

Juniper Networks M-Series



M-Series

IP/MPLS

POP (Collapsed POP)
(Route Reflector),

WAN

ATM,

SONET/SDH, TDM

Series

Internet Processor

ASIC, Juniper Networks I- , IP/MPLS

JUNOS

Juniper Networks M-Series

7 Gbps

320 Gbps

JUNOS

M7i, M10i, M40e, M120, M320

M-Series

(Connection)

M-Series

IP/MPLS

M-Series

VPN,

IPv6

JUNOS

Service-Built

IP/MPLS M-Series

(Route Reflector)

M-Series

Internet Processor II

I-chip

ASIC,
Series

IP/MPLS-rich JUNOS

M-

M-Series

7 Gbps

320 Gbps

M7i,

M10i, M40e, M120, M320

IP/MPLS M-Series

JUNOS

(Access- Agnostic)

M-Series

M-Series

M7i, M10i

M120

, WAN

M120 M320 Multiservices PIC Session Border
 Controller (SBC) Dynamic Application Awareness (DAA) SBC CapEx OpEx
 TDM M-Series ATM, DS0
 OC-192/STM-64 10 Gigabit Ethernet M-Series Peer-to-
 Ethernet M-Series Peer-to-
VPN
 M-Series Layer 2 Virtual Circuit, Layer 2 VPN, Layer
 2.5 Interworking VPN, Layer 3 2547 VPN, VPLS, IPsec, GRE, IP-IP
 VPN VPN M-Series
 Layer 3 VPN M10i, M40e, M120, M320
 Layer 2 VPN Routing Engine Switching/Forwarding Engine Board
 IP/MPLS Point-to-Point ATM JUNOS Hitless Switchover
QoS
 M-Series (In-service Software Upgrade) Graceful
 (DLCI, VC/VP, VLAN) (to DS0) QoS Protocol Routing Restart, MPLS fast Reroute, VRRP, SONET APS, SDH MSP,
 QoS (Weighted Roundrobin Scheduling), BFD LACP
 M-Series DOS
 J-Protect (Unicast Reverse Path
 Forwarding) M-Series
 J-Protect NAT,
 Stateful , DPI/IDP J-Flow
 MultiServices Physical Interface Card (PIC)
 ASIC JUNOS
 M-Series Service-Built Edge
 . MPLS VPN VPN
 (Multicast Over MPLS VPN)
 . IPv6 over MPLS IPv6 IPv6
 IP
 . NAT Stateful VRF , IPsec
 . M-Series Service-Built Edge

VPN
 Layer 2 Virtual Circuit, Layer 2 VPN, Layer 2.5 Interworking VPNs, Layer 3 2547 VPN, VPLS, IPsec, IP over IP, GRE
 VPN
 QoS
 DLCI, VP, VC, VLAN, (DS0) QoS
 Layer 2 (802.1p, CLP, DE) Layer 3 QoS (IP DSCP, MPLS EXP)
 IPv6, IPv6 over MPLS, IPv6 over IPv4 GRE IPv6/IPv4
 IGMP v1/v2/v3, PIM-SM, PIM-DM, MLD, SSM, RP, MSDP, BSR, MPLS/BGP VPN
 NAT stateful VRF NAT stateful
 MLPPP, MLFR .15 MLFR .16, 802.3ad (LACP)
 CoS J-Flow (Destination
 Class)
 XML JUNOScript API OSS
 SBC (Session Border Controller) CapEx OpEx
 DAA (Dynamic Application Awareness).

JUNOS M-Series
 PoP PoP
 ATM, FR, Ethernet TDM
 DS0 OC-192/STM-64

RE switchover Hitless switchover
 (Inservice Software Upgrades)
 MPLS FRR
 MPLS TE
 MPLS LSP Ping OA&M
 IS-IS, BGP, OSPF, OSPFv3, LDP, RSVP, Layer 2 VPN Layer 3 VPN Hitless Restart ETF Graceful Protocol Restart
 JUNOS

Service-Built
 NAT, Stateful, IPsec QoS M-Series
 Layer 2 VPNs, Layer 2.5 Interworking VPNs Layer 2 Layer 3 QoS IP/MPLS
 2

J-Protect NAT, (Stateful), DPI/DP Multiservices PIC IPsec
 Stateful
 IP DOS Flowed v5 v8 J-Flow Stateful
 RPF
 IPsec IPsec over MPLS

M7i

M7i 3.5 (8.9cm) 7Gbps
 POP IP/MPLS
 M7i Hardware-Accelerated NAT, Stateful
 Adaptive Services Module
 , IPsec J-Flow

M7i FIC (Fixed Interface Card) 4 PIC 2
 Fast Ethernet 1 Gigabit Ethernet
 OC-12c/STM-4 Gigabit Ethernet
 M7i M10i PIC

M10i

M10i
 M- M10i Routing Engines,
 Compact Forwarding Engine Boards,
 JUNOS
 M10i PoP
 M10i 2 FPC (Flexible
 PIC Concentrators) 8 (Ejector) PIC, OC-12/STM-4
 Gigabit Ethernet . M7i M10i
 PIC

M40e

M40e
 POP
 40+ Gbps 1/2 8 FPC OC-48/STM-16
 32 PIC . M40e
 Routing Engines,
 PIC M120, T320, T640

M120

M120 M-Series
 M120 128
 10 OC 192
 M120
 . M120 10
 Layer 3 VPN MPLS M120 2 3
 ATM
 . PIC M120, T320, T640

M320

M320 , 10Gbps-
 320Gbps 16 OC-192c/STM-64 PIC (32)
 64 OC-48c/STM-16 (128) . M320

32 type 1 type 2 PIC 10Gbps
 16 type 3 PIC 10- POP
 Engine Routing

. PIC M40e, M120, T320 T640

M-Series PFE (Packet Forwarding Engine) Routing
 Engine

PFE PIC, FPC,
 FIC, / / ASIC
 PIC (Physical Interface Card) (Electrical
 Transmission) PIC

M-Series PIC FPC
 FPC (Flexible PIC Concentrator) PIC PFE
 . FPC

. Egress FPC
 4 PIC
 FPC
 POP FPC

PIC M7i 2 Fast Ethernet 1
 Gigabit Ethernet . Gigabit

Ethernet Small Form Factor Pluggable
 (Transceiver Optics) ()
 M7i, M10i, M40e / / FPC

. FPC

- M7i/M10i Compact Forwarding Engine Board Enhanced
 Compact Forwarding Engine

- M40e Switching and Forwarding Module
 M120 PFE FPC (FPC)

Forwarding Engine Board (FEB) 2
 . FEB FPCs cFPCs (Route Lookup)
 . FPCs cFPCs

PIC 1+ 1
 N:1

M320 PFE FPC					ASIC	
M320 FPC	3	M320-FPC-E3				ASIC
E3 FPC	QoS	Next-Hop				
		Ingress PFE			RE (Routing Engine)	JUNOS
		Switch Interface Board ()		Egress		
PFE		ASIC				
		PFE	40Gbps			
		ASIC	Ingress	Egress	Routing Engine	
PFE					Routing Engine	
					Prefix, Prefix	BGP

M-Series

Router	M7i	M10i	M40e	M120	M320
Aggregate Half-Duplex Throughput	10 Gbps	16 Gbps	51.2 Gbps	120 Gbps	320 Gbps
FPC* Slots and Full Duplex Throughput per Slot	1 Built-in, 4 Gbps additional 1 Gbps for FIC	2 Built-in, 4 Gbps	8 FPC Slots, 3.2 Gbps	4 FPC Slots, 10 Gbps	8 FPC Slots, 20 Gbps
PICs** per Chassis	4, Plus 2 Additional Fixed FE, or 1 Fixed GE Ports	8	32	16	32
Chassis per Rack	24	9	2	4	2
Redundancy	No	Yes	Yes	Yes	Yes

M-Series

	M7i	M10i	M40e	M120	M320
Physical					
Dimensions (W x H x D)	17.5 x 3.5 x 18 in (44.5 x 8.9 x 45.7 cm)	17.5 x 8.5 x 18 in (44.5 x 22.2 x 45.7 cm)	17.4 x 35 x 26 in (44.2 x 88.9 x 66 cm)	17.5 x 20.7 x 25.7 in (44.5 x 52.6 x 65.3 cm)	17.4 x 34.8 x 25.7 in (44.2 x 88.4 x 65.3 cm)
Maximum Weight	38.2 lb / 17.3 kg	79 lb / 36 kg	370.5 lb / 168 kg	230 lb / 105 kg	439 lb / 199.6 kg
Mounting	Front or Center	Front or Center	Front or Center	Front or Center	Front or Center

Power

DC Input Power (Fully Loaded)	10 A at -48 VDC 378 Watts	12 A at -48 VDC 576 Watts	54 A at -48 VDC 2,600 Watts	45 A at 48 VDC 2,150 Watts	65 A at 48 VDC 3,135 Watts
No. of power supplies required (non-redundant/redundant)	1/2	2/4	1/2	1/2	2/4
AC Input Power (Fully Loaded)	4 to 2 A 100 to 240 VAC 47 to 63 Hz 400 Watts	8 to 4 A 100 to 240 VAC 47 to 63 Hz 800 Watts	15 to 13 A 200 to 240 VAC 47 to 63 Hz 3,000 Watts	28 to 14 A 100 to 240 VAC 47 to 63 Hz 2,200 Watts	17 to 14 A 200 to 240 VAC 47 to 63 Hz 3,500 Watts
No. of power supplies required (non-redundant/redundant)	1/2	2/3	1/2	1/2	3/4

Environment

Temperature	32° to 104° F 0° to 40° C	32° to 104° F 0° to 40° C	32° to 104° F 0° to 40° C	32° to 104° F 0° to 40° C	32° to 104° F 0° to 40° C
Relative Humidity	5% to 90% Noncondensing Humidity	5% to 90% Noncondensing Humidity	5% to 90% Noncondensing Humidity	5% to 90% Noncondensing Humidity	5% to 90% Noncondensing Humidity
Maximum Altitude	No Performance Degradation to 10,000 ft / 3,048 m	No Performance Degradation to 10,000 ft / 3,048 m	No Performance Degradation to 10,000 ft / 3,048 m	No Performance Degradation to 10,000 ft / 3,048 m	No Performance Degradation to 10,000 ft / 3,048 m

*Flexible PIC Concentrator

**Physical Interface Card

M-series Specifications continued

M320

4 Gbps full-duplex throughput per M320-FPC1
 16 Gbps full-duplex throughput per M320-FPC2
 20 Gbps full-duplex throughput per M320-FPC3
 Layer 2 / Layer 3 Packet Processing ASICs
 Switch Interface ASICs
 Internet Processor ASICs
 Memory subsystem, including Queuing and Memory Interface ASICs
 Processor subsystem

Routing Engine

400 MHz (M7i, M10i)

400 MHz Intel Celeron processor with default 256 KB Level 2 cache
 768 MB SDRAM
 1 GB compact flash drive for primary storage
 20 GB IDE hard drive for secondary storage
 Fast Ethernet RJ-45 port for out-of-band management
 Two RS-232 (DB-9 connector) asynchronous serial ports for console and remote management
 Optional PCMCIA card adapter and 1 GB compact flash card for media upgrades

850 MHz (M7i, M10i)

850 MHz Intel Pentium III
 1.5 GB DRAM
 1 GB compact flash drive for primary storage
 40 GB IDE hard drive for secondary storage
 Fast Ethernet RJ-45 port for out-of-band management
 Two RS-232 (DB-9 connector) asynchronous serial ports for console and remote management
 Optional PCMCIA card adapter and 1 GB compact flash card for media upgrades

1000 MHz (M40e, M120)

1 GHz Intel Celeron M processor
 2 GB DRAM
 1 GB compact flash drive for primary storage
 40 GB IDE hard drive for secondary storage
 Fast Ethernet RJ-45 port for out-of-band management
 Two RS-232 (DB-9 connector) asynchronous serial ports for console and remote management
 1 GB USB drive for media upgrades

2 GHz (M120, M320)

2 GHz Intel Celeron M processor
 4 GB DRAM
 1 GB compact flash drive for primary storage
 40 GB IDE hard drive for secondary storage
 Fast Ethernet RJ-45 port for out-of-band management
 Two RS-232 (DB-9 connector) asynchronous serial ports for console and remote management
 1 GB USB drive for media upgrades

Control Systems

M40e

Miscellaneous Control Subsystem

19.44 MHz stratum 3 reference clock for PICs
 Controller to monitor the status of router components

M120

Control Board

Switch fabric-Provides transit traffic through the Control Board
 Control FPGA-Provides the PCI interface to the Routing Engine
 1000Base-T Ethernet controller-Provides a 1-Gbps Ethernet link between the Routing Engines
 Ethernet switch-Provides Ethernet connectivity between the Routing Engine and the FPCs and FEBs
 SONET clocking module-Provides a Stratum 3 timing reference for all SONET interfaces installed in the system
 Optional redundancy

M320

Control Board

Provides buses and control processors used for chassis management
 10/100Base-T/TX Ethernet switch for intermodule communication
 Processor subsystem
 Two external clock inputs for 19.44 MHz stratum 3 reference clock
 Optional redundancy

Safety Approvals

CAN/CSA-C22.2 No.60950-00/UL 60950 Third Edition, Safety of Information Technology Equipment
 EN 60950 Safety of Information Technology Equipment
 EN 60825-1 Safety of Laser Products - Part 1: Equipment Classification, Requirements and User's Guide

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-61000-4-11 Voltage Dips and Sags

EMC

AS/NZS 3548 Class A (Australia/New Zealand)
 EN55022 Class A (Europe)
 FCC Part 15 Class A (USA)
 VCCI Class A (Japan)
 BSMI Class A (Taiwan)

NEBS

SR-3580 NEBS Criteria Levels (Level 3 Compliance)
 GR-63-CORE: NEBS, Physical Protection
 GR-1089-CORE: EMC and Electrical Safety for Network Telecommunications Equipment

ETSI

ETSI EN-300386-2 Telecommunication Network Equipment. Electromagnetic Compatibility Requirements

Management

Element Management: J-Web graphical user interface
 Policy Management: SDX-300 Service Deployment System, JUNOScope IP Service Manager
 Third party Management Applications: Dorado, InfoVista, Micromuse, and WAND

SNMP: SNMP v2/v3 Bilingual Agent support

PIC . PIC . PIC www.juniper.net

Component	Description	Model Number				
		M7i	M10i	M40e	M120	M320
Base Unit	DC Chassis	M7iBASE-DC-2FETX M7iBASE-DC-1GE	M10iBASE-DC	M40eBASE-DC	M120BASE-DC	M320BASE-DC
	AC Chassis	M7iBASE-AC-2FETX M7iBASE-AC-1GE M7i-AC-2GE-P	M10iBASE-AC	M40eBASE-AC	M120BASE-AC	M320BASE-AC
Flexible PIC Concentrator	FPC	Built into chassis	Built into chassis	M40e-FPC-S	-	-
	FPC1	-	-	M40e-FPC1-EP	M120-FPC-1	M320-FPC1-E2 M320-FPC-E3
	FPC2	-	-	M40e-FPC2-EP	M120-FPC-2	M320-FPC2-E2 M320-FPC2-E3
	FPC3	-	-	-	M120-FPC3 M120-cFPC-1OC192-XFP M120-cFPC-1XGE-XFP	M320-FPC3-E2 M320-FPC3-E2-20GE-SFP M320-FPC3-E2-2XGE-XENPAK M320-FPC3-E3 M320-FPC3-E3-20GE-SFP M320-FPC3-E3-2XGE-XENPAK
System Switching and Forwarding Boards	Base bundle options: FEB-M7i-BB FEB-M7i-E-BB Integrated services options: FEB-M7i-SVCS-BB FEB-M7i-SVCS-ASM-E-BB FEB-M7i-SVCS-MS-E-BB	Ibase bundle options: FEB-M10i-M7i-BB FEB-M10i-M7i-E-BB Redundancy options: FEB-M10i-M7i-R FEB-M10i-M7i-E-R	In-base bundle Redundancy: SFM-R	In-base bundle Redundancy: FEB-M120	In-base bundle Redundancy: SIB-M-R	
Routing Engine	In-base bundle	In-base bundle Redundancy: RE-400-768-R RE-850-1536-R	In-base bundle Redundancy: RE-A-1000-2048-R	In-base bundle Redundancy: RE-A-1000-2048-R RE-A-2000-4096-R	In-base bundle Redundancy: RE-A-2000-4096-R	

High-Performance Networking High-Performance Network High-Performance Network www.kr.juniper.net High-Performance Network



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