MX10003 5G Universal Routing Platform

Product Overview

Juniper's Secure Automated Distributed Cloud solution enables service providers to quickly react to changing market conditions in the cloud era, accelerating service delivery with world-class products and innovative architectural components.

The MX10003 is an integral part of this solution, offering massive scale and efficiency for space- and power-constrained environments. The MX10003 redefines per-slot economics, letting customers do more with less while simplifying network design, reducing OpEx, and enabling the profitable delivery of a broad range of business, residential, mobile, cable, data center, and cloud services—all while seamlessly supporting traditional and emerging network architectures.

Product Description

Service providers and cloud operators are making infrastructure investments today that pave the way for digital cohesion as a means of enhancing the user experience and enabling emerging market trends with mobility, IoT, and the continued growth of cloud networking. At the same time, these providers and operators are building out their networks to ensure performance, efficiency, and agility at cloud-era scale. In order to achieve these business goals and succeed in their respective hyper-competitive markets, service providers and cloud operators need software-centric edge solutions that address current demand while offering investment protecting evolution to emerging technologies and growth.

Realizing this edge vision requires service-oriented edge platforms with the density and throughput needed to accommodate traffic growth driven by ubiquitous video content and media-rich business services, as well as the anticipated traffic growth generated by emerging technology trends like Internet of Things, connected vehicles, and smart cities.

Juniper Networks® MX10003 5G Universal Routing Platform is a cloud-era platform that cost-effectively addresses the evolutionary edge and metro Ethernet needs of service providers, mobile, web-scale operators, and multiple-service operators (MSOs) with ultra-high-density 10GbE, 40GbE, and 100GbE connectivity in a space- and power-optimized package. Delivering 4.8 Tbps of throughput in just three rack units (3 U), the MX10003 delivers unmatched edge router density and performance while consuming just 0.9 W/Gb of throughput.

The MX10003 is powered by the same programmable Junos Trio chipset and Juniper Networks Junos® operating system that powers the entire MX Series 5G Universal Routing Platform portfolio, leveraging nearly two decades of Juniper R&D investments and innovations that have transformed the economics of networking. Key features include a comprehensive suite of advanced automation and telemetry capabilities that serve as the foundation for future self-driving networks, as well as line-rate 100GbE Media Access Control Security (MACsec) encryption and integrated advanced timing.

By combining service centricity, high throughput, and density with space and power efficiency, the MX10003 helps network operators overcome the challenges of a hyper-connected world and profitably deliver the widest variety of services and applications.

Architecture and Key Components

Routing Engine

Dual redundant Routing Engines (REs) on the MX10003 run the Junos OS, where they manage all routing protocol processes, router interface control, and control plane functions such as chassis component, system management, and user access to the router. These processes run on top of a kernel that interacts with the Packet Forwarding Engine (PFE) on Modular Port Concentrators (MPCs) via dedicated high-bandwidth management channels, providing a clean separation of the control and forwarding planes.

Modular Port Concentrators and Modular Interface Cards

Powered by the third-generation programmable Trio chipset, the MX10003 offers unprecedented bandwidth in a dense form factor. The MPCs provide broad routing, switching, inline services, subscriber management, and hierarchical quality of service (HQoS), among many other features. The MPCs also host Modular Interface Cards (MICs) that provide network connectivity and allow users to mix-and-match 100GbE, 40GbE, and 10GbE interfaces (using breakout cables) to flexibly and efficiently address their unique connectivity requirements.

Power

The MX10003 power and thermal subsystems use advanced technology to optimize power efficiency without sacrificing scale or features. The power subsystem is highly resilient, allowing full power supply and power cable feed redundancy. The MX10003 leads the industry in actual power consumption efficiency.

Junos Operating System

Junos OS is a reliable, high-performance, modular network operating system that is supported across all of Juniper's physical and virtual routing, switching, and security platforms, reducing the cost, complexity, and resources required to implement and maintain a Juniper-based network. With secure programming interfaces, the Juniper® Extension Toolkit (JET), versatile scripting support, and integration with popular orchestration frameworks, Junos OS offers flexible options for continuous delivery and DevOps-style management, helping service providers unlock more value from the network.

For more details on Junos OS, please visit http://www.juniper.net/us/en/products-services/nos/junos/.

Features and Benefits

Industry-Leading Port Density

The MX10003 is a full-featured single-chassis edge router that offers high density in a compact form factor (see Table 1).

Table 1: MX10003 Maximum Line-Rate Port Density

Interface	Per MPC Port Density	Per Chassis Port Density
10GbE	72	144
40GbE	18	36
100GbE	12	24

Unmatched Network Availability

A comprehensive set of hardware and software features enables the MX10003 to deliver the highest levels of network availability for a 3 U edge router. The MX10003 supports 1+1 control plane redundancy and N+1 power supply module redundancy.

From a software standpoint, Junos OS runs each program independently in its own protected memory space, ensuring that individual processes do not interfere with one another.

Excellent Power Design and Efficiency

The MX10003 offers excellent power design and efficiency, consuming just 0.9 W/Gb to ensure proper chassis operation under all conditions—critical when considering next-generation network elements. The MX10003 monitors power and temperature for each chassis component and shuts down interfaces and components when power or temperature thresholds are exceeded.

Junos Telemetry Interface

The programmable Junos Trio chipset provides the power to monitor and collect data at the component level. It uses the Junos Telemetry Interface to stream this data in a scalable manner to monitoring, analytics, and performance management applications, as well as to Path Computation Elements (PCEs) such as Juniper Networks NorthStar Controller. The derived telemetry information identifies current and trending congestion, resource utilization, traffic volume, latency, and delay, which helps service providers detect issues and make informed decisions on network design, optimization, and investment.

Integrated Timing

MX Series routers 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. The MX10003 supports advanced timing standards such as G.8275.1.

Junos Fusion Provider Edge

Junos Fusion Provider Edge enables MX Series routers to act as aggregation devices that provide cost-effective 1GbE support for Juniper Networks EX4300 Ethernet Switches and QFX5100 data center switching platforms acting as satellite devices. All aggregation and satellite devices appear as a single, port-dense platform managed by a single IP address, significantly expanding the number of network interfaces supported by an MX Series router while keeping operations simple with full feature support.

Junos Automation Toolkit

The Junos Automation Toolkit, included in the Junos OS software, offers a suite of tools supported on all Juniper Networks switches, routers, and security devices. These tools leverage the native XML capabilities of Junos OS, including commit scripts, op scripts, event policies and scripts, and macros that help automate operational and configuration tasks. Automation saves time by performing repetitive operational and configuration tasks, speeding troubleshooting, and maximizing network uptime by warning operators of potential problems and automatically responding to system events.

Applications and Use Cases

Business Edge

The MX10003 offers the 10GbE and 100GbE interfaces that large enterprises need, as well as a comprehensive VPN toolkit to support feature-rich, standards-based, and secure internetworking for innovative business services. In addition to basic L2/L3 VPN and virtual private LAN service (VPLS) support, the MX10003 offers enhanced VPN services such as quality-of-service (QoS)-prioritized VPN traffic for voice and video, L2 VPN internetworking to connect dissimilar L2 access networks, and rich IP/MPLS features to customize services and meet service level agreements (SLAs).

Metro Ethernet

The MX10003 provides outstanding support for metro and aggregation networks by offering a full suite of routing and switching features, allowing network operators to choose a deployment model that best suits their business and technical needs and goals. The MX10003 can be deployed as an IP/MPLS VPN edge router, VPLS router, MPLS label-switching router (LSR), or as a Layer 2 Ethernet switch or Layer 3 IP router. The MX10003 also supports an extensive set of Ethernet Operation, Administration, and Maintenance (OAM) features and is Metro Ethernet Forum (MEF) certified.

Distributed Broadband Network Gateway

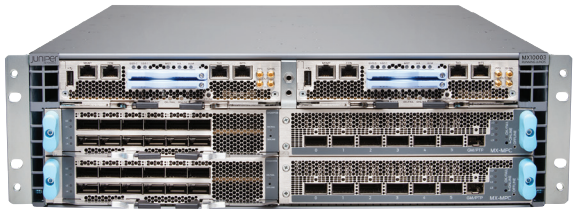
In a distributed broadband network gateway (BNG) architecture, the MX10003 serves as an ideal small-footprint BNG for deployment in central office and hub locations. The MX10003 maintains BNG feature parity with the current MX Series routers, including high subscriber densities and HQoS support.

Data Center

The MX10003 can be deployed as a data center gateway router and for data center interconnection. With high-density 10GbE and 100GbE interfaces, and key features such as L2/L3 VPN, dynamic tunnels using MPLS-over-GRE, Virtual Extensible LAN (VXLAN) encapsulation, and GRE support, the MX10003 offers a full suite of routing and switching features, allowing network operators to choose a deployment model that fits their business and technical needs.

IP Peering

The power-optimized, compact 3 U MX10003 is ideal for colocation facilities that charge based on provisioned power and space. Offering high control plane scale, the MX10003 supports IP Peering and route reflection capabilities that support inline flow monitoring, segment routing, BGP, and GRE, among many other features.



MX10003

Specifications

Physical Specifications

- Physical dimensions (HxDxW): 5.217 x 30 x 19 in (13.25 x 76.2 x 48.26 cm)
- Airflow: Front to back
- Operating temperature: 32º to 115º F (0º to 46º C) at sea level
- Number of fan trays: 4
- Maximum weight (approximate): 120 lbs (54.43 kg)
- System mounting: Four-post rack mounting
- Rack units: 3

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 https://www.juniper.net/us/en/products-services/.

Ordering Information

Product Number	Description
Base Units, Spares	
MX10003-BASE	MX10003 base 2-slot chassis; includes 1 RE, 4 fan trays, 4 power supplies, and 1 EMI door with air filter assembly
MX10003-PREMIUM	MX10003 premium 2-slot chassis; includes 2 REs, 4 fan trays, 6 power supplies, and 1 EMI door with air filter assembly
JNP10003-CHAS	MX10003 chassis, spare
Routing Engines (REs)	
JNP10003-RE1	MX10003 RE, spare
JNP10003-RE1-LT	MX10003 limited encryption RE, spare
MPCs	
JNP10003-LC2103	MX10003 Modular Port Concentrator, 6 quad small form-factor pluggable plus transceivers (QSFP+), 1 MIC slot
MICs	
JNP-MIC1	12x100GbE multirate MIC
JNP-MIC1-MACSEC	12x100GbE multirate MACsec MIC
Fan Trays	
JNP-FAN-3RU	MX10003 fan tray, spare
Power Supply Modules	
JNP-PWR1600-AC	MX10003 AC power supply module
JNP-PWR1100-DC	MX10003 DC power supply module
Cable Management	
JNP-CM-3RU	MX10003 cable manager
JNP-CMFLTR-3RU	MX10003 cable manager with air filter
Software	
USA	Junos OS
Junos OS	64-bit Junos Standard Software Suite
Junos OS-LTD	64-bit Junos Software Suite with Limited Encryption

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.

Corporate and Sales Headquarters
Juniper Networks, Inc.
1133 Innovation Way
Sunnyvale, CA 94089 USA
Phone: 888.JUNIPER (888.586.4737)
or +1.408.745.2000
Fax: +1.408.745.2100
www.juniper.net

APAC and EMEA Headquarters
Juniper Networks International B.V.
Boeing Avenue 240
1119 PZ Schiphol-Rijk
Amsterdam, The Netherlands
Phone: +31.0.207.125.700
Fax: +31.0.207.125.701

1000619-007-EN May 2018