-3580 NEBS Criteria Levels (Level 3 Compliance)	Yes
GR-63-CORE: NEBS, Physical Protection	Yes
GR-1089-CORE: EMC and Electrical Safety for Network Telecommunications Equipment	Yes
Data Center DC 3160	Yes
Immunity	
EN 300 386 V1.6.1 Class A Telecom Network Equipment—Immunity requirements	Yes
EN 300 386 V2.1.1 Class A Telecom Network Equipment—Immunity requirements	Yes
EN 55024 (CISPR 24)	Yes
IEC/EN 61000-4-X (-2, -3, -4, -5, -6, -11)	Yes
KN35 Korea Immunity	Yes
KN61000-4-X (-2, -3, -4, -5, -6, -11) Korea Immunity	Yes
TEC/EMI/TEL-001/FEB-09 India Immunity	Yes
TEC-SD-DD-EMC-221-05-OCT-16	Yes
IG Surge	Yes
EN 55035 (CISPR 35:2016) Electromagnetic compatibility of multimedia equipment	Yes

Ordering Information

Product	Description
Hardware	
ACX7509-BASE	ACX7509 Base chassis bundle
ACX7509-PREMIUM	ACX7509 Premium chassis bundle
ACX7509-FPC-20Y	ACX7509 20 x 1GbE/10GbE/25GbE/50GbE line card
ACX7509-FPC-4CD	ACX7509 4 x 400GbE/200GbE line card
ACX7509-FPC-16C	ACX7509 16 x 100GbE/40GbE line card
Spare SKUs	
ACX7509-FEB	ACX7509 Forwarding Engine, with 4.8 Tbps, forwarding with 2x Q2C, spare
ACX7509-RCB	ACX7509 Routing Engine, Intel X86 base CPU, 64 GB DDR4, 55 W CPU, spare
ACX7509-RCB-LT	ACX7509 Routing Engine, Intel X86 base CPU, 64 GB DDR4, 55 W CPU with limited encryption version, spare
JNP5700-CHAS	JNP5700 chassis for ACX7509, spare
ACX7509-EMI	ACX7509 EMI door with air filter and cable manager, spare
ACX7509-FLTR	ACX7509 air filter, spare
JNP5700-FAN	JNP5700 fan tray, spare
JNP-3000W-DC-AFO	Juniper DC power supply, 3000 W, front-to-back airflow, spare
JNP-3000W-AC-AFO	Juniper AC power supply, 3000 W, front-to-back airflow, spare
High Availability and MACsec License	
S-EACX-7500-HA-P	SW, EACX, Redundancy System license, without customer support, must purchase customer support separately, perpetual
S-ACXEVO100GMSEC-P	SW, ACXEVO, 100GbE, MACsec license, without customer support, must purchase customer support separately, perpetual
S-ACXEVO400GMSEC-P	SW, ACXEVO, 400GbE, MACsec license, without customer support, must purchase customer support separately, perpetual
S-ACXEVO100GMSEC-1	SW, ACXEVO, 100GbE, MACsec license, 1-year subscription, with software support
S-ACXEVO100GMSEC-3	SW, ACXEVO, 100GbE, MACsec license, 3-year subscription, with software support
S-ACXEVO100GMSEC-5	SW, ACXEVO, 100GbE, MACsec license, 5-year subscription, with software support
S-ACXEVO400GMSEC-1	SW, ACXEVO, 400GbE, MACsec license, 1-year subscription, with software support
S-ACXEVO400GMSEC-3	SW, ACXEVO, 400GbE, MACsec license, 3-year subscription, with software support
S-ACXEVO400GMSEC-5	SW, ACXEVO, 400GbE, MACsec license, 5-year subscription, with software support
Metro Software	
S-EACX-100G-A-1	SW, EACX Software 1 year Subscription Advance license; Per 100G Capacity, With Software Support
S-EACX-100G-A-3	SW, EACX Software 3 year Subscription Advance license; Per 100G Capacity, With Software Support
S-EACX-100G-A-5	SW, EACX Software 5 year Subscription Advance license; Per 100G Capacity, With Software Support
S-EACX-100G-A1-P	SW, EACX Software Perpetual Advance1 license; Per 100G Capacity, without SW Support
S-EACX-100G-P-1	SW, EACX Software 1 year Subscription Premium license; Per 100G Capacity, Includes ADV SW Subscription license, with software support
S-EACX-100G-P-3	SW, EACX Software 3 year Subscription Premium license; Per 100G Capacity, Includes ADV SW Subscription license, with software support
S-EACX-100G-P-5	SW, EACX Software 5 year Subscription Premium license; Per 100G Capacity, Includes ADV SW Subscription license, with software support
S-EACX-100G-P1-P	SW, EACX Software Perpetual Premium1 license; Per 100G Capacity, Includes ADV SW Subscription license, without SW Support
S-EACX-400G-A-1	SW, EACX Software 1 year Subscription Advance license; Per 400G Capacity, With Software Support
S-EACX-400G-A-3	SW, EACX Software 3 year Subscription Advance license; Per 400G Capacity, With Software Support
S-EACX-400G-A-5	SW, EACX Software 5 year Subscription Advance license; Per 400G Capacity, With Software Support
S-EACX-400G-A1-P	SW, EACX Software Perpetual Advance1 license; Per 400G Capacity, without SW Support
S-EACX-400G-P-1	SW, EACX Software 1 year Subscription Premium license; Per 400G Capacity, Includes ADV SW Subscription license, with software support
S-EACX-400G-P-3	SW, EACX Software 3 year Subscription Premium license; Per 400G Capacity, Includes ADV SW Subscription license, with Software support
S-EACX-400G-P-5	SW, EACX Software 5 year Subscription Premium license; Per 400G Capacity, Includes ADV SW Subscription license, with Software support
S-EACX-400G-P1-P	SW, EACX Software Perpetual Premium1 license; Per 400G Capacity, Includes ADV SW Subscription license, without SW Support

To learn more about Juniper software licensing, please refer to the ACX Series section of Juniper Licensing User Guide.

Product	Description
Power Cables	
CBL-JNP-SDG4-JPL	Cable Specific, Japan
CBL-JNP-SDG4-TW	Cable Specific, Taiwan
CBL-JNP-SDG4-US-L6	Cable Specific, US/North America, L6
CBL-JNP-PWR-EU	Cable Specific, EU, Africa, China
CBL-JNP-SDG4-US-L7	Cable Specific, US/North America, L7
CBL-JNP-SDG4-IN	Cable Specific, India
CBL-JNP-SDG4-SK	Cable Specific, South Korea
Additional SKUs	
JNP5K-FEB-BLNK	Blank cover for empty Forwarding Engine Board (FEB) slot
JNP5K-FPC-BLNK	Blank cover for empty FPC (line card) slot
JNP5K-RCB-BLNK	Blank cover for empty Routing and Control Board (RCB) slot
JNP5K-RMK-4POST	Rack mount kit
ACX7509-EMI	ACX7509 electromagnetic interference (EMI) door with air filter and cable manager, spare

Optics and Transceivers

ACX7509 supports varying port speeds with different transceiver options of direct attach copper (DAC), active optical cable (AOC), and breakout cable (BO). The most recent information on supported optics can be found at https://apps.juniper.net.

Juniper Networks Service and Support

Juniper Networks is the leader in performance-enabling services that are designed to accelerate, extend, and optimize your high-performance network. Our services allow you to maximize operational efficiency while reducing costs and minimizing risk, achieving a faster time to value for your network. Juniper Networks ensures operational excellence by optimizing the network to maintain required levels of performance, reliability, and availability. For more details, please visit https://www.juniper.net/us/en/products.html.

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.

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