



MX 204/240/480/960 Series Universal Routing Platforms



Product description

The continuous expansion of mobile, video, and cloud-based services is disrupting traditional networks and impacting the businesses that rely on them. While annual double-digit traffic growth requires massive resource investments to prevent congestion and accommodate unpredictable traffic spikes, capturing return on that investment can be elusive. Emerging trends such as [5G](#) mobility, Internet of Things (IoT) communications, and the continued growth of cloud networking promise even greater network challenges in the near future. The Juniper Networks MX Series Universal Routing Platform delivers the industry's first end-to-end infrastructure security solution for enterprises as they look to move business-critical applications to public clouds. Delivering features, functionality, and secure services at scale in the 5G era with no compromises, the MX Series is a critical part of the network evolution happening now.

At the same time, traditional operations environments are increasingly challenged to meet consumer and business requirements for rapid service delivery and cloud-like network experiences. Issues related to monitoring and management are placing additional stress on already strained budgets and personnel, and promising technologies like [Network Functions Virtualization \(NFV\)](#) and [SDN](#) introduce an entirely new set of operational challenges.

Our hyper-connected world demands more agile, automated, and scalable networks. Now more than ever, network operators need to transform their networks — and their operations environments — to accommodate this reality.

Utilizing state-of-the-art software and hardware innovations, MX Series Universal Routing Platforms are helping network operators worldwide successfully transform their networks and services. Powered by the Juniper Networks Junos operating system and the programmable Trio chipset, MX Series platforms support a broad set of automation tools and telemetry capabilities that enable a rich set of business- and consumer-oriented services with predictable low latency and wire-rate forwarding at scale, while providing the reliability needed to meet strict service-level agreements (SLAs).

Product overview

Unrelenting traffic growth is straining traditional [service provider](#) and enterprise networks. To accommodate this reality, HPE Secure Automated Distributed Cloud solution helps service providers react to changing market conditions and accelerate service delivery requirements. The MX Series, an integral part of this solution:

- Is powered by Junos OS and programmable Trio 5 silicon chipset
- Delivers powerful routing, switching, security, and services features
- Helps operators successfully transform their networks — and their businesses
- In today's hyper-connected world

An agile family of cloud-era universal routing platforms

The MX Series portfolio was designed for agility and built from the ground up to support a universal set of edge applications, helping HPE customers rapidly respond to evolving business and technical requirements while simplifying operations without sacrificing their current infrastructure investments.

With its massive scale and efficiency, the MX Series is ideal for space- and power-constrained environments. It redefines per-slot economics, enabling customers to do more with less while simplifying network design, reducing OpEx. It also enables the profitable delivery of a broad range of business, residential, mobile, cable, data center, and cloud services while seamlessly supporting traditional and emerging network architectures with adaptive software and pervasive security. The flexibility of the MX Series is enabled by the programmable Trio chipset, which allows MX Series platforms to add support for new features, such as telemetry, without costly hardware upgrades. Additionally, support for the Junos Automation Toolkit and the Juniper Extension Toolkit provide modern programming languages that reduce costs and increase profitability by improving productivity and customization.

This agility is evident in the wide variety of MX Series use cases that have been proven in the world's largest and most demanding networks, including:

- **Business edge:** MX Series platforms support the broadest range of L2/L2.5/L3 VPN services which, in combination with multilayer, multiprotocol resiliency, ensure that customer SLAs are met under all network conditions.
- **Internet/peering gateway:** MX Series platforms support the high performance, reliability, scale, and density needed to efficiently peer with internet and other service provider networks.
- **Broadband Network Gateway (BNG):** MX Series platforms offer the highest subscriber density and most sophisticated broadband edge features available in the industry.
- **Universal SDN gateway:** The MX Series offers a comprehensive solution for interconnecting virtual and physical networks — as well as between virtual networks operating with different technologies — via support for Multiprotocol BGP (MBGP), dynamic tunnels using MPLSoGRE or Virtual Extensible LAN (VXLAN) encapsulation, virtual routing and forwarding (VRF) tables, E-VPNs, and Network Configuration Protocol (NETCONF), along with the ability to send traffic between VRF and global routing tables based on configuration and policy.
- **Data center and cloud edge:** The MX Series is ideal for data center/cloud edge applications, with support for multiple overlay encapsulation methods, including

VXLAN, Network Virtualization using Generic Routing Encapsulation (NVGRE), MPLSoUDP, MPLSoGRE, 802.1BR, SR-MPLS, and SR-V6. The MX Series also incorporates data plane security with inline MACsec in the MPC-10E line cards, making it a perfect fit for data center and cloud deployments.

- **Enterprise WAN:** Enterprises and government agencies worldwide use MX Series platforms to build their own overlay network on top of a service provider's Layer 2 or MPLS network, using encapsulation technologies such as MPLSoGRE, VXLAN, and IPsec for secure transport.
- **Universal metro/aggregation:** MX Series platforms offer a full suite of routing and switching features, allowing you to choose a deployment model that best fits your business and technical needs. The MX Series can be deployed as IP/IP VPN edge routers, Ethernet VPN (EVPN) and virtual private LAN service (VPLS) provider edge (VPLS-PE) routers, MPLS label-switching (LSR) routers, and as Layer 2 Ethernet switches or Layer 3 IP routers.
- **Mobile backhaul:** In addition to switching, routing, and security features, MX Series platforms support highly scalable and reliable hardware-based timing that meets the strictest LTE requirements, including Synchronous Ethernet for frequency and the Precision Time Protocol (PTP) for frequency and phase synchronization.

At-a-glance: MX Series Universal Routing Platforms comparison

The MX Series portfolio includes a wide range of physical and virtual platforms that share a common architecture and feature set. This enables HPE customers to select the platform that best addresses their unique business goals and satisfies their scale, density, resiliency, space, power, and value-added service requirements without compromising on quality or features.

Modular MX Series platforms

MX960, MX480, and MX240 Universal Routing Platforms are modular, chassis-based platforms.

- The MX960 has been proven in the world's largest service provider, cable, mobile, and data center networks, offering 12 Tbps of system capacity in support of business and residential broadband services as well as peering and provider edge applications.
- The MX480 is a modular, 7.5 Tbps-capable router that supports a wide range of cloud, campus, enterprise, data center, service provider, cable, and mobile service core applications.
- The MX240 is a compact, 3 Tbps-capable router ideal for space-constrained cloud, enterprise, data center, service provider, cable, and mobile service core deployments.

The latest generation of line card hardware for the MX960, MX480, and MX240 platforms delivers multi-terabit crypto capabilities with 256-bit encryption complying with AES-GCM encapsulation per RFC4303; AES-GCM encapsulation per RFC4106; AES-GMAC encapsulation per RFC4543; and AES-GMAC (IPv4/v6) encapsulation per RFCs 4302 and 4543. Along with multi-terabit routing, the latest MPC also delivers integrated Layer 2 MACsec features at flexible interface rates of 10GbE, 40GbE, and 100GbE.

Fixed-configuration MX Series platforms

The MX204 Universal Routing Platforms is fixed-configuration platforms that supports modular interfaces.

- The MX204 is a space- and power-optimized router delivering ultra-high port density and throughput while consuming just 0.9W/Gb. It addresses the emerging edge and metro Ethernet networking needs of service providers, mobile, web-scale operators, and MSOs by delivering 400 Gbps of throughput in support of high-density 100GbE, 40GbE, and discrete and breakout 10GbE and 1GbE interfaces — all in a single rack unit.

The following table provides a comparison between the various MX Series modular and fixed-configuration platforms.

Architecture and key components

Modular components for chassis-based MX Series platforms

The modular, chassis-based MX960, MX480, and MX240 share the following components:

- Modular Port Concentrators (MPCs) provide routing, MPLS, switching, inline services, subscriber management, and hierarchical quality of service (HQoS) among many other features. MPCs may also host interfaces directly or via Modular Interface Cards (MICs) that allow users to “mix and match” interface types. Powered by the programmable Trio chipset, MPCs collect and stream telemetry that identifies resource utilization, loss and delay, and other metrics.
- Switch Control Boards (SCBs) feature an integrated switch fabric that connects to all slots in the chassis in a nonblocking architecture. The SCBs house the Routing Engine, control power to MPCs, monitor and control system functions such as fan speed and the system front panel, and manage clocking, resets, and boots.
- The Routing Engine (RE) provides the control plane, runs Juniper Networks Junos operating system, and handles all routing protocol processes as well as the software processes that control MPCs, chassis components, system management, and user access

Table 1. QFX5230-64CD system capacity

	MX960	MX480	MX240	MX204
Rack units	16	8	5	1
Systems per rack	3	6	9	48
Slots	11 MPCs	6 MPCs	2 MPCs	8 10GbE, 4 100GbE
Per slot capacity	1.5 Tbps	1.5 Tbps	1.5 Tbps	NA
Maximum system throughput¹	12 Tbps	7.5 Tbps	3 Tbps	400 Gbps
PDH	Yes	Yes	Yes	NA
Sonet/SDH	Yes	Yes	Yes	NA
Maximum 1GbE	440	240	80	24
Maximum 10GbE	528	300	120	24
Maximum 40GbE	132	75	30	4
Maximum 100GbE	120	75	30	4
Maximum 400GbE	24	15	6	NA
10GbE DWDM	88	48	16	8
100GbE DWDM	22	40	4	4

¹Full duplex maximum system throughput values (to determine half-duplex values, double system throughput)

to the router. In addition, unique cryptographic digital identity has been added to the Trusted Platform Module (TPM 2.0), which is embedded in the latest generation of REs. This addition enables device attestation and enhances security. REs communicate with MPCs via dedicated out-of-band management channels.

MPC-10E Line Card

The MPC-10E line card is a key contributor to the service provider transformation in the cloud era when deployed with MX960, MX480, and MX240 platforms in a HPE Secure Automated Distributed Cloud environment. By providing the underlying network infrastructure with scale, agility, routing innovation, and pervasive security while incorporating universal (10/40/100/400GbE) ports, the MPC-10E protects existing investments with disaggregated software innovation and infinite programmability. Built-in automation enables rapid deployment without disrupting the existing MX960/MX480/MX240 footprint. The MPC-10E line card is powered by Juniper Trio 5 silicon, which enables the benefits highlighted in Table 2.

Junos OS

Junos OS is a reliable, high performance, modular network operating system that is supported across all of HPE 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. With secure programming interfaces, 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.

The programmable Trio chipset

The programmable Trio chipset is HPE-developed breakthrough silicon technology that is implemented

across the MX Series portfolio. Its innovative design improves business economics by enabling a truly converged platform with maximum performance, service agility, and exceptional power and thermal efficiency.

Trio has a programmable forwarding data structure that allows fast microcode changes in the hardware itself, as well as a programmable lookup engine that allows inline service processing. Furthermore, Trio's programmable QoS engine supports coarse and fine-grained queuing to efficiently address the diverse requirements of core, edge, and aggregation use cases.

With its proven extensibility and agility, the programmable Trio chipset helps network operators worldwide successfully address their most complex technical and market challenges and promises to meet the requirements of emerging applications for many years to come.

Network edge services

MX Series platforms can host optionally licensed Junos OS-based network edge services at scale, both inline on MPCs as well as on dedicated service cards. Hosting network edge services on MX Series platforms reduces network cost and complexity by eliminating numerous elements, operating systems, and interconnections.

- MPCs support inline services using the programmable Trio chipset; supported services include flow monitoring, 1:1 Network Address Translation (NAT), port mirroring, generic routing encapsulation (GRE), IP tunneling, logical tunnels, lawful intercept, flow monitoring, and video monitoring.
- The MS-MPC and the MS-MIC provide dedicated processing for compute-intensive services such as carrier-grade NAT (CGNAT), IPSec, stateful firewall, deep packet inspection, flow monitoring, and load balancing.
- The MX-SPC3 provides security services such as carrier-grade NAT (CGNAT), IPSec, stateful firewall, deep packet inspection, IDS, traffic load balancing, web filtering, and DNS sinkhole.

Table 2. MPC-10E Line Card benefits at a glance

Attribute	Benefit
Performance	Triples MX960/MX480/MX240 chassis performance to 1/1.5 Tbps per slot with new SCBE3 fabric, enabling up to 12 Tbps throughput
Universal interfaces	Reduces interface sparing with multi-rate 10/40/100GbE interfaces
Power efficiency	Consumes ~0.5W per gigabit per system level
Inline data plane security	Features AES-256 MACsec line-side encryption
Investment protection	Backward compatible with existing MPCs and REs: MPC3E/ MPC4E/MPC5E/MPC7E, MX-SPC3, MPC2E/3E-NG, and 16x10G MPCs; RE-S-1800 and RE-S-X6 Routing Engine modules
Seamless deployment	Reuse deployed MX960/MX480/MX240 chassis, power modules, and fan trays

MX Series platform/feature matrix

Security	Firewall filters/ACLs	✓	✓	✓	✓
	DDoS — control plane	✓	✓	✓	✓
	DDoS — FlowSpec	✓	✓	✓	✓
	Stateless filters L2–L4	✓	✓	✓	✓
	Stateful services	✓	✓	✓	✓
Inline services	GRE reassembly	✓	✓	✓	✓
	1:1 NAT	✓	✓	✓	✓
	Flow monitoring	✓	✓	✓	✓
	Video monitoring	✓	✓	✓	✓
	Lawful intercept	✓	✓	✓	✓
	Mirroring	✓	✓	✓	✓
	Corero SmartWall Threat Defense Director	✓	✓	✓	✓
	SeiIntel Threat Intelligence	✓	✓	✓	No
Service Card supported services^{2, 4, 5}	Deep packet inspection	✓	✓	✓	No
	CGNAT	✓	✓	✓	No
	Flow monitoring	✓	✓	✓	No
	Server traffic load balancing ³	✓	✓	✓	No
	IPSec	✓	✓	✓	No
	Stateful firewall	✓	✓	✓	No
	HTTP header manipulation	✓	✓	✓	No
	Web filtering	✓	✓	✓	No
	DNS sinkhole	✓	✓	✓	No
	Intrusion detection system	✓	✓	✓	✓
Resiliency	Redundant RE	✓	✓	✓	No
	Unified ISSU	✓	✓	✓	No
	Nonstop active routing (NSR)	✓	✓	✓	No
	Fast restoration	✓	✓	✓	✓
	Operation, Administration, and Maintenance (OAM)	✓	✓	✓	✓

² Service Card supported services are available via optional software license and require an MX-SPC3, MS-MPC, or MS-MIC.

³ For more information, see juniper.net/documentation/en_US/junos/topics/concept/tdf-tlb-overview.html

⁴ Features are supported as part of the Broadband Gateway (BNG) solution

⁵ Flow Monitoring leverages the MS-MPC and MS-MIC service cards. The MX-SPC3 is not required to support Flow Monitoring as it runs inline on the MPC's

MX Series platform/feature matrix

System virtualization	Enhanced SLA and queuing	✓	✓	✓	✓
	Junos Fusion Edge (AD)	✓	✓	✓	✓
	Logical systems	✓	✓	✓	✓
	Virtual router/switch	✓	✓	✓	✓
	Path Computation Element Protocol (PCEP)	✓	✓	✓	✓
	OpenConfig	✓	✓	✓	✓
	YANG data modeling	✓	✓	✓	✓
	Juniper Extension Toolkit	✓	✓	✓	✓

Key features and benefits

Unmatched network availability

MX Series platforms ensure network and service availability with a broad set of multilayered physical, logical, and protocol-level resiliency features, including HPE Virtual Chassis technology, which supports chassis-level redundancy while enabling users to manage two routers as a single element. Additionally, a multichassis link aggregation group (MC-LAG) implementation supports stateful chassis, card, and port redundancy, as well as subscriber and session persistence.

Application aware networking

MX Series platforms use deep packet inspection to detect applications, and they consult with user-defined policies to determine traffic treatment on a per-application basis, enabling highly customized and differentiated services at scale. Working in conjunction with [Juniper Networks Contrail Cloud Platform](#), MX Series routers can also steer into complex service chains and stream granular data to analytics engines and back-office systems to permit real-time charging and end-user engagement at the application and content level.

Junos Continuity and unified In-Service Software Upgrade (Unified ISSU)

Junos Continuity and unified ISSU features remove 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 MX Series platforms; 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.

Junos Telemetry Interface

The Junos Telemetry Interface feature streams component-level data to monitoring, analytics, performance management, and visualization tools as well as to Path Computation Elements such as Juniper Networks NorthStar Controller. Analytics derived from this streaming telemetry can identify current and trending congestion, resource utilization, traffic volume, and buffer occupancy, which can be used to make informed decisions on network design and investments.

Integrated timing

MX Series platforms support highly scalable and reliable hardware-based timing that meets the strictest LTE requirements, including Synchronous Ethernet for frequency, and the Precision Time Protocol (PTP) for frequency and phase synchronization. Synchronous Ethernet and PTP can be combined in a “hybrid” mode to achieve the highest level of frequency (10 ppb) and phase (< 1.5 uS) accuracy required for LTE-Advanced, eliminating the need for external clocks.

Junos Fusion Provider Edge

Junos Fusion Provider Edge enables MX Series platforms to act as aggregation devices for the Juniper Networks EX4300 Ethernet Switch and QFX5100 line of data center switching platforms acting as satellite devices while appearing to management as a single, port-dense device managed by a single IP address. Junos Fusion Provider Edge significantly expands the number of network interfaces on the MX Series router while keeping operations simple.

Automated Support and Prevention

HPE Automated Support and Prevention consists of an ecosystem of tools, applications, and systems that simplify and streamline operations, delivering operational efficiency, reducing downtime, and increasing your network's ROI running Junos OS. Automated Support and Prevention brings operational efficiency by automating several time-consuming tasks such as incident management, inventory management, proactive bug notification, and on-demand End-of-Life/End-of-Support/End-of-Engineering (EOL/EOS/EOE) reports. The Junos Space ServiceNow and Service Insight service automation tools are standard entitlements of all Juniper Care contracts.

Junos Automation Toolkit and Juniper Extension Toolkit

Included in Junos OS software, the Junos Automation Toolkit is a suite of tools supported on all HPE Juniper Networking switches, routers, and security devices. These tools, which leverage the native XML capabilities of Junos OS, include commit scripts, op scripts, event policies and event scripts, and macros that help automate operational and configuration tasks. Additionally, the platform-independent Juniper Extension Toolkit provides a modern programming tool kit that includes support for:

- OpenConfig/YANG
- gRPC, Thrift, NETCONF
- JSON/XML
- API support for all modern programming languages
- Rich on-box scripting support using Python
- REST APIs

Together, Junos OS automation and programmability features simplify complex configurations and reduce the potential for configuration errors. They also save time by automating operational and configuration tasks, speed troubleshooting, and maximize network uptime by warning operators of potential problems and automatically responding to system events.

Security intelligence for the edge

The MX960, MX480, and MX240 can be used for advanced threat prevention when deployed as edge routers, further extending security coverage to applications and infrastructure.

Using HPE Seclntel capabilities, these MX Series routers offer another layer of network security by identifying and blocking command and control traffic discovered by [Juniper Threat Labs](#) and other industry-leading threat feeds, as well as by utilizing custom blacklists and whitelists at a network hardware level. This feature makes your MX Series router an information security enforcement point without having to invest in additional hardware.



MX960



MX480



MX240

Specifications

		MX960	MX480	MX240	MX204
Layout	System capacity	12 Tbps	7.5 Tbps	3 Tbps	400 Gbps
	Slot orientation	Vertical	Horizontal	Horizontal	NA
	Mounting	Front or center	Front or center	Front or center	Front or center
Physical specification	Dimensions (W x H x D)	17.37 x 27.75 x 23 in (44.11 x 70.49 x 58.42 cm)	17.45 x 14 x 24.5 in (44.3 x 35.6 x 62.2 cm)	17.45 x 8.71 x 24.5 in (44.3 x 22.1 x 62.2 cm)	17.6 x 1.75 x 18.7 in (44.7 x 4.45 x 47.5 cm)
	Weight fully loaded	334 lb/151.6 kg	180 lbs/81.6 kg	130 lb/59 kg	23.15 lb/10.5 kg
	Weight unloaded	150 lbs/68.1 kg	65.5 lbs/29.7 kg	52 lbs/23.6 kg	17 lb/7.71 kg
Routing engine	Default memory	2x16 MB NOR flash storage; 64 GB of DDR4 RAM; 2x50 GB SSD	2x16 MB NOR flash storage; 64 GB of DDR4 RAM; 2x50 GB SSD	2x16 MB NOR flash storage; 64 GB of DDR4 RAM; 2x50 GB SSD	32 GB DDR4; 2x100 GB SSD
	Number of cores	6 cores	6 cores	6 cores	8 cores
Redundancy	Components	Power supplies, REs, fans	Power supplies, REs, fans	Power supplies, REs, fans	Power supplies and fans
Environmental	Air flow	Front to back	Side to side	Side to side	Front to back
	Operating temperature	32° to 115° F (0° to 46° C) at sea level	32° to 115° F (0° to 46° C) at sea level	32° to 115° F (0° to 46° C) at sea level	32° to 115° F (0° to 46° C) at sea level
	Operating humidity	5% to 90%	5% to 90%	5% to 90%	5% to 90%
	Operating altitude	10,000 ft (3048 m)	10,000 ft (3048 m)	10,000 ft (3048 m)	6,000 ft (1900 m)
Certifications	NEBS	— GR-1089-Core EMC and Electrical Safety	— GR-1089-Core EMC and Electrical Safety	— GR-1089-Core EMC and Electrical Safety	— GR-1089-Core EMC and Electrical Safety
		— Common Bonding Network (CBN)	— Common Bonding Network (CBN)	— Common Bonding Network (CBN)	— Common Bonding Network (CBN)
		— National Electrical Code (NEC)	— National Electrical Code (NEC)	— National Electrical Code (NEC)	— National Electrical Code (NEC)
		— GR-63-Core Physical Protection	— GR-63-Core Physical Protection	— GR-63-Core Physical Protection	— GR-63-Core Physical Protection

Ordering information

MX204 base product bundles

Product	Product number	Description
MX204	MX204-HW-BASE	MX204 chassis with 3 fan trays and 2 power supplies. MX204 integrated SKU with base HW + standard Junos SW, Perpetual
	MX204-HWBASE- AC-FS	MX204 chassis with 3 fan trays and 2 power supplies, R mode MX204 Fixed AC System — HW and standard Junos; feature right to use must be ordered separately
	MX204-HWBASE- DC-FS	MX204 chassis with 3 fan trays and 2 power supplies, IR mode. MX204 Fixed DC System — HW and standard Junos; feature right to use must be ordered separately

MX204 chassis

Product	Product number	Description
MX204	JNP204-CHAS	MX204 chassis, spare

MX204 power supply

Product	Product number	Description
MX204	JPSU-650W-AC-AO	MX204 AC power supply, spare
	JPSU-650W-DC-AFO	MX204 DC power supply, spare

MX204 fan trays

Product	Product number	Description
MX204	JNP-FAN-1RU	MX204 fan tray

MX240, MX480, and MX960 base bundles

Product	Product number	Description
MX240	MX240BASE-AC-HIGH	4 slot MX240 base chassis with 1 AC power supply, 1 SCB
	MX240BASE-AC-LOW	4 slot MX240 base chassis with 2 AC power supplies, 1 SCB
	MX240BASE3-DC	4 slot MX240 base 3 chassis, DC power
	MX240BASE-DC	4 slot MX240 base chassis with 1 fan tray, 1 DC power supply, 1 SCB
	MX240BASE3-ACH	4 slot MX240 base 3 chassis, highline AC power
	MX240BASE3-ACL	4 slot MX240 base chassis, lowline AC power
MX480	MX480BASE3-AC	8 slot MX480 base bundle, AC power
	MX480BASE-AC	8 slot MX480 AC base chassis, 1 fan tray, 3 AC power supplies, 1 SCB, 1 RE
	MX480BASE3-DC	8 slot MX480 base 3 chassis, DC power
	MX480BASE-DC	8 slot MX480 base chassis with 1 fan tray, 2 DC power supplies, 1 SCB, 1 RE
MX960	MX960BASE3-AC	14 slot MX960 base 3 chassis, AC power
	MX960BASE-AC	14 slot MX960 base chassis with 2 fan trays, 3 AC power supplies, 2 SCBs, 1 RE
	MX960BASE3-AC-ECM	14 slot MX960 base 3 chassis with AC power and extended cable manager
	MX960BASE-AC-ECM	14 slot MX960 base chassis with AC power and extended cable manager
	MX960BASE3-DC	14 slot MX960 base 3 chassis, DC power
	MX960BASE-DC	14 slot MX960 base chassis with 2 fan trays, 2 DC power supplies, 2 SCBs, 1 RE
	MX960BASE3-DC-ECM	14 slot MX960 base 3 chassis with DC power and extended cable manager
	MX960BASE-DC-ECM	14 slot MX960 base chassis with DC power extended cable manager

MX240, MX480 and MX960 premium bundles

Product	Product number	Description
MX240	MX240-PREMIUM2-AC-HIGH	4 slot MX240 premium 2 chassis with midplane, redundant RE, SCBEs, highline AC power
	MX240-PREMIUM2-AC-LOW	4 slot MX240 premium 2 chassis with midplane, redundant RE, SCBEs, lowline AC power
	MX240-PREMIUM2-DC	4 slot MX240 premium 2 chassis with midplane, redundant RE, SCBEs, DC power
	MX240-PREMIUM3-ACH	4 slot MX240 premium 3 chassis with enhanced midplane, redundant RE, SCBEs, highline AC power
	MX240-PREMIUM3-ACL	4 slot MX240 premium 3 chassis with enhanced midplane, redundant RE, SCBEs, lowline AC power
MX480	MX480-PREMIUM2-AC	8 slot MX480 premium 2 chassis with midplane, redundant RE, SCBEs, AC power
	MX480-PREMIUM2-DC	8 slot MX480 premium 2 chassis with midplane, redundant RE, SCBEs, DC power
	MX480-PREMIUM3-AC	8 slot MX480 premium 3 chassis with enhanced midplane, redundant RE, SCBEs, AC power
	MX480-PREMIUM3-DC	8 slot MX480 premium 3 chassis with enhanced midplane, redundant RE, SCBEs, DC power
	MX960-PREMIUM2-AC-ECM	14 slot MX960 premium 2 chassis with midplane, redundant Routing Engine, SCBEs, AC power, and extended cable manager
MX960	MX960-PREMIUM2-DC-ECM	14 slot MX960 premium 2 chassis with midplane, redundant Routing Engine, SCBEs, DC power, and extended cable manager
	MX960-PREMIUM3-AC-ECM	14 slot MX960 premium 3 chassis with enhanced midplane, redundant Routing Engine, SCBEs, AC power, and extended cable manager
	MX960-PREMIUM3-DC-ECM	14 slot MX960 premium 3 chassis with enhanced midplane, redundant Routing Engine, SCBEs, DC power, and extended cable manager
	MX960-PREMIUM2-AC	14 slot MX960 premium 2 chassis with midplane, redundant Routing Engine, SCBEs, AC power
	MX960-PREMIUM2-DC	14 slot MX960 premium 2 chassis with midplane, redundant Routing Engine, SCBEs, DC power
	MX960-PREMIUM3-AC	14 slot MX960 premium 3 chassis with enhanced midplane, redundant Routing Engine, SCBEs, AC
	MX960-PREMIUM3-DC	14 slot MX960 premium 3 chassis with enhanced midplane, redundant Routing Engine, SCBEs, DC power

MX240, MX480, and MX960 chassis

	MX240	MX480	MX960
DC Chassis	MX240BASE-DC, MX240BASE3-DC	MX480BASE-DC, MX480BASE3-DC	MX960BASE3-DC; MX960BASE-DC
AC Chassis	MX240BASE-AC, MX240BASE3-ACH, MX240BASE3-ACL	MX480BASE-AC, MX480BASE3-AC	MX960BASE3-AC; MX960BASE-AC

X240, MX480, and MX960 power supplies

Product	Product number	Description
MX240	PWR-MX480-2400-DC-BB	MX480/MX240 2400W DC P/S, base bundle
MX480	PWR-MX480-2400-DC-R	MX480/MX240 2400W DC P/S, redundant
	PWR-MX480-2400-DC-S	MX480/MX240 2400W DC P/S, spare
	PWR-MX480-2520-AC-BB	MX480/MX240 2520W AC P/S, base bundle
	PWR-MX480-2520-AC-R	MX480/MX240 2520W AC P/S, redundant
	PWR-MX480-2520-AC-S	MX480/MX240 2520W AC P/S, spare
MX960	MX960-PSM-5K-AC-BB	MX960 5000W AC power supply, base bundle
	MX960-PSM-5K-AC-R	MX960 5000W AC power supply, redundant
	MX960-PSM_5K-AC-S	MX960 5000W AC power supply, spare
	MX960-PSM-HV-BB	MX960 High Voltage Power, base bundle
	MX960-PSM-HV-R	MX960 High Voltage Power, redundant
	MX960-PSM-HV-S	MX960 High Voltage Power, spare
	PWR-MX960-4100-AC-BB	MX960 4100W AC power supply, base bundle
	PWR-MX960-4100-AC-R	MX960 4100W AC power supply, redundant
	PWR-MX960-4100-AC-S	MX960 4100W AC power supply, spare
	PWR-MX960-4100-DC-BB	MX960 4100W DC power supply, base bundle
	PWR-MX960-4100-DC-R	MX960 4100W DC power supply, redundant
	PWR-MX960-4100-DC-S	MX960 4100W DC power supply, spare

MPCs

Product Number	Description
MPC10E-10C-P-BASE	Fixed 8xQSFP28 multirate ports (10/40/100GbE) plus 2xQSFP56-DD multirate ports (10/40/100/400GbE) line card bundle with standard Junos software, perpetual
MPC10E-15C-P-BASE	Fixed 12xQSFP28 multirate ports (10/40/100GbE) plus 3xQSFP56-DD multirate ports (10/40/100/400GbE) line card bundle with standard Junos software, perpetual
MPC7E-10G	Fixed 40x10GbE line card bundle with full-scale L2/L2.5 and reduced scale L3 features; optional license permits up to 32,000 queues with HQoS
MPC7E-10G-RB	Fixed 40x10GbE line card bundle with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/ L2.5, L3, and L3VPN features
MPC7E-10G-I-RB	Fixed 40x10GbE line card bundle with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/ L2.5, L3 features, and up to 16 L3VPN instances
MPC7E-MRATE	Fixed 12xQSFP line card bundle for the MPC7-MRATE only; all ports support 4x10GbE and 40GbE, and 4 ports support 100GbE (QSFP 28), with full-scale L2/L2.5 and reduced scale L3 features; optional license permits up to 32,000 queues with HQoS
MPC7E-MRATE-RB	Fixed 12xQSFP line card bundle for the MPC7-MRATE only; all ports support 4x10GbE and 40GbE, and 4 ports support 100GbE (QSFP 28); includes full-scale L2/L2.5, L3, and L3VPN features
MPC7E-MRATE-I-RB	Fixed 12xQSFP line card bundle for the MPC7-MRATE only; all ports support 4x10GbE and 40GbE, and 4 ports support 100GbE (QSFP 28); includes full-scale L2/L2.5 and L3 features and up to 16 L3VPN instances

Product number	Description
MPCs (continued)	
MPC7E-MRATE-Q	Fixed 12xQSFP line card for the MPC7-MRATE only; all ports support 4x10GbE and 40GbE, and 4 ports support 100GbE (QSFP 28) with HQoS; supports 1 million queues and 128,000 sessions; with full-scale L2/L2.5 and reduced scale L3 features
MPC7E-MRATE-Q-RB	Fixed 12xQSFP line card bundle; all ports support 4x10GbE and 40GbE, and 4 ports support 100GbE (QSFP 28) with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/L2.5, L3, and L3VPN features
MPC7E-MRATE-Q-I-RB	Fixed 12xQSFP line card bundle for the MPC7-MRATE only; all ports support 4x10GbE and 40GbE, and 4 ports support 100GbE (QSFP 28) with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/L2.5, L3 features, and up to 16 L3VPN instances
MPC5E-100G10G	Fixed 2x100GbE and 4x10GbE line card bundle with full-scale L2/L2.5 and reduced scale L3 features; optional license permits up to 32,000 queues with HQoS
MPC5E-100G10G-IRB	Fixed 2x100GbE and 4x10GbE line card bundle with full-scale L2/L2.5, L3 features and up to 16 L3VPN instances; optional license permits up to 32,000 queues with HQoS
MPC5E-100G10G-RB	Fixed 2x100GbE and 4x10GbE line card bundle with full-scale L2/L2.5, L3, and L3VPN features; optional license permits up to 32,000 queues with HQoS
MPC5E-40G10G	Fixed 6x40GbE or 24x10GbE line card bundle with full-scale L2/L2.5 and reduced scale L3 features; optional license permits up to 32,000 queues with HQoS
MPC5E-40G10G-IRB	Fixed 6x40GbE or 24x10GbE line card bundle with full-scale L2/L2.5, L3 features and up to 16 L3VPN instances; optional license permits up to 32,000 queues with HQoS
MPC5E-40G10G-RB	Fixed 6x40GbE or 24x10GbE line card bundle with full-scale L2/L2.5, L3, and L3VPN features; optional license permits up to 32,000 queues with HQoS
MPC5EQ-100G10G	Fixed 2x100GbE and 4x10GbE line card bundle with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/L2.5 and reduced scale L3 features
MPC5EQ-100G10G-IRB	Fixed 2x100GbE and 4x10GbE line card bundle with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/L2.5, L3 features, and up to 16 L3VPN instances
MPC5EQ-100G10G-RB	Fixed 2x100GbE and 4x10GbE line card bundle with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/L2.5, L3, and L3VPN features
MPC5EQ-40G10G	Fixed 6x40GbE or 24x10GbE line card bundle with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/L2.5 and reduced scale L3 features
MPC5EQ-40G10G-IRB	Fixed 6x40GbE or 24x10GbE line card bundle with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/L2.5, L3 features, and up to 16 L3VPN instances
MPC5EQ-40G10G-RB	Fixed 6x40GbE or 24x10GbE line card bundle with HQoS; supports 1 million queues and 128,000 sessions; includes full-scale L2/L2.5, L3, and L3VPN features
MPC4E-3D-2GE	Fixed 2x100GbE and 8x10GbE line card bundle with full-scale L2/L2.5 and reduced scale L3 feature
MPC4E-3D-32XGE-SFPP	Fixed 32x10GbE line card bundle with full-scale L2/L2.5 and reduced scale L3 features
MPC4E-3D-2CGE-8XGE-IRB	Fixed 2x100GbE and 8x10GbE line card bundle with full-scale L2/L2.5, L3 features; up to 16 L3VPNs per MPC
MPC4E-3D-32XGE-IRB	Fixed 32x10GbE SFPP line card bundle with full-scale L2/L2.5, L3 features; up to 16 L3VPNs per MPC
MPC4E-3D-2CGE8XGE-RB	Fixed 2x100GbE and 8x10GbE line card bundle with full-scale L2/L2.5, L3, and L3VPN features
MPC4E-3D-32XGE-RB	Fixed 32XGbE small form-factor pluggable transceiver (SFP) line card bundle with full-scale L2/L2.5, L3, and L3VPN features

Product number	Description
MPCs (continued)	
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, L3VPNs features; optics sold separately
MPC3E-3D-NG	Next-generation MPC3E with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5 and reduced scale L3 features; flexible queuing option enables HQoS support with up to 32,000 total queues; supports all MICs supported by MPC1E, MPC2E, and MPC3E
MPC3E-3D-NG-IR-B	Next-generation MPC3E line card bundle with upgraded CPU and memory; offers full feature parity with the MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5 and L3 features and up to 16 L3VPNs per MPC; flexible queuing option enables HQoS support with up to 32,000 total queues; supports all MICs supported by the MPC1E, MPC2E, and MPC3E
MX-MPC3E-3D-R-B	MPC3E with support for 100GbE, 40GbE, and 10GbE interfaces; includes full-scale L2, L3, L3VPNs features; optics sold separately
MPC3E-3D-NG	Next-generation MPC3E with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5 and reduced scale L3 features; flexible queuing option enables HQoS support with up to 32,000 total queues; supports all MICs supported by MPC1E, MPC2E, and MPC3E
MPC3E-3D-NG-IR-B	Next-generation MPC3E line card bundle with upgraded CPU and memory; offers full feature parity with the MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5 and L3 features and up to 16 L3VPNs per MPC; flexible queuing option enables HQoS support with up to 32,000 total queues; supports all MICs supported by the MPC1E, MPC2E, and MPC3E
MPC3E-3D-NG-R-B	Next-generation MPC3E line card bundle with upgraded CPU and memory; offers full feature parity with the MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, L3, and L3VPNs features; flexible queuing option enables HQoS support with up to 32,000 total queues; supports all MICs supported by the MPC1E, MPC2E, and MPC3E
MPC3E-3D-NG-Q	Next-generation MPC3E with upgraded CPU and memory; offers full feature parity with the MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5 features, reduced scale L3 features, and HQoS with up to 512,000 queues per slot; supports all MICs supported by the MPC1E, MPC2E, and MPC3E
MPC3E-3D-NG-Q-IR-B	Next-generation MPC3E line card bundle with upgraded CPU and memory; offers full feature parity with the MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, L3, and up to 16 L3VPNs features, and HQoS with up to 512,000 queues per slot; supports all MICs supported by the MPC1E, MPC2E, and MPC3E
MPC3E-3D-NG-Q-R-B	Next-generation MPC3E line card bundle with upgraded CPU and memory; offers full feature parity with the MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5 features, L3 features, and HQoS with up to 512,000 queues per slot; supports all MICs supported by the MPC1E, MPC2E, and MPC3E
MPC-3D-16XGE-SFPP	Fixed 16x10GbE line card bundle with L2.5 features
MPC-3D-16XGE-SFPP-R-B	Fixed 16x10GbE line card bundle with full-scale L2/L2.5 and L3 features
MPC2E-3D-NG	Next-generation MPC2E with upgraded CPU and memory; offers full feature parity with the MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5 and reduced scale L3 features; flexible queuing option enables HQoS support with up to 32,000 total queues; supports all MICs supported by MPC1E and MPC2E
MPC2E-3D-NG-IR-B	Next-generation MPC2E line card bundle with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, L3 features, and up to 16 L3VPNs per MPC; flexible queuing option enables HQoS support with up to 32,000 total queues; supports all MICs supported by MPC1E and MPC2E
MPC2E-3D-NG-R-B	Next-generation MPC2E line card bundle with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, L3, and L3VPNs features; flexible queuing option enables HQoS support with up to 32,000 total queues; supports all MICs supported by MPC1E and MPC2E

Product number	Description
MPCs (continued)	
MPC2E-3D-NG-Q	Next-generation MPC2E with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, reduced scale L3 features, and HQoS with up to 512,000 queues per slot; supports all MICs supported by MPC1E and MPC2E
MPC2E-3D-NG-Q-IR-B	Next-generation MPC2E line card bundle with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, L3, and up to 16 L3VPN features, and HQoS with up to 512,000 queues per slot; supports all MICs supported by MPC1E and MPC2E
MPC2E-3D-NG-R-B	Next-generation MPC2E line card bundle with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, L3, and L3VPN features; flexible queuing option enables HQoS support with up to 32,000 total queues; supports all MICs supported by MPC1E and MPC2E
MPC2E-3D-NG-Q	Next-generation MPC2E with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, reduced scale L3 features, and HQoS with up to 512,000 queues per slot; supports all MICs supported by MPC1E and MPC2E
MPC2E-3D-NG-Q-IR-B	Next-generation MPC2E line card bundle with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, L3, up to 16 L3VPN features, and HQoS with up to 512,000 queues per slot; supports all MICs supported by MPC1E and MPC2E
MPC2E-3D-NG-Q-R-B	Next-generation MPC2E line card bundle with upgraded CPU and memory; offers full feature parity with MPC1E, MPC2E, and MPC3E; includes full-scale L2/L2.5, L3 features, and HQoS with up to 512,000 queues per slot; supports all MICs supported by MPC1E and MPC2E
MX-MPC2-3D	MPC2 with port queuing; includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC2-3D-EQ	MPC2 line card bundle with per-IFL HQoS, 512,000 queues; includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC2-3D-EQ-R-B	MPC2 line card bundle with per-IFL HQoS, 512,000 queues; includes full-scale L3, L2, and L2.5 features
MX-MPC2-3D-Q	MPC2 line card bundle with per-IFL HQoS, 256,000 queues (max 128,000 egress); includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC2-3D-Q-R-B	MPC2 line card bundle; includes full-scale L3, L2, and L2.5 features
MX-MPC2-3D-R-B	MPC2 line card bundle; includes full-scale L3, L2, and L2.5 features
MX-MPC2E-3D-R-B	Enhanced MPC2 line card bundle; includes full-scale L3, L2, and L2.5 features
MX-MPC2E-3D	Enhanced MPC2 with port queuing; includes full-scale L2/ L2.5 and reduced scale L3 features
MX-MPC2E-3D-EQ	Enhanced MPC2 with per-IFL HQoS, 512,000 queues; includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC2E-3D-EQ-R-B	Enhanced MPC2 line card bundle; includes full-scale L3, L2, and L2.5 features
MX-MPC2E-3D-P	Enhanced MPC2 with 1588v2, port queuing; includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC2E-3D-P-Q-B	Enhanced MPC2 line card bundle; includes 1588v2, per-IFL HQoS, 256,000 queues (maximum 128,000 egress), full-scale L2/L2.5 and reduced scale L3 features
MX-MPC2E-3D-P	Enhanced MPC2 with 1588v2, port queuing; includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC2E-3D-P-Q-B	Enhanced MPC2 line card bundle; includes 1588v2, per-IFL HQoS, 256,000 queues (maximum 128,000 egress), full-scale L2/L2.5 and reduced scale L3 features
MX-MPC2E-3D-Q	Enhanced MPC2 line card bundle; includes per-IFL HQoS, 256,000 queues (maximum 128,000 egress); includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC2E-3D-Q-R-B	Enhanced MPC2E line card bundle; includes per-IFL HQoS, 256,000 queues (maximum 128,000 egress); includes full-scale L3, L2, and L2.5 features

Product number	Description
MPCs (continued)	
MX-MPC1-3D	MPC1 with port queuing; includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC1-3D-Q	MPC1 with per-IFL HQoS, 128,000 queues (maximum 64,000 egress); includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC1-3D-Q-R-B	MPC1 line card bundle; includes full-scale L3, L2, and L2.5 features
MX-MPC1-3D-R-B	MPC1 line card bundle; includes full-scale L3, L2, and L2.5 features
MX-MPC1E-3D	Enhanced MPC1 with port queuing; includes full-scale L2/ L2.5 and reduced scale L3 features
MX-MPC1E-3D-Q	Enhanced MPC1 with per-IFL HQoS, 128,000 queues (maximum 64,000 egress); includes full-scale L2/L2.5 and reduced scale L3 features
MX-MPC1E-3D-Q-R-B	Enhanced MPC1 with per-IFL HQoS, 128,000 queues (maximum 64,000 egress) line card bundle; includes full-scale L3, L2, and L2.5 features
MX-MPC1E-3D-R-B	Enhanced MPC1 line card bundle; includes full-scale L3, L2, and L2.5 features
MS-MPC-128	Multiservices MPC supports a variety of optionally licensed applications, including stateful firewall, carrier-grade NAT, IPsec, and deep packet inspection (DPI); each purchased separately
MX-SPC3	Security services card supports a variety of optionally licensed applications, including stateful firewall, carrier-grade NAT, IPsec, deep packet inspection (DPI), IDS, traffic load balancing, web filtering, and DNS sinkhole

Modular interface cards

Product number	Description
MIC3-3D-10XGE-SFPP	MIC with 10x10GbE small form-factor pluggable plus transceiver (SFP+) interface; optics sold separately
MIC3-3D-1X100GE-CFP	MIC with 1x100GbE C form-factor pluggable transceiver (CFP) interface; optics sold separately
MIC3-3D-1X100GE-CXP	MIC with 1x100GbE 100-gigabit small form-factor pluggable transceiver (CXP) interface; optics sold separately
MIC3-100G-DWDM	MIC with 1x100GbE OTU4 dense wavelength-division multiplexing (DWDM) PIC, DP-QPSK, full C-band tunable, GFEC, HG FEC, SDFEC; requires MPC3E or MPC3E-NG; optics sold separately
MIC3-3D-2X40GE-QSFPP	MIC with 2x40GbE quad small form-factor pluggable plus transceiver (QSFP+) interface; optics sold separately
MIC-3D-1CHOC48	1 port channelized OC48/channelized STM16 (down to DSO) MIC
MIC-3D-1OC192-XFP	1 port OC192/STM64 MIC
MIC-3D-20GE-SFP	20x10/100/1000 MIC for MX Series; requires optics sold separately
MIC-3D-2XGE-XFP	2x10GbE MIC for MX Series; requires optics sold separately
MIC-3D-40GE-TX	40x10/100/1000 RJ-45 full height MIC (fixed optics)
MIC-3D-4CHOC3-2CHOC12	4 port channelized OC3/2 port channelized OC12 (down to DSO) MIC
MIC-3D-4COC3-1COC12-CE	Multi-rate circuit emulation MIC; 4 port channelized OC3/STM1 (to DSO) or 1 port channelized OC12/STM4 (to DSO)
MIC-MACSEC-20GE	2x10GbE/20x10GbE MACsec MIC for MX104/ MX240/MX480/MX960, supports both 128b AES and 256b AES MACsec
MS-MIC-16	Multiservices MIC supports a variety of optionally licensed applications, including stateful firewall, carrier-grade NAT, IPsec, and deep packet inspection (DPI); each purchased separately
MIC-3D-10GE-SFP-E	10x1GbE with MACsec and PTP
S-MIC-3D-10X10GE	Enable 10GbE on MIC-3D-10GE-SFP-E

Routing engines

Product number	Description
RE-S-X6-64G-BB	6 Core 2.0 GHz CPU and 64 GB memory, base bundle
RE-S-X6-64G-S	6 Core 2.0 GHz CPU and 64 GB memory, spare
RE-S-X6-64G-R	6 Core 2.0 GHz CPU and 64 GB memory, redundant RE
RE-S-X6-64G-LT-S	6 Core 2.0 GHz CPU with 64 GB memory, limited encryption version, spare
RE-S-X6-64G-LT-BB	6 Core 2.0 GHz CPU with 64 GB memory, limited encryption version, base bundle
RE-S-X6-64G-LT-R	6 Core 2.0 GHz CPU with 64 GB memory, limited encryption version, redundant
RE-S-X6-128G-S-BB	6 Core 2.0 GHz CPU with 128 GB memory, base bundle
RE-S-X6-128G-S-S	6 Core 2.0 GHz CPU with 128 GB memory, spare
RE-S-X6-128G-S-R	6 Core 2.0 GHz CPU with 128 GB memory, redundant
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
RE-S-1800X4-32G-BB	Quad core 1.8 GHz CPU with 32 GB memory, base bundle
RE-S-1800X4-32G-R	Quad core 1.8 GHz CPU with 32 GB memory, redundant
RE-S-1800X4-32G-S	Quad core 1.8 GHz CPU with 32 GB memory, spare
RE-S-1800X4-32G-UB	Quad core 1.8 GHz CPU with 32 GB memory, upgrade for base bundle
RE-S-1800X4-32G-WS	Quad core 1.8 GHz CPU with 32 GB memory, worldwide version

Switch Control Board

Product number	Description
SCB-MX960-BB	SCB for MX240, MX480, and MX960
SCBE-MX-BB	Enhanced Switch Control Board (SCBE) for MX240, MX480, and MX960
SCBE2-MX-BB	SCBE for MX240, MX480, and MX960
SCBE3-MX-BB	1.5 T fabric card for MX240, MX480, and MX960

Broadband Network Gateway (BNG) licensing

Subscriber Access feature pack licenses

One Subscriber Access (SA) license is required per chassis, and provides:

- Per-subscriber RADIUS accounting (time- and volume-based)
- RADIUS-based authentication and authorization
- Subscriber configuration via client profiles at subscriber login
- RADIUS and/or SDX-based address (pool) management
- Static and dynamic IP management
- Dynamic auto-sensed VLANs

Product number	Description
S-SA-FP2	Subscriber Access feature pack license for MX240, MX480, MX960, MX2010, and MX2020

Subscriber Services Management feature pack licenses

Subscriber Services Management licenses are optional additions to Subscriber Access licenses that offer:

- Per-service RADIUS accounting (time- and volume-based)
- Service profile activation/deactivation at subscriber login via RADIUS grants/access accepts (services activation/deactivation VSAs); or change existing sessions via RADIUS COA/RID or Session and Resource Control (SRC)
- Parameterization of service profiles
- ANCP QoS adjustment based on sync rate via Access Node Control Protocol (ANCP)

Product number	Description
S-SSM-FP	Subscriber Service Management feature pack license (RADIUS/SRC-based service activation/deactivation); per-service accounting features for subscribers, for MX240, MX480, MX960, MX2010, and MX2020
S-SSP-FP	Subscriber Traffic Lawful Intercept feature pack License, for MX240, MX480, MX960, MX2010, and MX2020
S-BB-NASREQ	Junos Broadband Policy Enforcement feature license for dynamic subscriber authentication and authorization using NASREQ, for MX240, MX480, MX960, MX2010, and MX2020

Additional Subscriber Services Management licenses are available to support Inline L2TP LNS Tunneling, Subscriber-Based Lawful Intercept, Virtual Chassis, and interface with policy management systems, as indicated in the table below.

Product number	Description
S-BB-GX	Junos Broadband Policy Enforcement feature license for PCRF communications using 3GPP Gx and Gx+, for MX240, MX480, MX960, MX2010, and MX2020
S-BB-GY	Junos Broadband Policy Enforcement feature license for online charging using 3GPP Gy interface, for MX240, MX480, MX960, MX2010, and MX2020
S-LNS-IN	Software license for Inline L2TP LNS, for MX240, MX480, MX960, MX2010, and MX2020
S-VCR	Software license for single member of an MX Series Virtual Chassis

Subscriber Access scale licenses

These tiered licenses support from 4000 to 256,000 sessions and are bound to one chassis.

Product number	Description
S-SA-4K	Subscriber scale license, up to 4000 subscribers
S-SA-8K	Subscriber scale license, up to 8000 subscribers
S-SA-16K	Subscriber scale license, up to 16,000 subscribers
S-SA-32K	Subscriber scale license, up to 32,000 subscribers
S-SA-64K	Subscriber scale license, up to 64,000 subscribers
S-SA-128K	Subscriber scale license, up to 128,000 subscribers
S-SA-256K	Subscriber scale license, up to 256,000 subscribers

Subscriber Access scale upgrade licenses

These tiered licenses support from 4000 to 256,000 sessions and are bound to one chassis.

Product number	Description
S-SA-UP-8K	Subscriber scale upgrade, from 4000 to 8000 subscribers
S-SA-UP-16K	Subscriber scale upgrade, from 8000 to 16,000 subscribers
S-SA-UP-32K	Subscriber scale upgrade, from 16,000 to 32,000 subscribers
S-SA-UP-64K	Subscriber scale upgrade, from 32,000 to 64,000 subscribers
S-SA-UP-96K	Subscriber scale upgrade, from 64,000 to 96,000 subscribers
S-SA-UP-128K	Subscriber scale upgrade, from 96,000 to 128,000 subscribers
S-SA-UP-256K	Subscriber scale upgrade, from 128,000 to 256,000 subscribers

Flex licensing

MX204

Product number	Description
Base hardware	
MX204-HW-BASE	MX204-HW-BASE integrated SKU with base hardware and standard Junos software, perpetual
Software	
S-MX-4C-A1-C1-1*	MX Series Advanced software feature subscription license for 1-year term; 4x100GbE software support included; valid for subscription renewals only
S-MX-4C-A1-C1-3	MX Series Advanced software feature subscription license for 3-year term; 4x100GbE software support included
S-MX-4C-A1-C1-5	MX Series Advanced software feature subscription license for 5-year term; 4x100GbE software support included
S-MX-4C-A1-C1-P	MX Series Advanced software feature perpetual license; 4x100GbE; software support not included
S-MX-4C-P1-C1-1*	MX Series Premium software feature subscription license for 1-year term; 4x100GbE software support included; valid for subscription renewals only

* 1-year term license for Advanced and Premium tier are renewal only

Product number	Description
Software (continued)	
S-MX-4C-P1-C1-3	MX Series Premium software feature subscription license for 3-year term; 4x100GbE software support included
S-MX-4C-P1-C1-5	MX Series Premium software feature subscription license for 5-year term; 4x100GbE software support included
S-MX-4C-P1-C1-P	MX Series Premium software feature perpetual license; 4x100GbE; software support not included

MX240, MX480, MX960

Product number	Description
MPC10E-10C base hardware	
MPC10E-10C-P-BASE	Fixed 8xQSFP28 multirate ports (10/40/100GbE) plus 2xQSFP56- DD multirate ports (10/40/100/400GbE) line card bundle with standard Junos software, perpetual
MPC10E-10C software	
S-MX-10C-A1-1*	MX Series Advanced software feature subscription license for 1-year term; 10x100GbE software support included; valid for subscription renewals only
S-MX-10C-A1-3	MX Series Advanced software feature subscription license for 3-year term; 10x100GbE software support included
S-MX-10C-A1-5	MX Series Advanced software feature subscription license for 5-year term; 10x100GbE software support included
S-MX-10C-A1-P	MX Series Premium software feature perpetual license; 10x100GbE; software support not included
S-MX-10C-P1-1*	MX Series Premium software feature subscription license for 1-year term; 10x100GbE software support included; valid for subscription renewals only
S-MX-10C-P1-3	MX Series Premium software feature subscription license for 3-year term; 10x100GbE software support included
S-MX-10C-P1-5	MX Series Premium software feature subscription license for 5-year term; 10x100GbE software support included
S-MX-10C-P1-P	MX Series Premium software feature perpetual license; 10x100GbE; software support not included
MPC10E-15C base hardware	
MPC10E-15C-P-BASE	Fixed 12xQSFP28 multirate ports (10/40/100GbE) plus 3xQSFP56- DD multirate ports (10/40/100/400GbE) line card bundle with standard Junos software, perpetual
MPC10E-15C software	
S-MX-15C-A1-1*	MX Series Advanced software feature subscription license for 1-year term; 15x100GbE software support included; valid for subscription renewals only
S-MX-15C-A1-3	MX Series Advanced software feature subscription license for 3-year term; 15x100GbE software support included
S-MX-15C-A1-5	MX Series Advanced software feature subscription license for 5-year term; 15x100GbE software support included
S-MX-15C-A1-P	MX Series Premium software feature perpetual license; 15 x100GbE; software support not included

* 1-year term license for Advanced and Premium tier are renewal only

Product number	Description
MPC10E-15C software (continued)	
S-MX-15C-P1-1*	MX Series Premium software feature subscription license for 1-year term; 15x100GbE software support included; valid for subscription renewals only
S-MX-15C-P1-3	MX Series Premium software feature subscription license for 3-year term; 15x100GbE; software support included
S-MX-15C-P1-5	MX Series Premium software feature subscription license for 5-year term; 15x100GbE software support included
S-MX-15C-P1-P	MX Series Premium software feature perpetual license; 15x100GbE; software support not included

* 1-year term license for Advanced and Premium tier are renewal only

Junos OS

- USA: Junos OS
- Worldwide: Junos-WW

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