MX SERIES 3D UNIVERSAL EDGE ROUTERS

Product Overview

With ongoing technology advances and standards development, Ethernet is increasingly the technology of choice for enterprises and service providers for connectivity and intelligent service delivery. Ethernet bandwidth requirements continue to rise as a result of companies needing high-speed connectivity between their geographically dispersed sites. There is an increased reliance on collaborative applications across a globally distributed user base, which requires sharing data across the WAN. These are often multimedia applications, including video conferencing and video streaming, and thus require extremely high bandwidth and low latency. To address these requirements, Juniper Networks MX Series 3D Universal Edge Routers deliver a high-performance network infrastructure that provides fast, secure, and reliable delivery of the applications that drive business processes, while containing cost and increasing operational efficiency.

Today's advanced services are dictating that both enterprises and service providers build networks that meet increasingly stringent requirements for quality of service (QoS), network performance, and availability. With Ethernet as the primary transport technology, network providers are also looking at solutions to integrate legacy (ATM/Frame Relay/TDM) service infrastructure with the Ethernet Infrastructure and for a migration path to Ethernet over time. In addition to these basic requirements, service providers seeking to provide a differentiated user experience are finding that they must scale their networks to support increasingly higher amounts of bandwidth, services, and subscribers. Scaling the network in these three dimensions will be critical to securing competitive differentiation for the next generation of services.

Juniper Networks® MX Series 3D Universal Edge Routers are the only routers designed to provide the 3D scaling necessary to address today's advanced Ethernet converged network requirements. Powered by Juniper Networks Junos® operating system and high-performance silicon such as the I-Chip and Junos Trio chipset, the MX Series enables service providers and enterprises to adapt to Ethernet services in a changing market.

Product Description

MX Series offers a portfolio of high-performance Ethernet routers with integrated multiservice support, and it functions as a true Universal Edge platform capable of supporting all business, mobile, and residential services. With powerful switching and security features, the MX Series delivers unmatched flexibility and reliability to support advanced services and applications. MX Series routers also separate control and forwarding functions to provide maximum scale and intelligent service delivery capabilities.

MX Series 3D Universal Edge Routers are optimized for Ethernet and address a wide range of deployments, architectures, port densities, and interfaces for both service provider and enterprise environments. In both markets, the MX Series routers provide scalable, high port density routing and switching. They surpass the requirements of carrier Ethernet routing and switching as defined by the Metro Ethernet Forum, making them the platforms of choice for service providers seeking 3D scaling in the Universal Edge. These features are also ideal for high-performance enterprise data centers and enterprise campus networks.

Powered by Junos OS, the MX Series provides a consistent operating environment that streamlines network operations and improves the availability, performance, and security of all types of services supported at the Universal Edge. It offers the most complete, advanced routing features in the industry without compromising performance, which maximizes investment protection. These features include traffic segmentation and virtualization with MPLS, other sophisticated virtualization techniques such as Virtual Chassis technology, logical systems, low latency multicast, as well as comprehensive

security and QoS implementations to accelerate delivery of time-sensitive applications and services.

The carrier-class reliability and high availability features on the MX Series include graceful restart, nonstop routing (NSR), MPLS fast reroute, unified in-service software upgrade (unified ISSU), a comprehensive OAM toolkit, and service-level resiliency with features such as virtual private LAN service (VPLS) multihoming. MX Series 3D Universal Edge Routers provide the 3D scale, bandwidth, services, and subscribers that enterprises and service providers need to command a competitive advantage in today's Ethernet environment. MX Series routers are ideal for large applications requiring predictable performance for feature-rich infrastructures. In addition, this platform is ideal where Switch Control Board (SCB) and Routing Engine redundancy are required. With the MX Series, all major components are field replaceable, increasing system serviceability and reliability, and decreasing mean time to repair (MTTR).

Architecture and Key Components

MX Series Routers for the Midrange

MX Series 3D Universal Edge Routers for the midrange are the most compact members of the MX Series product family. Only 2 rack units (2 RU) high and built to support optional redundant power supplies and fans, this platform is perfectly suited for environments facing space or power constraints. Midrange routers include the Juniper Networks MX5, MX10, MX40, MX80, and MX80-48T 3D Universal Edge Routers. The MX Series midrange routers are software upgradeable and are very attractive to customers who appreciate the flexibility of "pay-as-you-grow" software licenses. More information on the MX Series for the midrange can be found at **www.juniper.net/us/en/local/pdf/datasheets/1000374-en.pdf**.

MX240 3D Universal Edge Router

Juniper Networks MX240 3D Universal Edge Router delivers increased port density over traditional Ethernet platforms, as well as performance, scalability, and reliability in a space efficient package. The MX240 offers fully redundant hardware options that include redundant SCB and Routing Engines to increase system availability.

MX480 3D Universal Edge Router

Juniper Networks MX480 3D Universal Edge Router provides a dense, highly redundant platform primarily targeted for medium to large enterprise campus and data centers, and dense dedicated access aggregation and provider edge services in medium and large points of presence (POPs). The MX480 offers common hardware redundancy options that include the SCBs, Routing Engines, fan trays, and power supplies.

MX960 3D Universal Edge Router

Juniper Networks MX960 3D Universal Edge Router is a high-density Layer 2 and Layer 3 Ethernet platform designed for deployment in a number of enterprise and service provider Ethernet scenarios. For service providers, the wide range of Universal Edge applications supported by the MX960 include VPLS for multipoint connectivity, virtual leased line for point-to-point services, full support for MPLS VPNs throughout the Ethernet network, Ethernet aggregation at the campus/enterprise edge, and Ethernet aggregation at the multiservice edge. In the enterprise, the MX960 can be used for campus and data center core and aggregation as well as a WAN gateway.

Table 1: MX Series Key Components

Description	MX240	MX480	MX960
System capacity[1]	960 Gbps	2.72 Tbps	5.12 Tbps
Switch fabric capacity per slot[2]	240 Gbps	240 Gbps	240 Gbps
Dense Port Concentrators (DPCs) and/or Modular Port Concentrators (MPCs) per chassis	3	6	12
Chassis per rack	9	6	3

Switch Control Board (SCB)

Integrated into the SCB is the switch fabric, providing a non-blocking architecture or any-to-any connectivity, connecting to all FPCs, DPCs, and MPCs within the chassis. The Routing Engine installs directly into the SCB. The SCB powers on and off cards, controls clocking, resets, and booting, and monitors and controls systems functions, including fan speed, board power status, inline power distribution module (PDM) status and control, and the system front panel.

There are currently two different flavors of SCB available for the MX960, MX480, and MX240 routers—SCB and SCBE—which provide different fabric capacities.

Table 2: Comparison of SCBs

Model Number	Description	Switch Fabric Capacity (Tbps)		
		MX240	MX480	MX960
SCB-MX960-BB	Switch Control Board (SCB)	.96	1.44	2.64
SCBE-MX-BB	Enhanced Switch Control Board (SCBE)	1.92	2.88	5.3

[1] System capacity with Enhanced Switch Control Boards (SCBE).
[2] Switch fabric capacity per slot will be 400 Gbps with SCBE2

Routing Engine (RE)

The Routing Engine handles all routing protocol processes, as well as the software processes that control the router's interfaces, the chassis components, system management, and user access to the router. These routing and software processes run on top of a kernel that interacts with the Packet Forwarding Engine (PFE). The Routing Engine provides control plane functions and runs Junos OS. Software processes that run on the Routing Engine maintain the routing tables, manage the routing protocols used on the router, control the router interfaces, control some chassis components, and provide the interface for system management and user access to the router. Routing Engines communicate with DPCs and MPCs via dedicated out-of-band management channels, providing a clear distinction between the control and forwarding planes.

Dense Port Concentrator (DPC)

DPCs provide multiple physical interfaces and PFEs on a single board that installs in a slot in the MX Series routers. A DPC receives incoming packets from the network and sends outgoing packets to the network. The PFEs on a DPC are equipped with purpose-built ASICs that perform packet processing and forwarding. Each PFE consists of one I-Chip for Layer 3 processing and one Layer 2 network processor

For more details on the DPC, please visit **www.juniper.net/us/en/local/pdf/datasheets/1000209-en.pdf**.

Modular Port Concentrator (MPC)

MPCs leverage the Junos Trio chipset to deliver the industry's highest density GbE, as well as the flexibility of modular interface cards (ATM/Sonet/Ethernet) across the MX Series portfolio. These advanced capabilities allow customers to flexibly mix and match interfaces to create service-specific and "pay as you grow" configurations. The MPC houses the PFEs to deliver comprehensive Layer 3 routing (IPv4 and IPv6), MPLS, and Layer 2 switching. These MPCs also support inline services and advanced Hierarchical QoS (HQoS) per MX Series slot.

For more details on MPCs, please visit **www.juniper.net/us/en/local/pdf/datasheets/1000294-en.pdf**.

MX Series Extends Junos OS in the Network

Junos OS is a world-class operating system with proven stability coupled with industrial-strength routing protocols, flexible policy language, and leading MPLS implementation. When building your Ethernet-centric infrastructure, Junos OS can be a tremendous asset as a flexible and reliable operating platform.

Junos OS runs on Juniper Networks MX Series 3D Universal Edge Routers, M Series Multiservice Edge Routers, T Series Core Routers, as well as EX Series Ethernet Switches, J Series Services Routers, and SRX Series Services Gateways. Junos OS—the first routing operating system developed specifically for the Internet—is especially designed for large production networks. With native support for both IPv4 and IPv6 as well as advanced interworking capabilities, Junos OS also eases the transition to IPv6 as it ensures long-term investment protection.

Junos OS offers XML interfaces for advanced scripting capabilities, and has been designed to configure the routing protocols that run on the MX Series and the properties of its interfaces. After a software configuration is activated, Junos OS has been designed to monitor the protocol traffic passing through the MX Series, as well as troubleshoot protocol and network connectivity problems.

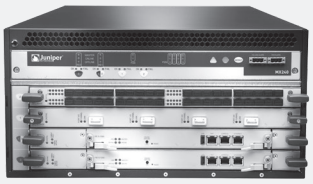
MX Series Features and Benefits

Junos OS and the MX Series support the industry's richest portfolio of VPNs:

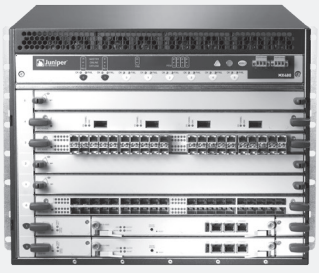
- **MPLS Layer 2 VPNs**—the MX Series offers full support for both LDP and BGP-based VPLS, as well as LDP and BGP-based pseudowires. With support for up to 1 million media access control (MAC) addresses and 128,000 VLANs, the MX Series delivers industry-leading scale for Layer 2 VPNs.
- **MPLS Layer 3 VPNs**—with support for all types of IPv4 VPNs, as well as IPv6 VPNs such as 6PE and 6VPE, the MX Series expands the range of services that carriers can offer customers. The MX Series supports VPNs with advanced, application-layer features such as session border controller (SBC), Dynamic Application Awareness, intrusion prevention system (IPS), and stateful firewall services.
- **Carrier-of-carrier VPNs**—the MX Series allows a VPN service provider to supply VPN service to a customer who is also a service provider. The latter service provider supplies Internet or VPN service to the end customer.
- **Interprovider VPNs**—Juniper supports standards-based interprovider VPNs, enabling customers to supply connectivity between two VPNs in separate autonomous systems (AS). This functionality could be used by a VPN customer with connections to several Internet service providers (ISPs), or different connections to the same ISP in various geographic regions.
- **Virtual router-based VPNs**—with the virtualization capabilities in Junos OS, the MX Series can be divided into multiple virtual or logical routing instances, each supporting an individual VPN.

Table 3: MX Series Features and Benefits

Description	Features	Benefits
High availability	• Fully redundant hardware (cooling, power supplies, Routing Engines, SCBs) • Modular operating system • Separate data and control planes • Graceful restart • Nonstop routing • MPLS fast reroute • VPLS multihoming	The MX Series carrier-grade design provides the highest level of redundancy and resiliency to ensure that critical services and customers stay connected.
High performance	Powered by Juniper's I-Chip ASIC and Junos Trio chipset, the MX Series features include: • Enhanced QoS capabilities • Additional packet processing flexibility • Scaling enhancements that include route lookup, next hop, logical interface scaling, and interface accounting • Enhanced multicast performance	Industry-leading performance enables the MX Series to satisfy critical applications and services at the edge.
Services	Simultaneous support for Layer 2 and Layer 3 Universal Edge: VPLS, RFC 2547bis, IP/MPLS VPNs, and triple-play services.	Providing business, mobility, and residential services from a common platform optimizing OpEx and CapEx.
Modular Interface Cards (MICs)	Delivering all combinations of Gigabit Ethernet interfaces (1/10/40/100) working across all MX Series 3D Universal Edge Routers.	Interface flexibility and common sparing across the MX Series platforms.
Modular Services Dense Port Concentrator (MS-DPC)	MS-DPCs are full slot modules that supply hardware acceleration for an array of packet processing-intensive services for the MX960, MX480, and MX240 routers. These services include advanced SBC functions, stateful firewall, Carrier Grade NAT, IPsec, anomaly detection, J-Flow accounting, and tunnel services.	The MS-DPC implements all services on the router itself, eliminating discrete devices and layers of network and management complexity to deliver lower cost of ownership.
Multiservice Interface MICs	Delivering the most widely used multiservice interfaces, including DS3, OC3, OC12, and OC48 with support for PPP/HDLC/Frame Relay, and ATM link-layer technologies.	Addressing multiple WAN scenarios and permitting service delivery with a single versatile platform.
Virtualization	The MX Series has many virtualization features and technologies to address enterprise and service provider requirements. • Network service virtualization: For access to services such as security, L2VPN, L3VPN, and VPLS to allow layering of services on the MPLS network • Virtual Chassis: Scale ports and services beyond one chassis to create one logical chassis with one management and one control plane • Virtual router: Logical systems, virtual switch • Link virtualization: VLAN, link aggregation group (LAG), generic routing encapsulation (GRE), and MPLS LSP virtualized physical links	Network virtualization allows customers to group multiple physical networks into one virtual network, or separate a single physical network into multiple logical networks improving network utilization, device utilization, scalability, and resiliency.



MX240



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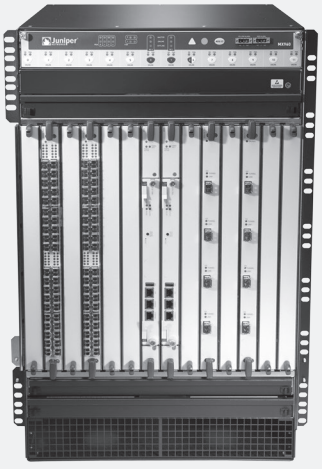

MX960

Specifications

This section lists basic specifications by platform. For further details, please refer to the hardware installation manuals on **www.juniper.net/techpubs/hardware**. For more information on the MX5, MX10, MX40, and MX80 midrange routers, please refer to **www.juniper.net/us/en/local/pdf/datasheets/1000374-en.pdf**.

Specification	MX240	MX480	MX960
Dimensions and Power			
Physical dimensions (W x H x D)	17.5 x 8.7 x 23.8 in (44.5 x 22.1 x 60.5 cm)	17.5 x 14 x 23.8 in (44.5 x 35.6 x 60.5 cm)	17.5 x 27.8 x 23.5 in (44.5 x 70.5 (16 RU) x 59.7 cm)
Weight (lb/kg) fully configured	130 lb/59 kg	180 lb/81.7 kg	334 lb/151.6 kg
Mounting	Front or center	Front or center	Front or center
Power (DC/AC)	-40 to -72 V DC 100 to 240 V AC	-40 to -72 V DC 100 to 240 V AC	-40 to -72 V DC 200 to 240 V AC
AC power consumption (theoretical maximum at 55º C)	2,006 W	3,955 W	7,341 W
DC power consumption (theoretical maximum at 55º C)	1,821 W	3,592 W	7,512 W
Operating temperature	32º to 104º F (0º to 40º C)	32º to 104º F (0º to 40º C)	32º to 104º F (0º to 40º C)
Humidity	5% to 90% noncondensing humidity		
Altitude	No performance degradation to 13,000 ft (4,000 m)		

Note: For an MX960 3D Universal Edge Router with 176 10GbE ports, the actual energy consumption measured under ATIS/Juniper Energy Consumption Rating (ECR) methodology is 6,306 W. For more information on power provisioning, please refer to the MX Series Router Hardware Guide.

Agency Approvals

Safety

- CAN/CSA-22.2 No. 60950-00/UL 1950 Third Edition, Safety of Information Technology Equipment
- EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements and User's Guide
- EN 60950 Safety of Information Technology Equipment

EMC

- AS/NZS 3548 Class A (Australia/New Zealand)
- EN 55022 Class A Emissions (Europe)
- FCC Part 15 Class A (USA)
- VCCI Class A (Japan)

NEBS

- GR-63-Core: NEBS, Physical Protection
- GR-1089-Core: EMC and Electrical Safety for Network Telecommunications Equipment

ETSI

- ETS-300386-2 Telecommunication Network Equipment Electromagnetic Compatibility Requirements

Immunity

- EN 61000-3-2 Power Line Harmonics
- EN 61000-3-3 Voltage Fluctuations and Flicker
- EN 61000-4-2 ESD
- EN 61000-4-3 Radiated Immunity
- EN 61000-4-4 EFT
- EN 61000-4-5 Surge
- EN 61000-4-6 Low Frequency Common Immunity
- EN 1000-4-11 Voltage Dips and Sags

Management

Element Management

- Juniper Networks J-Web Software graphical user interface

Policy Management

- Juniper Networks Junos Scope
- Juniper Networks SRC Series Session and Resource Control Modules

Third-party management applications (HP, IBM, InfoVista, Intelliden, WANDL)

- SNMP with v2/v3 bilingual agent support

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

Model Number	MX240	MX480	MX960
Base Unit			
DC Chassis	MX240BASE-DC	MX480BASE-DC	MX960BASE3-DC; MX960BASE-DC
AC Chassis	MX240BASE-AC	MX480BASE-AC	MX960BASE3-AC; MX960BASE-AC
DPC			
DPCE-R-20GE-2XGE	20-port GbE + 2-port 10GbE DPC with L2+L3 features		
DPCE-R-Q-20GE-2XGE	20-port GbE + 2-port 10GbE enhanced queuing DPC with L2+L3 features		
DPCE-R-Q-20GE-SFP	20x1GbE L2/L3 capable with enhanced queuing		
DPCE-R-2XGE-XFP	2x10GbE Enhanced DPC for MX Series		
DPCE-R-40GE-SFP	40x1GbE L2/L3 capable		
DPCE-R-Q-40GE-SFP	40x1GbE enhanced queuing DPC for MX Series with L2/L3 features and VLAN-HQoS		
DPCE-R-40GE-TX	40-port 10/100/1000 RJ-45 DPC with L2+L3 features		
DPCE-X-40GE-SFP	40x1GbE L2+ capable		
DPCE-X-Q-40GE-SFP	40x10/100/1000 Ethernet L2/L3 capable with RJ45		
DPCE-X-4XGE-XFP	4x10GbE L2+ capable		
DPCE-R-4XGE-XFP	4x10GbE Enhanced DPC with L2+L3 features		
DPCE-R-Q-4XGE-XFP	4x10GbE queuing DPC with L2/L3 features and VLAN-HQoS		
DPCE-X-Q-4XGE-XFP	4x10GbE L2+ capable board with enhanced queuing		
MX-FPC2	DPC with 2 slots for type 2 PICs		
MS-DPC	Multiservices DPC		
MPC			
MX-MPC1-3D	1xTrio Chipset MPC, port queuing; price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC1-3D-Q	1xTrio Chipset MPC, per-IFL HQoS, 128K queues (maximum 64K egress); price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC1-3D-Q-R-B	MX-MPC1-3D-Q line card bundle; price includes full scale L3, L2, and L2.5 features		
MX-MPC1-3D-R-B	MX-MPC1-3D line card bundle; price includes full scale L3, L2, and L2.5 features		
MX-MPC1E-3D	1xTrio Chipset Enhanced MPC, port queuing; price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC1E-3D-Q	1xTrio Chipset Enhanced MPC, per-IFL HQoS, 128K queues (max 64K egress); price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC1E-3D-Q-R-B	MX-MPC1E-3D-Q line card bundle; price includes full scale L3, L2, and L2.5 features		
MX-MPC1E-3D-R-B	MX-MPC1E-3D line card bundle; price includes full scale L3, L2, and L2.5 features		
MX-MPC2-3D	2xTrio Chipset MPC, port queuing; price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC2-3D-EQ	2xTrio Chipset MPC, per-IFL HQoS, 512K queues; price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC2-3D-EQ-R-B	MX-MPC2-3D-EQ line card bundle, price includes full scale L3, L2 and L2.5 features		
MX-MPC2-3D-Q	2xTrio Chipset MPC, per-IFL HQoS, 256K queues (max 128K egress); price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC2-3D-Q-R-B	MX-MPC2-3D-Q line card bundle; price includes full scale L3, L2, and L2.5 features		
MX-MPC2-3D-R-B	MX-MPC2-3D line card bundle; price includes full scale L3, L2, and L2.5 features		
MX-MPC2E-3D	2xTrio Chipset Enhanced MPC, port queuing; price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC2E-3D-EQ	2xTrio Chipset Enhanced MPC, per-IFL HQoS, 512K queues; price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC2E-3D-EQ-R-B	MX-MPC2E-3D-EQ line card bundle; price includes full scale L3, L2, and L2.5 features		
MX-MPC2E-3D-P	2xTrio Chipset Enhanced MPC, 1588v2, port queuing; price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC2E-3D-P-Q-B	MX-MPC2E-3D-P line card bundle; price includes 1588v2, per-IFL HQoS, 256K queues (maximum 128K egress), full scale L2/L2.5 and reduced scale L3 features		
MX-MPC2E-3D-P-Q-R-B	MX-MPC2E-3D-P line card bundle; price includes 1588v2, per-IFL HQoS, 256K queues (maximum 128K egress), full scale L3, L2, and L2.5 features		

Ordering Information (continued)

Model Number	MX240	MX480	MX960
MPC (continued)			
MX-MPC2E-3D-P-R-B	MX-MPC2E-3D-P line card bundle; price includes 1588v2, full scale L3, L2, and L2.5 features		
MX-MPC2E-3D-Q	2xTrio Chipset Enhanced MPC, per-IFL HQoS, 256K queues (maximum 128K egress); price includes full scale L2/L2.5 and reduced scale L3 features		
MX-MPC2E-3D-Q-R-B	MX-MPC2E-3D-Q line card bundle; price includes full scale L3, L2, and L2.5 features		
MX-MPC2E-3D-R-B	MX-MPC2E-3D line card bundle; price includes full scale L3, L2, and L2.5 features		
MX-MPC3E-3D	MPC3 with support for 100GbE, 40GbE, and 10GbE interfaces, L2.5 features, optics sold separately		
MX-MPC3E-3D-R-B	MPC3E with support for 100GbE, 40GbE, and 10GbE interfaces, includes full scale L2, L3, L3VPN features, optics sold separately		
MIC			
MIC-3D-20GE-SFP	20 ports of 10/100/1000 Ethernet with small form-factor pluggable transceiver (SFP) interfaces		
MIC-3D-2XGE-XFP	2 10GbE modular interface cards with XFP interfaces		
MIC-3D-4XGE-XFP	4 10GbE modular interface cards with XFP interfaces		
MIC-3D-40GE-TX	40 ports of 10/100/1000 Ethernet with TX interfaces		
MIC3-3D-1X100GE-CFP	MIC with 1x100GbE C form-factor pluggable transceiver (CFP) interface		
MIC3-3D-1X100GE-CXP	MIC with 1x100GbE CXP interface		
MIC3-3D-2X40GE-QSFPP	MIC with 2x40GbE QSFP+ interfaces		
Routing Engines			
RE-S-1300-2048-BB	1.3 GHz CPU and 2 GB memory, base bundle		
RE-S-2000-4096-UPG-BB	2 GHz CPU and 4 GB memory, base bundle		
RE-S-1300-2048-R	1.3 GHz CPU and 2 GB memory, redundant		
RE-S-2000-4096-R	2 GHz CPU and 4 GB memory, redundant		
RE-S-1800X2-8G-R	Dual core 1.8 GHz CPU and 8 GB memory, redundant		
RE-S-1800X2-16G-R	Dual core 1.8 GHz CPU and 16 GB memory, redundant		
RE-S-1800X4-8G-R	Quad core 1.8 GHz CPU and 8 GB memory, redundant		
RE-S-1800X4-16G-R	Quad core 1.8 GHz CPU and 16 GB memory, redundant		
RE-S-1800X2-8G-UPG-BB	Dual core 1.8 GHz CPU and 8 GB memory, upgrade for base bundle		
RE-S-1800X2-16G-UPG-BB	Dual core 1.8 GHz CPU and 16 GB memory, upgrade for base bundle		
RE-S-1800X4-8G-UPG-BB	Quad core 1.8 GHz CPU and 8 GB memory, upgrade for base bundle		
RE-S-1800X4-16G-UPG-BB	Quad core 1.8 GHz CPU and 16 GB memory, upgrade for base bundle		
Switch Control Board			
SCB-MX960-BB	SCB, MX240, MX480, and MX960		
SCBE-MX-BB	Enhanced Switch Control Board		
DPC Support			
DPCE-Q	Yes	Yes	Yes
DPCE-X	Yes	Yes	Yes
DPCE-R	Yes	Yes	Yes
Routing Engine Support			
RE-1300	Yes	Yes	Yes
RE-2000	Yes	Yes	Yes
RE-1800X	Yes	Yes	Yes
Junos OS			
USA	Junos OS	Junos OS	Junos OS
Worldwide	Junos-WW	Junos-WW	Junos-WW

About Juniper Networks

Juniper Networks is in the business of network innovation. From devices to data centers, from consumers to cloud providers, Juniper Networks delivers the software, silicon and systems that transform the experience and economics of networking. The company serves customers and partners worldwide. Additional information can be found at **www.juniper.net**.

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