



MX304 UNIVERSAL ROUTING PLATFORM DATASHEET

Product Overview

Juniper Networks MX Series Universal Routing Platforms provide world-class technology and innovative architectures that enable service providers, cloud providers, and large enterprises to quickly react to changing market conditions in the cloud era, accelerating service delivery. The MX304, an integral part of this family, offers massive scale and efficiency for space- and power-constrained environments. By redefining per-rack-unit economics, the MX304 helps customers do more with less while simplifying network design, reducing OpEx, and enabling profitable delivery 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, enhancing the user experience while supporting emerging market trends with mobility, Internet of Things (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. To achieve these business goals and succeed in their respective hyper-competitive markets, service providers and cloud operators need software-centric edge solutions that satisfy current demand while offering investment protecting evolution to emerging technologies and growth.

Realizing this edge vision requires service-oriented edge platforms that offer the density and throughput needed to accommodate anticipated traffic growth driven by ubiquitous video content, media-rich business services, and emerging technology trends like IoT, connected vehicles, and smart cities.

Juniper Networks® MX304 Universal Routing Platform is a cloud-era platform that cost effectively addresses the evolutionary edge and metro Ethernet needs of service providers, mobile operators, web-scale operators, and multiple-service operators (MSOs). Offering ultra-high-density 1GbE, 10GbE, 25GbE, 40GbE, 50GbE, 100GbE, and 400GbE connectivity in a space- and power-optimized package, the MX304 delivers 4.8 Tbps of throughput in just two rack units (RU), providing unmatched edge router density and performance while consuming just 0.3 W/Gb of throughput.

Powered by the same programmable Junos® Trio chipset and Junos operating system that powers the entire MX Series Universal Routing Platforms portfolio, the MX304 leverages 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 400GbE Media Access Control Security (MACsec) encryption and integrated advanced timing. The MX304 supports handling IPsec security in ESP tunnel mode directly within its forwarding engine using encryption (AES GCM-128 and AES-GCM-256). This means it encrypts and encapsulates the entire IP packet, including its header. By combining service centricity, high throughput, and density with space and power efficiency, the MX304 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

The MX304 Universal Routing Platform features the following components.

Routing engine

Dual redundant Routing Engines (REs) on the MX304 run Junos OS, where they manage all routing protocol processes, router interface control, and control plane functions such as chassis operations, 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 Interface Cards (MICs) via dedicated high-bandwidth management channels, providing a clean separation between the control and forwarding planes.

Modular interface cards

Powered by the sixth-generation programmable Trio chipset, the MX304 offers unprecedented bandwidth in a dense form factor with MICs providing broad routing, switching, inline services, subscriber management, hierarchical quality of service (HQoS), and a host of other features. The MICs allow users to mix-and-match 1GbE, 10GbE, 25GbE, 40GbE, 50GbE, 100GbE, and 400GbE interfaces to flexibly and efficiently address their unique connectivity requirements.

Power

The MX304 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, resulting in industry-leading 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 <https://www.juniper.net/us/en/products/network-operating-system/junos-os.html>.

Features and Benefits

Industry-leading port density

The MX304 is a full-featured single-chassis edge router that offers high port density in a compact form factor (see Table 1).

Table 1: MX304 Maximum Line-Rate Port Density

Interface	Per MIC port density	Per chassis port density
1GbE	32	96
10GbE	32	96
25GbE	32	96
40GbE	8	24
50GbE	32	96
100GbE	16	48
400GbE	4	12

Unmatched network availability

A comprehensive set of hardware and software features enables the MX304 to deliver the highest levels of network availability for a 2 RU edge router. The MX304 supports 1+1 control plane redundancy and 1+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 MX304 offers excellent, industry-leading power design and efficiency, consuming just 0.3 W/Gb to ensure proper chassis operation under all conditions—critical when considering next-generation network elements. The MX304 monitors power and temperature for each chassis component, shutting down interfaces and components when power or temperature thresholds are exceeded.

Junos Telemetry Interface

The programmable Junos Trio 6 chipset provides the power to monitor and collect data at the component level. The chipset 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 Paragon Pathfinder. The derived telemetry information identifies current and trending congestion, resource utilization, traffic volume, latency, and delay, helping service providers detect issues and make informed decisions about network design, optimization, and investments.

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 accuracy (< 1.5 uS) required for LTE-Advanced, eliminating the need for external clocks. The MX304 also supports advanced timing standards such as G.8275.1.

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, operations scripts, event policies and scripts, and macros that 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

The MX304 Universal Routing Platform delivers a powerful solution for the following use cases.

Business edge

The MX304 offers the 1GbE, 10GbE, 25GbE, 40GbE, 50GbE, 100GbE, and 400GbE interfaces that large enterprises and service providers 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 MX304 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 MX304 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 MX304 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 MX304 also

supports an extensive set of Ethernet Operation, Administration, and Maintenance (OAM) features and is Metro Ethernet Forum (MEF) certified 3.0.

Data center

The MX304 can be deployed as a data center gateway router and for data center interconnection. With high-density 1GbE, 10GbE, 25GbE, 40GbE, 50GbE, 100GbE, and 400GbE interfaces, and key features such as L2/L3 VPN, dynamic tunnels using MPLS-over-GRE, Virtual Extensible LAN (VXLAN) encapsulation, and generic routing encapsulation (GRE) support, the MX304 offers a full suite of routing and switching features, allowing network operators to choose the deployment model that best fits their business and technical needs.

IP peering

The power-optimized, compact 2 RU MX304 is ideal for collocation facilities that charge based on provisioned power and space. Offering high control plane scale, the MX304 supports IP peering and route reflection capabilities that support inline flow monitoring, segment routing, BGP, and GRE, among other features.



MX304

Specifications

Physical specifications

- Physical dimensions (HxWxD): 3.5 x 17.3 x 24 in, (8.89 x 44 x 61 cm)
- Airflow: Front to back
- Operating temperatures: 32° to 115° F (0° to 46° C) at sea level
- Number of fan trays: 3
- Maximum weight (approximate): 66.1 lbs (30 kg) (2 x RE configuration)
- System mounting: 2/4-post rack mounting
- Rack units: 2

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.html>.

Ordering Information

Please contact your Juniper sales representative for MX304 availability.

Hardware and Software

Product Number	Description
Base units, Spares	
MX304-BASE	MX304 base chassis bundle; includes 1 RE, 3 fan trays, and 2 power supplies
MX304-PREM	MX304 premium chassis bundle; includes 2 REs, 3 fan trays, and 2 power supplies
Routing Engines (REs)	
JNP304-RE	JNP304 Routing Engine
JNP304-RE-BB	JNP304 Routing Engine, base bundle
JNP304-RE-R	JNP304 Routing Engine, redundant
JNP304-RE-LT	JNP304 Routing Engine, limited encryption version
JNP304-RE-LT-BB	JNP304 Routing Engine, limited encryption version, base bundle
JNP304-RE-LT-R	JNP304 Routing Engine, limited encryption version, redundant
Fan trays	
JNP-FAN-2RU	MX304 fan tray
JNP-FAN-2RU-BB	MX304 fan tray, base bundle
Power Supply modules	
JNP-PWR2200-AC	MX304 AC power supply module
JNP-PWR2200-AC-BB	MX304 AC power supply module, base bundle
JNP-PWR2200-DC	MX304 DC power supply module
JNP-PWR2200-DC-BB	MX304 DC power supply module, base bundle
JNP-PWR2200-HV	MX304 high-voltage power supply module
JNP-PWR2200-HV-BB	MX304 high-voltage power supply module, base bundle
Rack mount kit	
JNP304-2PST-RMK	JNP304 2 post rack mount kit
JNP304-4PST-RMK	JNP304 4 post rack mount kit
Blank cover panel	
JNP304-BLNK	JNP304 MIC/RE blank cover panel
Software	
JUNOS-64-BB	64-bit Junos Standard Software Suite
JUNOS-LTD-64-BB	64-bit Junos Software Suite for EACU Zone

Flex licensing

Flex product number	Description
Hardware	
MX304-LMIC16-BASE	MX304 1.6 T combo MIC 16x100GbE/4x400GbE—integrated SKU with base hardware + Standard Junos OS software, perpetual
Software	
S-MX-16C-A1-C1-1*	MX Series Advanced software feature subscription license for 1-year term, 16x100GbE, software support included; valid for subscription renewals only
S-MX-16C-A1-C1-3	MX Series Advanced software feature subscription license for 3-year term, 16x100GbE, software support included
S-MX-16C-A1-C1-5	MX Series Advanced software feature subscription license for 5-year term, 16x100GbE, software support included
S-MX-16C-A1-C1-P	MX Series Advanced software feature perpetual license, 16x100GbE, software support not included
S-MX-16C-P1-C1-1*	MX Series Premium software feature subscription license for 1-year term, 16x100GbE, software support included; valid for subscription renewals only
S-MX-16C-P1-C1-3	MX Series Premium software feature subscription license for 3-year term, 16x100GbE, software support included
S-MX-16C-P1-C1-5	MX Series Premium software feature subscription license for 5-year term, 16x100GbE, software support included
S-MX-16C-P1-C1-P	MX Series Premium software feature perpetual license, 16x100GbE, software support not included
S-MX-1C-A1-C1-1*	MX Series Advanced software feature subscription license for 1-year term, 100GbE, software support included; valid for subscription renewals only
S-MX-1C-A1-C1-3	MX Series Advanced software feature subscription license for 3-year term, 100GbE, software support included
S-MX-1C-A1-C1-5	MX Series Advanced software feature subscription license for 5-year term, 100GbE, software support included
S-MX-1C-A1-C1-P	MX Series Advanced software feature perpetual license, 100GbE, software support not included
S-MX-1C-P1-C1-1*	MX Series Premium software feature subscription license for 1-year term, 100GbE, software support included; valid for subscription renewals only
S-MX-1C-P1-C1-3	MX Series Premium software feature subscription license for 3-year term, 100GbE, software support included
S-MX-1C-P1-C1-5	MX Series Premium software feature subscription license for 5-year term, 100GbE, software support included
S-MX-1C-P1-C1-P	MX Series Premium software feature perpetual license, 100GbE, software support not included

*1-year term license for Advanced and Premium tiers is renewal only.

About Juniper Networks

Juniper Networks believes that connectivity is not the same as experiencing a great connection. [Juniper's AI-Native Networking Platform](#) is built from the ground up to leverage AI to deliver exceptional, highly secure, and sustainable user experiences from the edge to the data center and cloud. Additional information can be found at juniper.net or connect with Juniper on [X](#) (formerly Twitter), [LinkedIn](#), and [Facebook](#).

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