

MX Series 3D Universal Edge Router Mobile Broadband Gateway Line Card Guide

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Mobile Dense Port Concentrator Overview

A Dense Port Concentrator (DPC) provides multiple physical interfaces and Packet Forwarding Engines on a single board that installs into a slot within the MX Series 3D Universal Edge Routers. A DPC receives incoming packets from the network and sends outgoing packets to the network. The Packet Forwarding Engines on a DPC are equipped with purpose-built ASICs that perform packet processing and forwarding.

When a slot is not occupied by a DPC, you must insert a blank DPC to fill the empty slot and ensure proper cooling of the system. For complete information about installing and handling DPCs, see the hardware guide for your router.

Mobile Modular Port Concentrator (MPC) Overview

Modular Port Concentrators (MPCs) provide packet forwarding services that deliver up to 120 Gbps of full-duplex traffic. The MPCs are inserted into a slot in a router. Modular Interface Cards (MICs) provide the physical interfaces and install into the MPCs. You can install up to two MICs of different media types in the same MPC as long as the MPC supports those MICs.

A specialized fixed configuration MPC provides higher port density over MICs and combines packet forwarding and Ethernet interfaces onto a single line card. The fixed configuration MPC is inserted into a slot in a router and contains no slots for MICs.

MICs receive incoming packets from the network and transmit outgoing packets to the network. During this process, each MIC performs framing and high-speed signaling for its media type. Before transmitting outgoing data packets through the MIC interfaces, the MPCs encapsulate the packets received. Each MPC is equipped with up to four Junos Trio chipsets, which perform control functions tailored to the MPC's media type.

You must install a high-capacity fan tray to use an MPC. The maximum number of supported MPCs varies per router and hardware configuration:

- MX960 router—Up to 12 MPCs (For power requirements, see [Calculating Power Requirements for MX960 Routers](#)).
- MX480 router—Up to 6 MPCs (For power requirements, see [Calculating Power Requirements for MX480 Routers](#)).
- MX240 router—Up to 3 MPCs (For power requirements, see [Calculating Power Requirements for MX240 Routers](#)).

When a slot is not occupied by an MPC, you must insert a blank DPC to fill the empty slot and ensure proper cooling of the system. For complete information about installing and handling MPCs, see the hardware guide for your router.

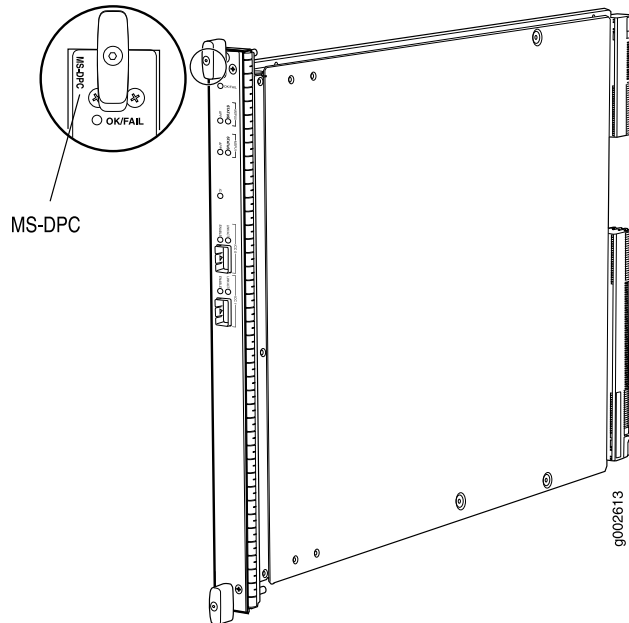
Mobile Line Cards Supported on MX Series Routers

[Table 1 on page 3](#) lists the line cards supported by the MX Series 3D Universal Edge routers.

Table 1: DPCs Supported in the MX Series 3D Universal Edge Routers

Line Card Name	Model Number	Ports	Maximum Throughput	First Junos OS Release
DPC				
Mobile Multiservices DPC	MX-MOB-SDPC	2 (Not supported)	–	11.2W
MPC				
Mobile 16x10GE MPC	MX-MOB-MPC-16XGE	16	120 GB	11.2W
Mobile MPC2 EQ	MX-MOB-MPC2-EQ	–	60 GB	11.2WR2

Mobile Multiservices DPC



Software release	<ul style="list-style-type: none"> Junos OS Release 11.2W and later
Description	<ul style="list-style-type: none"> Power requirement: 5.52 A @ 48 V (265 W) Weight: 14.7 lb (6.7 kg) Supports tunnel services. This feature is included with the DPC and does not require an individual license. Individual licenses must be purchased for additional services. Supports large Ethernet frame sizes for more efficient throughput across the intra-POP network Maximum number of supported DPCs: <ul style="list-style-type: none"> MX240 router: 2 MX480 router: 4 MX960 router: 4 Model number: MX-MOB-SDPC
Hardware features	<ul style="list-style-type: none"> Active monitoring on up to 10 million flows Maximum transmission units (MTUs) of up to 9192 bytes Two Multiservices Processing Units (MSPUs) per DPC, which include two 1.1Ghz multicore CPUs, each with 4GB of memory for processing integrated services
Software features	<ul style="list-style-type: none"> Support for up to 12,000 service sets See for information about the protocols and applications that this DPC supports.
Cables and connectors	<ul style="list-style-type: none"> SFPs are not supported.

LEDs**OK/FAIL LED, one bicolor:**

- Steady green—DPC is functioning normally.
- Blinking green—DPC is transitioning online or offline.
- Red—DPC has failed.

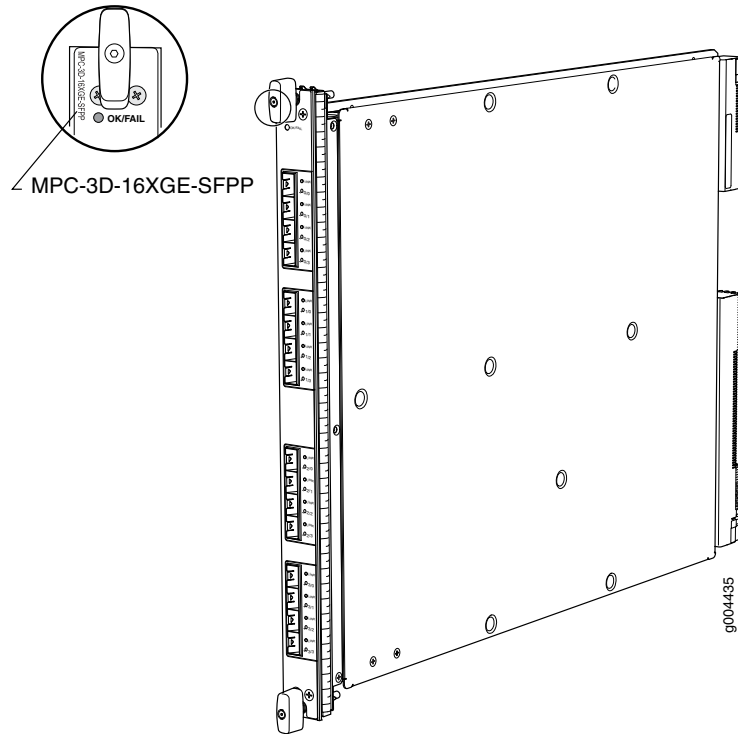
STATUS LED, one tricolor per MSPU:

- Off—MSPU is offline. If both MSPUs are offline it is safe to remove the DPC from the chassis.
- Green—MSPU is operating normally.
- Yellow—MSPU is initializing.
- Red—MSPU has an error or failure.

Application (APP) LED, one tricolor per MSPU:

- Off—Service is not running on the MSPU.
- Green—Service is running on the MSPU under acceptable load.
- Yellow—Service on the MSPU is overloaded.

Mobile Mobile 16x10GE MPC



Software release	<ul style="list-style-type: none"> Junos OS Release 11.2W and later
Description	<ul style="list-style-type: none"> Fixed configuration MPC with sixteen 10-Gigabit Ethernet ports Power requirement: 9.17 A @ 48 V (440 W) Weight: 18.35 lb (8.3 kg) Model numbers: <ul style="list-style-type: none"> MPC-3D-16XGE-SFPP MPC-3D-16XGE-SFPP-R-B
Hardware features	<ul style="list-style-type: none"> High-performance throughput on each port at speeds up to 10 Gbps Four fully programmable Junos Trio chipsets for increased scaling for bandwidth, subscribers, and services One Junos Trio chipset per set of four ports that can share up to 30 Gbps of full-duplex traffic Up to 120 Gbps of full-duplex traffic LAN-PHY mode at 10.3125 Gbps
Software features	<ul style="list-style-type: none"> Optical diagnostics and related alarms See Protocols and Applications Supported by MX240, MX480, MX960 MPCs for information about the protocols and applications that this MPC supports.

- Cables and connectors**
- 10-Gigabit SFP+ transceivers:
 - Connector: Duplex LC/PC (Rx and Tx)
 - 10GBASE-ER (model number: SFPP-10GE-ER)
 - 10GBASE-LR (model number: SFPP-10GE-LR)
 - 10GBASE-LRM (model number: SFPP-10GE-LRM)
 - 10GBASE-SR (model number: SFPP-10GE-SR)
- Optical interface specifications—see 10-Gigabit Ethernet 10GBASE Optical Interface Specifications

LEDs

OK/FAIL LED, one bicolor:

- Steady green—MPC is functioning normally.
- Blinking green—MPC is transitioning online or offline.
- Red—MPC has failed.

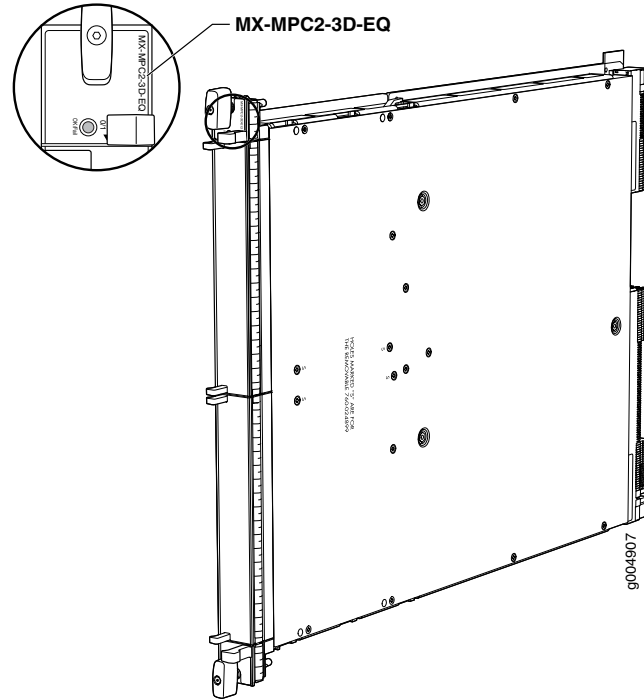
Enable/disable LED, one bicolor per port:

- Green—Port is enabled.
- Yellow—Port is not functioning normally.
- Off—Port is disabled.

The enable/disable LEDs are labeled in groups of four:

- 0/0 through 0/3
- 1/0 through 1/3
- 2/0 through 2/3
- 3/0 through 3/3

Mobile MPC2 EQ



Software release	<ul style="list-style-type: none"> Junos OS Release 11.2WR2 and later
Description	<ul style="list-style-type: none"> Power requirement: 6.13 A @ 48 V (294 W) Weight: 14 lb (6.4 kg) Model number: MX-MOB-MPC2-EQ
Hardware features	<ul style="list-style-type: none"> Two slots for MICs labeled PIC 0/1 and PIC 2/3 Two Junos Trio chipsets for increased scaling for bandwidth, subscribers, and services Up to 60 Gbps of full-duplex traffic LAN-PHY mode at 10.3125 Gbps WAN-PHY mode at 9.953 Gbps
Software features	<ul style="list-style-type: none"> See Protocols and Applications Supported by MX240, MX480, MX960 MPCs for information about the protocols and applications that this MPC supports.
LEDs	<p>OK/FAIL LED, one bicolor:</p> <ul style="list-style-type: none"> Steady green—MPC is functioning normally. Blinking green—MPC is transitioning online or offline. Red—MPC has failed.

Protocols and Applications Supported by Mobile Line Cards

- [Protocols and Applications Supported by the Mobile Multiservices DPC on page 9](#)
- [Protocols and Applications Supported by the MX Series MPCs on page 10](#)

Protocols and Applications Supported by the Mobile Multiservices DPC

Table 2 on page 9 contains the first Junos OS Release support for protocols and applications on the MX Series Multiservices DPCs. A dash indicates that the protocol or application is not supported.

Table 2: Protocols and Applications Supported by the MX Series Multiservices DPC (MS-DPC)

Protocol or Application	MS-DPC
Accepts traffic destined for GRE tunnels	11.2W
Active flow monitoring exports cflowd version 5 and version 8 records	11.2W
Active flow monitoring exports flow monitoring version 9 records, based on RFC 3954	11.2W
Graceful Routing Engine Switchover (GRES)	11.2W
GRE dont fragment	11.2W
GRE Key	11.2W
GRE reassembly	11.2W
IP Security (IPSec) encryption	11.2W
Network Address Translation (NAT) for IP addresses	11.2W
Packet-triggered dynamic subscribers and policy control (PTSP)	11.2W
Port Address Translation (PAT) for port numbers	11.2W
Real-time Performance Monitoring (RPM)	11.2W
Stateful firewall with packet inspection: detects SYN attacks, ICMP and UDP floods, and ping-of-death attacks	11.2W
Tunnel services:	
<ul style="list-style-type: none"> • GRE unicast tunneling-Supports GRE fragmentation 	11.2W
<ul style="list-style-type: none"> • IP-IP unicast tunneling 	11.2W

Table 2: Protocols and Applications Supported by the MX Series Multiservices DPC (MS-DPC) (continued)

Protocol or Application	MS-DPC
<ul style="list-style-type: none"> • Multicast tunneling 	11.2W
<ul style="list-style-type: none"> • Protocol Independent Multicast (PIM) sparse mode unicast tunneling 	11.2W
<ul style="list-style-type: none"> • Virtual loopback tunneling (VT) 	11.2W
Voice over IP (VoIP) services:	11.2W
<ul style="list-style-type: none"> • Border Gateway Function (BGF) using external H.248/1a control • Integrated Multi-Service Gateway (IMSG)—Session Border Controller 	

Protocols and Applications Supported by the MX Series MPCs

Table 3 on page 10 contains the first Junos OS Release support for protocols and applications on the MX Series MPCs. A dash indicates that the protocol or application is not supported.

Table 3: Protocols and Applications Supported by the MX Series MPCs

Protocol or Application	First Junos OS Release Supported by MPC Model Number (MPC Name)	
	Mobile 16x10GE MPC	Mobile MPC2 EQ
Access Node Control Protocol (ANCP)	–	11.2WR2
Accepts traffic destined for GRE tunnels or DVMRP (IP-in-IP) tunnels	11.2W	11.2WR2
Bidirectional Forwarding Detection protocol (BFD)	11.2W	11.2WR2
Border Gateway Protocol (BGP)	11.2W	11.2WR2
BGP/Multiprotocol Label Switching (MPLS) virtual private networks (VPNs)	11.2W	11.2WR2
Distance Vector Multicast Routing Protocol (DVMRP) and generic routing encapsulation (GRE) support—access side and server side	11.2W	11.2WR2

Table 3: Protocols and Applications Supported by the MX Series MPCs (continued)

Protocol or Application	First Junos OS Release Supported by MPC Model Number (MPC Name)	
	Mobile 16x10GE MPC	Mobile MPC2 EQ
IEEE 802.1ag Ethernet OAM Continuity Check protocol	11.2W	11.2WR2
IEEE 802.1ag Ethernet OAM Linktrace protocol	11.2W	11.2WR2
IEEE 802.1ag Ethernet OAM Loopback protocol	11.2W	11.2WR2
Firewall filters	11.2W	11.2WR2
Flexible Ethernet encapsulation	11.2W	11.2WR2
Graceful Routing Engine Switchover (GRES)	11.2W	11.2WR2
In-service software upgrade (ISSU)	–	–
Ingress Differentiated Services Code Point (DSCP) rewrite	11.2W	11.2WR2
Ingress hierarchical quality of service (HQoS) shaping and scheduling: <ul style="list-style-type: none"> • Group of virtual LANs (VLANs) level • Virtual LAN (VLAN) level • Port level 	–	–
Intelligent oversubscription	11.2W	11.2WR2
Integrated Routing Bridging (IRB)	11.2W	11.2WR2
Intermediate System-to-Intermediate System (IS-IS)	11.2W	11.2WR2
Internet Group Management Protocol (IGMP) (excludes snooping)	11.2W	11.2WR2
IPv4	11.2W	11.2WR2

Table 3: Protocols and Applications Supported by the MX Series MPCs (*continued*)

Protocol or Application	First Junos OS Release Supported by MPC Model Number (MPC Name)	
	Mobile 16x10GE MPC	Mobile MPC2 EQ
IP multicast	11.2W	11.2WR2
IPv6	11.2W	11.2WR2
IPv6 MLD	11.2W	11.2WR2
IPv6 multicast	11.2W	11.2WR2
IPv6 Neighbor Discovery	11.2W	11.2WR2
Label Distribution Protocol (LDP)	11.2W	11.2WR2
Labeled switched paths (LSPs) including accounting, policers, and filtering	11.2W	11.2WR2
LAN-PHY mode	11.2W	11.2WR2
Layer 2 frame filtering	11.2W	11.2WR2
IEEE 802.3ad link aggregation	11.2W	11.2WR2
Link Aggregation Control Protocol (LACP)	11.2W	11.2WR2
Local loopback	11.2W	11.2WR2
MAC learning, policing, accounting, and filtering	11.2W	11.2WR2
Mobile IP	–	–
Multi-chassis link aggregation	–	11.2WR2
Multiple Tag Protocol Identifiers (TPIDs)	11.2W	11.2WR2
Multiprotocol Label Switching (MPLS)	11.2W	11.2WR2
Nonstop active routing (NSR)	11.2W	11.2WR2

Table 3: Protocols and Applications Supported by the MX Series MPCs (continued)

Protocol or Application	First Junos OS Release Supported by MPC Model Number (MPC Name)	
	Mobile 16x10GE MPC	Mobile MPC2 EQ
IEEE 802.3ah OAM <ul style="list-style-type: none"> • Discovery and link monitoring • Fault signaling and detection • Remote loopback 	11.2W	11.2WR2
Multitopology routing	11.2W	11.2WR2
OSPF	11.2W	11.2WR2
Packet mirroring	11.2W	11.2WR2
IEEE 802.1ah provider backbone bridges (PBB)	11.2W	11.2WR2
Quality of service (QoS) per port: <ul style="list-style-type: none"> • Eight queues per port • Excess-rate configuration at the traffic-control-profile level • Excess-rate and excess-priority configuration at the queue level • Shaping at port level • Shaping at queue level • Scheduling of queues based on weighted round-robin (WRR) per priority class • Tricolor marking • Weighted random early detection (WRED) 	11.2W	11.2WR2
Quality of service (QoS) per virtual LAN (VLAN): <ul style="list-style-type: none"> • Accounting, filtering, and policing 	11.2W	11.2WR2
<ul style="list-style-type: none"> • IEEE 802.1p rewrite 	11.2W	11.2WR2
<ul style="list-style-type: none"> • Classification 	11.2W	11.2WR2

Table 3: Protocols and Applications Supported by the MX Series MPCs (*continued*)

Protocol or Application	First Junos OS Release Supported by MPC Model Number (MPC Name)	
	Mobile 16x10GE MPC	Mobile MPC2 EQ
<ul style="list-style-type: none"> Excess-rate configuration at the traffic-control-profile level 	–	11.2WR2
<ul style="list-style-type: none"> Excess-rate and excess-priority configuration at the queue level 	–	11.2WR2
<ul style="list-style-type: none"> Tricolor marking 	11.2W	11.2WR2
<ul style="list-style-type: none"> Shaping at the queue level 	–	11.2WR2
<ul style="list-style-type: none"> Scheduling of queues based on weighted round-robin (WRR) per priority class 	–	11.2WR2
<ul style="list-style-type: none"> Weighted random early detection (WRED) 	–	11.2WR2
Quality of service (QoS) per Point-to-point Protocol over Ethernet (PPPoE) or Dynamic Host Configuration Protocol (DHCP) subscriber interfaces:		
<ul style="list-style-type: none"> Accounting, filtering, and policing 	–	11.2WR2
<ul style="list-style-type: none"> IEEE 802.1p rewrite 	–	11.2WR2
<ul style="list-style-type: none"> Classification 	–	11.2WR2
<ul style="list-style-type: none"> Excess-rate configuration at the traffic-control-profile level 	–	11.2WR2
<ul style="list-style-type: none"> Excess-rate and excess-priority configuration at the queue level 	–	11.2WR2
<ul style="list-style-type: none"> Tricolor marking 	–	11.2WR2

Table 3: Protocols and Applications Supported by the MX Series MPCs (continued)

Protocol or Application	First Junos OS Release Supported by MPC Model Number (MPC Name)	
	Mobile 16x10GE MPC	Mobile MPC2 EQ
<ul style="list-style-type: none"> Shaping at the queue level 	–	11.2WR2
<ul style="list-style-type: none"> Scheduling of queues based on weighted round-robin (WRR) per priority class 	–	11.2WR2
<ul style="list-style-type: none"> Weighted random early detection (WRED) 	–	11.2WR2
RSVP	11.2W	11.2WR2
RIP	11.2W	11.2WR2
SNMP	11.2W	11.2WR2
Spanning Tree Protocols:	11.2W	11.2WR2
<ul style="list-style-type: none"> IEEE 802.1D Spanning Tree Protocol (STP) IEEE 802.1s Multiple Spanning Tree Protocol Per-VLAN Spanning Tree (PVST)+ IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) 		
Subscriber Management:		
<ul style="list-style-type: none"> Aggregated Ethernet over static VLANs 	–	11.2WR2
<ul style="list-style-type: none"> Aggregated Ethernet over dynamic VLANs 	–	11.2WR2
<ul style="list-style-type: none"> DHCP access model 	–	11.2WR2
<ul style="list-style-type: none"> Dynamic adjustment of shapers 	–	11.2WR2
<ul style="list-style-type: none"> Dynamic PPPoE subscriber interface creation based on PPPoE service name table configuration 	–	11.2WR2
<ul style="list-style-type: none"> Dynamic profiles 	–	11.2WR2

Table 3: Protocols and Applications Supported by the MX Series MPCs (*continued*)

Protocol or Application	First Junos OS Release Supported by MPC Model Number (MPC Name)	
	Mobile 16x10GE MPC	Mobile MPC2 EQ
<ul style="list-style-type: none"> Dynamic shaping, scheduling, and queuing 	–	11.2WR2
<ul style="list-style-type: none"> Dynamic VLANs 	–	11.2WR2
<ul style="list-style-type: none"> Static and dynamic PPPoE subscriber interfaces 	–	11.2WR2
Synchronous Ethernet (SyncE)	11.2W	11.2WR2
Two-Way Active Measurement Protocol (TWAMP)	–	–
IEEE 802.1Q VLANs: <ul style="list-style-type: none"> VLAN stacking and rewriting Channels defined by two stacked VLAN tags Flexible VLAN tagging IP service for nonstandard TPID and stacked VLAN tags 	11.2W	11.2WR2
Virtual private LAN service (VPLS)	11.2W	11.2WR2
Virtual private network (VPN)	11.2W	11.2WR2
Virtual Router Redundancy Protocol (VRRP) for IPv4	11.2W	11.2WR2
WAN-PHY mode	–	11.2WR2

Junos Documentation and Release Notes

For a list of related Junos documentation, see <http://www.juniper.net/techpubs/software/junos/> .

If the information in the latest release notes differs from the information in the documentation, follow the *Junos Release Notes*.

To obtain the most current version of all Juniper Networks[®] technical documentation, see the product documentation page on the Juniper Networks website at <http://www.juniper.net/techpubs/> .

Requesting Technical Support

Technical product support is available through the Juniper Networks Technical Assistance Center (JTAC). If you are a customer with an active J-Care or JNASC support contract, or are covered under warranty, and need post-sales technical support, you can access our tools and resources online or open a case with JTAC.

- JTAC policies—For a complete understanding of our JTAC procedures and policies, review the *JTAC User Guide* located at <http://www.juniper.net/us/en/local/pdf/resource-guides/7100059-en.pdf> .
- Product warranties—For product warranty information, visit <http://www.juniper.net/support/warranty/> .
- JTAC hours of operation—The JTAC centers have resources available 24 hours a day, 7 days a week, 365 days a year.

Self-Help Online Tools and Resources

For quick and easy problem resolution, Juniper Networks has designed an online self-service portal called the Customer Support Center (CSC) that provides you with the following features:

- Find CSC offerings: <http://www.juniper.net/customers/support/>
- Search for known bugs: <http://www2.juniper.net/kb/>
- Find product documentation: <http://www.juniper.net/techpubs/>
- Find solutions and answer questions using our Knowledge Base: <http://kb.juniper.net/>
- Download the latest versions of software and review release notes: <http://www.juniper.net/customers/csc/software/>
- Search technical bulletins for relevant hardware and software notifications: <https://www.juniper.net/alerts/>
- Join and participate in the Juniper Networks Community Forum: <http://www.juniper.net/company/communities/>
- Open a case online in the CSC Case Management tool: <http://www.juniper.net/cm/>

To verify service entitlement by product serial number, use our Serial Number Entitlement (SNE) Tool: <https://tools.juniper.net/SerialNumberEntitlementSearch/>

Opening a Case with JTAC

You can open a case with JTAC on the Web or by telephone.

- Use the Case Management tool in the CSC at <http://www.juniper.net/cm/> .
- Call 1-888-314-JTAC (1-888-314-5822 toll-free in the USA, Canada, and Mexico).

For international or direct-dial options in countries without toll-free numbers, see <http://www.juniper.net/support/requesting-support.html> .

Revision History

December 2011—Added the Enhanced MPC.

July 2011—Initial release.

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