

ACX6000 LINE OF UNIVERSAL METRO ROUTERS

Product Overview

The ACX6000 line of Universal Metro Routers adds operational intelligence to metro environments, letting you deploy packet optical, metro Ethernet, or IP/MPLS infrastructure. High-precision synchronization technology, industry-leading security, and high availability features enhance quality of experience (QoE). Extensive OAM, built-in advanced SLA management, and zero touch deployment capabilities reduce TCO. The ACX6000 addresses a variety of service provider use cases including business, cable distributed-access architectures, residential fiber, and mobile backhaul, as well as enterprise applications for utilities, oil and gas, mining, transportation, defense, and public safety industries.

Product Description

Juniper Networks® ACX6000 line of Universal Metro Routers responds to a shift in metro network architectures, where the access and aggregation layers are extending operational intelligence from the service provider edge to the access network. The ACX6000 line simplifies access and aggregation architectures by eliminating unnecessary layers and network overlays, dramatically reducing CapEx and OpEx. Based on architectural simplification and cost reduction, the ACX6000 line gives service providers and enterprises the ability to adopt a true universal metro paradigm. The ACX6000 line also provides high capacity, scalability, and a secure packet optical transport layer while delivering industry-leading performance with a wide range of port densities and interface types. Table 1 provides an overview of the interfaces supported on each model in the ACX6000 line. Flexibility and upgradability (the ability to mix and match interface types) make the Juniper Networks ACX Series Universal Metro Routers ideal for a wide range of use cases.

ACX Series Product Family

ACX Series Universal Metro Routers offer a wide range of metro solutions, including the **ACX500, ACX1000, ACX2000, and ACX4000**, as well as the ACX5000 and ACX6000 lines. The ACX6000 line includes two models, each targeted at different applications:

- ACX6160:** The ACX6160 Universal Metro Router is an optical transport that provides full OpenROADM-compatible transponder support for metro packet optical transport applications in a 1 U platform. As a pure transparent transponder, the ACX6160 supports eight quad small form-factor pluggable transceiver QSFP28 100GbE/OTU4 client interfaces and four 100 Gbps/200 Gbps CFP2-DCO line-side interfaces. OpenROADM-compatible APIs provide fully compliant third-party controller support along with HG-FEC-compliant interfaces, enabling true interoperable transponder functionality.
- ACX6360:** The ACX6360 Universal Metro Router allows operators to seamlessly collapse secure packet optical transport layers and IP/MPLS networking layers into a single platform. Powered by the latest Juniper Networks ExpressPlus™ silicon running at 3.6 Tbps, the ACX6360 supports 20 QSFP28 100GbE interfaces and eight 100 Gbps/200 Gbps CFP2-DCO interfaces, providing a secure IEEE 802.1AE/802.1X industry-compliant 256AES MACsec-encrypted solution for pervasive security across IP and optical.

Table 1: Built-In Interface Options for ACX6000 Line Models

Model	TDM (T1/E1)	OC3 (STM1)/ OC12 (STM4)	GbE (copper)	GbE (combo)	GbE (SFP)	10GbE (SFP+)	40GbE (QSFP)	100GbE (QSFP28)	100/200 Gbps (CFP2-DCO)
ACX6160	-	-	-	-	-	-	-	8	4*
ACX6360	-	-	-	-	-	80**	20	20	8

*ACX6160 initial release will be limited to 100G CFP2 line rate

**Via QSFP+ 4x10GbE breakout

Architecture and Key Components

Powered by Juniper Networks Junos® operating system, the ACX6000 line complements Juniper Networks MX Series 5G Universal Routing Platforms through a flexible and scalable service provider and enterprise branch routing portfolio optimized to support rapidly growing mobile, video, and cloud computing applications. The ACX Series introduces Juniper's proven IP/MPLS leadership from core and edge into the access layers of the network. Maintaining relative simplicity in the access network, the ACX6360 supports a rich suite of L3 and IP/MPLS functionality to allow large-scale seamless MPLS networks with simplified service provisioning and operations.

- Seamless MPLS:** The ACX6000 line of routers supports MPLS for both RSVP-TE and SPRING. Growing demands for bandwidth are accompanied by network growth in terms of number of nodes—in some cases, up to tens of thousands. Seamless MPLS architecture enables scale and service flexibility by decoupling physical topology for transport and service layers. With a seamless MPLS architecture, service providers can leverage the existing investment of MPLS in the core and edge and extend the operational benefit into the access layer. This enables higher network service flexibility and higher scaling parameters of the metro area network (MAN), where metro Ethernet services can span multiple network segments and be seamlessly terminated at any point of the network or cloud.
- Junos OS:** A reliable, high-performance, modular network operating system, Junos OS is supported across all of Juniper's physical and virtual routing, switching, and security platforms. Junos OS improves network operations and increases service availability, performance, and security with features like low-latency multicast, comprehensive quality of service (QoS), unified in-service software upgrade (unified ISSU), and Junos Continuity, which eliminates the risk and complexity of OS upgrades. Junos OS comes with embedded scripting tools and APIs, which enable automation of many routines and practical integration with any operator's back-end management tools. With secure programming interfaces, the Juniper Extension Toolkit (JET), versatile scripting support, and integration with popular orchestration frameworks, Junos OS offers flexible options for DevOps-style management that can unlock more value from the network.

- Management:** Junos Space® Network Management Platform provides comprehensive management with broad fault, configuration, accounting, performance, and security management (FCAPS) capabilities for both device and service-level management. For device management, it supports Network Configuration Protocol (NETCONF), CLI, and SNMP v1/v2/v3 protocols, while its northbound APIs support easy integration with existing network management systems (NMS) and operations/business support systems (OSS/BSS). Running on the Junos Space platform, Junos Space Connectivity Services Director ensures effortless end-to-end service provisioning of metro Ethernet (E-Line, E-LAN, E-Tree, E-Access), VPLS, L3VPN, EVPN, and MPLS on featured ACX Series platforms, using a simple interface to design, validate, and manage these services. Another application of Junos Space, Cross Provisioning Platform helps service providers provision E-Line, L2/L3 VPN services, and virtual private LAN service (VPLS) between Juniper devices and those from third-party vendors. The Juniper Networks proNX Optical Director software platform manages and controls Juniper Programmable Photonic Layer open-line system elements and Juniper coherent dense wavelength-division multiplexing (DWDM) transponder-based solutions, including the ACX6360, as well as integrated DWDM transponders on MX Series routers, PTX Series Packet Transport Routers, and QFX Series switches.

Features and Benefits

The ACX Series delivers new levels of programmability, reliability, and scalability to service provider and enterprise networks. The ACX Series portfolio improves customer satisfaction while lowering the total cost of operating, maintaining, and updating the network infrastructure.

Zero Touch Deployment

Based on Junos OS automation capabilities, ACX Series routers support a zero touch deployment (ZTD) feature that significantly reduces the time required to install and provision new equipment, resulting in lower OpEx, lower TCO, and greater operational efficiency. ZTD also reduces the complexity of deploying MPLS in the access layer.

Advanced Security Services

The ACX6000 line enables advanced security services such as Media Access Control Security (MACsec) to protect against potential vulnerabilities in the network as well as subscriber traffic.

High Availability and Reliability

Junos Continuity and unified ISSU features eliminate the downtime risks associated with implementing new hardware or upgrading operating systems. Junos Continuity eliminates OS upgrades and system reboots when adding new hardware to ACX Series routers—a plug-in package provides the drivers and support files needed to bring the hardware online. Unified ISSU reduces the risks associated with OS upgrades by enabling upgrades between two different Junos OS releases (major or minor) with no control plane disruption and minimal traffic disruption on the forwarding plane.

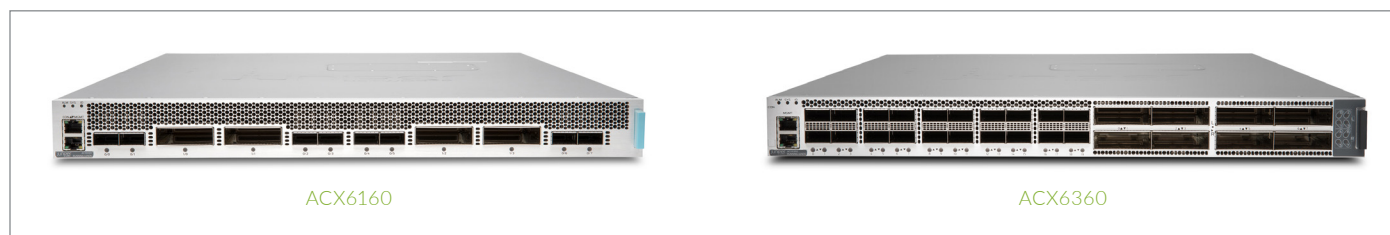
Full Feature Set of L3 and IP/MPLS

The ACX6360 supports a full L3 and IP/MPLS feature set, while the ACX6160 provides full OpenROADM-compatible transponder functionality.

Table 2: ACX6000 Line Platform Feature Matrix

Features	ACX6160	ACX6360
Throughput	1.6/3.2 Tbps	3.6/7.2 Tbps
Link Aggregation Control Protocol (LACP)	-	✓
Link Layer Discovery Protocol (LLDP)	✓	✓
IPv4	-	✓
IPv6	-	✓

Features	ACX6160	ACX6360
RPF	-	✓
Equal-cost multipath (ECMP)	-	✓
Enhanced load balancing based on L2-L4 header info	-	✓
OSPF	-	✓
IS-IS	-	✓
BGP	-	✓
Indirect/composite next hop	-	✓
RSVP	-	✓
LDP	-	✓
Path Computation Element Protocol (PCEP)	-	✓
RSVP-TE	-	✓
BGP-LU	-	✓
LDP-RSVP	-	✓
RSVP fast reroute (FRR)	-	✓
Segment routing	-	✓
IEEE 802.1AE/802.1X industry-compliant 256AES MACsec	-	✓
CLI	-	✓
NETCONF	✓	✓
SNMP v2/v3	✓	✓
SLAX/Python on-box scripting tools	✓	✓
ZTD	✓	✓
YANG	✓	✓



Specifications

This section lists basic specifications for the ACX6000 line of routers. For further details, please refer to the hardware installation manuals at www.juniper.net/techpubs.

Specifications	ACX6160	ACX6360
Dimensions (W x H x D)	17.36 x 1.72 x 24.40 in (44.09 x 4.37 x 61.98 cm)	17.36 x 1.72 x 24.40 in (44.09 x 4.37 x 61.98 cm)
Weight (lb/kg) fully configured	24 lb (10.9 kg)	30 lb (13.6 kg)
Power (DC)	-40 to -72 VDC power	-40 to -72 VDC power
Power (AC)	100-240 VAC	100-240 VAC
Maximum power draw	500 W (with optical small form-factor pluggable transceivers)	756 W (with optical SFP transceivers)
Operating temperature	32° to 104° F (0° to 40° C)	32° to 104° F (0° to 40° C)
Humidity	5%-90% RH noncondensing	5%-90% RH noncondensing

Approvals

	ACX6160	ACX6360
Safety Approvals		
CAN/CSA-C22.2 No. 60950-1	Yes	Yes
UL 60950-1	Yes	Yes
EN 60950-1	Yes	Yes
IEC 60950-1—CB Scheme	Yes	Yes
EN 60825-1	Yes	Yes

	ACX6160	ACX6360
EMC		
AS/NZS CISPR22		
Class A	Yes	Yes
EN55022 Class A	Yes	Yes
VCCI Class A	Yes	Yes
FCC Part 15 Class A	Yes	Yes
IECS-003 Issue 4	Yes	Yes
BSMI CNS 13438 and NCC C6357 Taiwan Radiated Emissions	Yes	Yes
KN 22, Class A	Yes	Yes
EN-61000-4-6 Low Frequency Common Immunity	Yes	Yes
EN-61000-4-11 Voltage Dips and Sags	Yes	Yes
CISPR 24/EN55024 Information Technology Equipment Immunity Characteristics	Yes	Yes

ETSI (European Telecommunications Standardization Institute)

	ACX6160	ACX6360
EN 300 386 V1.6.1 Telecommunication Network Equipment, Electromagnetic Compatibility Requirements	Yes	Yes

	ACX6160	ACX6360
ETSI EN 300 019-2-1 (2000)—Storage, Class T1.2	Yes	Yes
ETSI EN 300 019-2-2 (1999)—Transportation, Class T2.3	Yes	Yes
ETSI EN 300 019-2-3 (2003)—Stationary Use at Weather Protected Locations, Class T3.2	Yes	Yes
ETSI 300753 (1997)—Acoustic Noise Emitted by Telecommunications Equipment	Yes	Yes

	ACX6160	ACX6360
Other EMC Requirements		
Deutsche Telekom 1TR9 (2008) EMC Specification	Yes	Yes
British Telecom EMC Immunity Requirements (2007)	Yes	Yes

	ACX6160	ACX6360
NEBS		
SR-3580 NEBS Criteria Levels (Level 3 Compliance)	Yes	Yes
GR-63-CORE: NEBS, Physical Protection	Yes	Yes
Telecommunications Equipment (Issue 6 compliant)	Yes	Yes

	ACX6160	ACX6360
Telecomm Compliance		
Device management: NETCONF, CLI, SNMP v1/v2/v3	Yes	Yes
End-to-end provisioning of E-Line, emulated LAN (ELAN), Layer 3 VPN (L3VPN), Operation, Administration, and Maintenance (OAM), class of service (CoS)	Yes	Yes
Device and service-level fault management	Yes	Yes
Device and service-level performance management	Yes	Yes

Juniper Networks Services 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 www.juniper.net/us/en/products-services.

Ordering Information

Product	Description
ACX6160-T-AC*	ACX6160 Optical Transport, supports 8x100GbE QSFP28/QSFP+ client ports, 4x100/200G CFP2-DCO pluggable DWDM optics, redundant fans and redundant AC power supplies, front-to-back airflow
ACX6160-T-DC*	ACX6160 Optical Transport, supports 8x100GbE QSFP28/QSFP+ client ports, 4x100/200G CFP2-DCO pluggable DWDM optics, redundant fans and redundant DC power supplies, front-to-back airflow
ACX6360-OR-AC**	ACX6360 Optical Router configuration, 20x100GbE QSFP28/QSFP+ client ports, 8x100/200G CFP2-DCO pluggable DWDM optics, redundant fans and redundant AC power supplies, front-to-back airflow
ACX6360-OR-DC**	ACX6360 Optical Router configuration, 20x100GbE QSFP28/QSFP+ client ports, 8x100/200G CFP2-DCO pluggable DWDM optics, redundant fans and redundant DC power supplies, front-to-back airflow
ACX6360-OX-AC**	ACX6360 Optical Transport configuration, 20x100GbE QSFP28/QSFP+ client ports, 8x100/200G CFP2-DCO pluggable DWDM optics, redundant fans and redundant AC power supplies, front-to-back airflow
ACX6360-OX-DC**	ACX6360 Optical Transport configuration, 20x100GbE QSFP28/QSFP+ client ports, 8x100/200G CFP2-DCO pluggable DWDM optics, redundant fans and redundant DC power supplies, front-to-back airflow

*ACX6160 initial release will be limited to 100G CFP2 line rate and OpenROADM-based management

**The ACX6360 can be ordered in an optical router (-OR) or an optical transport (-OX) configuration.

About Juniper Networks

Juniper Networks brings simplicity to networking with products, solutions and services that connect the world. Through engineering innovation, we remove the constraints and complexities of networking in the cloud era to solve the toughest challenges our customers and partners face daily. At Juniper Networks, we believe that the network is a resource for sharing knowledge and human advancement that changes the world. We are committed to imagining groundbreaking ways to deliver automated, scalable and secure networks to move at the speed of business.

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