Key features

• Up to 5 Mpps forwarding performance; support for multiple concurrent services
• HPE Open Application Platform (OAP) for HPE AllianceOne applications
• Embedded security features with hardware-based encryption, stateful firewall, network address translation (NAT), and virtual private networks (VPNs)
• No additional licensing complexity; no cost for advanced features
• Zero-touch solution, with single-pane-of-glass management

Product overview

The HPE MSR3000 Router Series, the next generation of router from Hewlett Packard Enterprise (HPE), is a component of the HPE FlexBranch solution, which is a part of the comprehensive HPE FlexNetwork architecture. These routers feature a modular design that delivers unmatched application services for medium- to large-sized branch offices. This gives your IT personnel the benefit of reduced complexity, and simplified configuration, deployment, and management.

The MSR3000 routers use the latest multicore CPUs, offer Gigabit switching, provide an enhanced PCI bus, and ship with the latest version of HPE Comware software to help enable high performance with concurrent services. The MSR3000 series provides a full-featured, resilient routing platform, including IPv6 and Multi-Protocols Label Switching (MPLS), with up to 5 Mpps forwarding capacity and 3.3 Gb/s of IPSec VPN encrypted throughput. These routers also support HPE Open Application Platform (OAP) modules to deliver integrated industry-leading HPE AllianceOne partner applications such as virtualization, unified communications and collaboration (UC&C), and application optimization capabilities.

The MSR3000 series provides an agile, flexible network infrastructure that enables you to quickly adapt to changing business requirements while delivering integrated concurrent services on a single, easy-to-manage platform.
Features and benefits

Performance

• Excellent forwarding performance
  Provides forwarding performance up to 5 Mpps (3.3 Gb/s) ; meets the bandwidth-intensive application demands of enterprise businesses

• Powerful security capacity
  The MSR3000 series is available with standard or high encryption, an embedded hardware encryption accelerator to improve encryption performance; IPSec encryption throughput can be up to 3.3 Gb/s with a maximum of 4,000 IPSec VPN tunnels

Product architecture

• SDN/OpenFlow
  OpenFlow is the communications interface defined between the control and forwarding layers of a SDN (Software-Defined Networking) architecture. OpenFlow separates the data forwarding and routing decision functions. It keeps the flow-based forwarding function and employs a separate controller to make routing decisions. OpenFlow matches packets against one or more flow tables. MSR support OpenFlow 1.3.1

• Ideal multiservice platform
  Provides WAN router, Ethernet switch, 3G/4G WAN, stateful firewall, VPN, and Session Initiation Protocol (SIP) or voice gateway on MSRs

• Advanced hardware architecture
  Provides multicore processors, Gigabit switching, and PCIe bus; external RPS or dual internal power supplies, and internal and external CF cards are offered; new high-performance MIM modules (HMIM) supported

• New operating system
  Ships with new Comware v7 Operating System delivering the latest in virtualization and routing

• Open Application Platform architecture
  Provides unmatched application and services flexibility, with the potential to deliver the functionality of multiple devices, creating capital and operational expense savings and lasting investment protection

• Field-programmable gate array (FPGA)
  Improves the bandwidth of I/O module slots from 100 Mb/s to 1000 Mb/s, and improves uplink performance from 1 Gb/s to 10 Gb/s

• Multi Gigabit Fabric (MGF)
  Eases utilization of the main processor by transmitting Layer 2 packets directly via the MGF

Connectivity

• Ethernet Virtual Interconnect (EVI)
  EVI is a MAC-in-IP technology that provides Layer 2 connectivity between distant Layer 2 network sites across an IP routed network. It is used for connecting geographically dispersed sites of a virtualized large-scale data center that requires Layer 2 adjacency.

• VXLAN (Virtual eXtensible LAN)
  VXLAN (Virtual eXtensible LAN, scalable virtual local area network) is an IP-based network, using the “MAC in UDP” package of Layer VPN technology. VXLAN can be based on an existing ISP or enterprise IP networks for decentralized physical site provides Layer 2 communication, and can provide service isolation for different tenants.
• Virtual Private LAN Service (VPLS)

Virtual Private LAN Service (VPLS) delivers a point-to-multipoint L2VPN service over an MPLS or IP backbone. The backbone is transparent to the customer sites, which can communicate with each other as if they were on the same LAN. The following protocols support on MSRs, RFC 4447, RFC 4761, and RFC 4762, BFD detection in VPLS, Support hierarchical HOPE (H-VPLS), MAC address recovery in H-VPLS to speed up convergence.

• Network Mobility (NEMO)

Network mobility (NEMO) enables a node to retain the same IP address and maintain application connectivity when the node travels across networks. It allows location-independent routing of IP datagrams on the Internet.

• High-density port connectivity

Provides up to 10 interface module slots and up to three on-board Gigabit Ethernet ports, 8 or 24 ports GE supported on one HMIM module.

• Multiple WAN interfaces

Provides traditional links with E1, T1, Serial, ADSL over POTS, ADSL over ISDN, G.SHDSL, Asynchronous Transfer Mode (ATM), and ISDN links; high-density Ethernet access with WAN Gigabit Ethernet and LAN 4- and 9-port Fast/Giga Ethernet, PoE/PoE+, mobility access with 3G (WCDMA or HSPA) /4G LTE SIC modules, and 3G/4G USB modems, and high-speed E3/T3 and 155 Mb/s OC3 access options.

• Packet storm protection

Protects against broadcast, multicast, or unicast storms with user-defined thresholds.

• Loopback

Supports internal loopback testing for maintenance purposes and an increase in availability; loopback detection protects against incorrect cabling or network configurations and can be enabled on a per-port or per-VLAN basis for added flexibility.

• 3G/4G LTE access support

Provides 3G/4G LTE wireless access for primary or backup connectivity via a 3G/4G LTE SIC module certified on various cellular networks; optional carrier 3G/4G LTE USB modems are available.

• USB interface

Uses USB memory disk to download and upload configuration or OS image files; supports an external USB 3G/4G modem for a 3G/4G WAN uplink.

• Flexible port selection

Provides a combination of fiber and copper interface modules, 100/1000BASE-X support, and 10/100/1000BASE-T auto-speed detection plus auto duplex and MDI/MDI-X.

Layer 2 switching

• Spanning Tree Protocol (STP)

Supports standard IEEE 802.1D STP, IEEE 802.1w Rapid Spanning Tree Protocol (RSTP) for faster convergence, and IEEE 802.1s Multiple Spanning Tree Protocol (MSTP).

• Internet Group Management Protocol (IGMP) and Multicast Listener Discovery (MLD) protocol snooping

Controls and manages the flooding of multicast packets in a Layer 2 network.

• Port mirroring

Duplicates port traffic (ingress and egress) to a local or remote monitoring port.
• VLANs
  Supports up to 4,094 VLANs or IEEE 802.1Q-based VLANs
• sFlow®
  Allows traffic sampling
• Define port as switched or routed
  Supports command switch to easily change switched ports to routed (maximum of four Fast Ethernet ports)

**Layer 3 routing**
• Static IPv4 routing
  Provides simple manually configured IPv4 routing
• Routing Information Protocol (RIP)
  Uses a distance vector algorithm with User Datagram Protocol (UDP) packets for route determination, supports RIPv1 and RIPv2 routing, includes loop protection
• Open shortest path first (OSPF)
  Delivers faster convergence; uses this link-state routing Interior Gateway Protocol (IGP), which supports ECMP, NSSA, and MD5 authentication for increased security and graceful restart for faster failure recovery
• Border Gateway Protocol 4 (BGP-4)
  Delivers an implementation of the Exterior Gateway Protocol (EGP) utilizing path vectors; uses TCP for enhanced reliability for the route discovery process; reduces bandwidth consumption by advertising only incremental updates; supports extensive policies for increased flexibility; scales to very large networks
• Intermediate system to intermediate system (IS-IS)
  Uses a path vector Interior Gateway Protocol (IGP), which is defined by the ISO organization for IS-IS routing and extended by IETF RFC 1195 to operate in both TCP/IP and the OSI reference model (Integrated IS-IS)
• Static IPv6 routing
  Provides simple manually configured IPv6 routing
• Dual IP stack
  Maintains separate stacks for IPv4 and IPv6 to ease the transition from an IPv4-only network to an IPv6-only network design
• Routing Information Protocol next generation (RIPng)
  Extends RIPv2 to support IPv6 addressing
• OSPFv3
  Provides OSPF support for IPv6
• BGP+
  Extends BGP-4 to support Multi-protocol BGP (MBGP), including support for IPv6 addressing
• IS-IS for IPv6
  Extends IS-IS to support IPv6 addressing
**IPv6 tunneling**

Allows IPv6 packets to traverse IPv4-only networks by encapsulating the IPv6 packet into a standard IPv4 packet; supports manually configured, 6 to 4, and Intra-Site Automatic Tunnel Addressing Protocol (ISATAP) tunnels; is an important element for the transition from IPv4 to IPv6

**Multi-protocol Label Switching (MPLS)**

Uses BGP to advertise routes across Label Switched Paths (LSPs), but uses simple labels to forward packets from any Layer 2 or Layer 3 protocol, which reduces complexity and increases performance; supports graceful restart for reduced failure impact; supports LSP tunneling and multilevel stacks

**Multi-protocol Label Switching (MPLS) Layer 3 VPN**

Allows Layer 3 VPNs across a provider network; uses Multi-protocol BGP (MBGP) to establish private routes for increased security; supports RFC 2547bis multiple autonomous system VPNs for added flexibility; supports IPv6 MPLS VPN

**Multi-protocol Label Switching (MPLS) Layer 2 VPN**

Establishes simple Layer 2 Point-to-Point VPNs across a provider network using only MPLS Label Distribution Protocol (LDP); requires no routing and therefore decreases complexity, increases performance, and allows VPNs of non-routable protocols; uses no routing information for increased security; supports Circuit Cross Connect (CCC), Static Virtual Circuits (SVCs), Martini draft, and Kompella-draft technologies

**Routing policy**

Allows custom filters for increased performance and security; supports access control lists (ACLs), IP prefix, AS paths, community lists, and aggregate policies

**Layer 3 services**

**NAT-PT**

Network Address Translation—Protocol Translation (NAT-PT) enables communication between IPv4 and IPv6 nodes by translating between IPv4 and IPv6 packets. It performs IP address translation, and according to different protocols, performs semantic translation for packets. This technology is only suitable for communication between a pure IPv4 node and a pure IPv6 node.

**WAN Optimization**

MSR performs optimization using TFO and a combination of DRE, Lempel-Ziv (LZ) compression to provide the bandwidth optimization for file service and Web applications. The policy engine module determines which traffic can be optimized and which optimization action should be taken. A pair of WAN optimization equipment can discover each other automatically and complete the negotiation to establish a TCP optimization session.

**Address Resolution Protocol (ARP)**

Determines the MAC address of another IP host in the same subnet; supports static ARPs; gratuitous ARP allows detection of duplicate IP addresses; proxy ARP allows normal ARP operation between subnets or when subnets are separated by a Layer 2 network

**User Datagram Protocol (UDP) helper**

Redirects UDP broadcasts to specific IP subnets to prevent server spoofing

**Dynamic Host Configuration Protocol (DHCP)**

Simplifies the management of large IP networks and supports client and server; DHCP Relay enables DHCP operation across subnets
Quality of Service (QoS)
- Traffic policing
  Supports Committed Access Rate (CAR) and line rate
- Congestion management
  Supports FIFO, PQ, CQ, WFQ, CBQ, and RTPO
- Weighted random early detection (WRED) or random early detection (RED)
  Delivers congestion avoidance capabilities through the use of queue management algorithms
- Hierarchical quality of service (HfQoS) or Nested QoS
  Manages traffic uniformly, and hierarchically schedules traffic by user, network service, and application; provides more granular traffic control and quality assurance services than traditional QoS
- Other QoS technologies
  Support traffic shaping, MPLS QoS, MP QoS or LFI, and Control Plane Policing (CoPP)

Security
- IPS
  Built-in Intrusion Prevention System (IPS) detects and protects the branch office from security threats. Optional HPE integration filters for client-side, branch protection from exploits and vulnerabilities
- Zone based firewall
  Zone-Based Policy Firewall changes the firewall configuration from the older interface-based model to a more flexible, more easily understood zone-based model. Interfaces are assigned to zones, and inspection policy is applied to traffic moving between the zones. Inter-zone policies offer considerable flexibility and granularity, so different inspection policies can be applied to multiple host groups connected to the same router interface.
- Enhanced stateful firewall
  Application layer protocol inspection, Transport layer protocol inspection, ICMP error message check, and TCP SYN check. Support more L4 and L7 protocols like TCP, UDP, UDP-Lite, ICMPv4/ICMPv6, SCTP, DCCP, RAWIP, HTTP, FTP, SMTP, DNS, SIP, H.323, SCCP.
- Auto Discover VPN (ADVPN)
  Collects, maintains, and distributes dynamic public addresses through the VPN Address Management (VAM) protocol, making VPN establishment available between enterprise branches that use dynamic addresses to access the public network; compared to traditional VPN technologies, ADVPN technology is more flexible and has richer features, such as NAT traversal of ADVPN packets, AAA identity authentication, IPSec protection of data packets, and multiple VPN domains
- IPSec VPN
  Supports DES, Triple DES (3DES), and Advanced Encryption Standard (AES) 128/192/256 encryption, and MD5 and SHA-1 authentication
- Access control list (ACL)
  Supports powerful ACLs for both IPv4 and IPv6; ACLs are used for filtering traffic to prevent unauthorized users from accessing the network, or for controlling network traffic to save resources; rules can either deny or permit traffic to be forwarded; rules can be based on a Layer 2 header or a Layer 3 protocol header; rules can be set to operate on specific dates or times
- Terminal Access Controller Access-Control System (TACACS+)
  Delivers an authentication tool using TCP with encryption of the full authentication request, providing additional security
• Unicast Reverse Path Forwarding (URPF)
  Allows normal packets to be forwarded correctly, but discards the attaching packet due to lack of reverse path route or incorrect inbound interface; prevents source spoofing and distributed attacks

• Network login
  Allows authentication of multiple users per port

• RADIUS
  Eases security access administration by using a user or password authentication server

• Network address translation (NAT)
  Supports one-to-one NAT, many-to-many NAT, and NAT control, enabling NAPT to support multiple connections; supports blacklist in NAT, a limit on the number of connections, session logs, and multi-instances

• Secure Shell (SSHv2)
  Uses external servers to securely login to a remote device; with authentication and encryption, it protects against IP spoofing and plain text password interception; increases the security of Secure File Transfer Protocol (SFTP) transfers

Convergence
• Internet Group Management Protocol (IGMP)
  Utilizes Any-Source Multicast (ASM) or Source-Specific Multicast (SSM) to manage IPv4 multicast networks; supports IGMPv1, v2, and v3

• Protocol Independent Multicast (PIM)
  Defines modes of Internet IPv4 and IPv6 multicasting to allow one-to-many and many-to-many transmission of information; supports PIM Dense Mode (DM), Sparse Mode (SM), and Source-Specific Mode (SSM)

• Multicast Source Discovery Protocol (MSDP)
  Allows multiple PIM-SM domains to interoperate; is used for inter-domain multicast applications

• Multicast Border Gateway Protocol (MBGP)
  Allows multicast traffic to be forwarded across BGP networks and kept separate from unicast traffic

Integration
• Embedded NetStream
  Improves traffic distribution using powerful scheduling algorithms, including Layer 4 to 7 services; monitors the health status of servers and firewalls

• Embedded VPN and stateful firewall
  Provides enhanced stateful packet inspection and filtering, delivers advanced VPN services with Triple DES (3DES) and Advanced Encryption Standard (AES) encryption at high performance and low latency, URL filtering, and application prioritization and enhancement

• SIP trunking
  Delivers multiple concurrent calls on one link; the carrier authenticates only the link, rather than carrying each SIP call on the link
Resiliency and high availability

- Intelligent Resilient Framework (IRF)
  Intelligent Resilient Framework (IRF), allows the customer build an IRF stack, namely a logical device, by interconnecting multiple devices through stack ports. The customer can manage all the devices in the IRF stack by managing the logical device, which is cost-effective like a box-type device, and scalable and highly reliable like a chassis-type distributed device.

- Backup center
  Acts as a part of the management and backup function to provide backup for device interfaces; delivers reliability by switching traffic over to a backup interface when the primary one fails

- Virtual Router Redundancy Protocol (VRRP)
  Allows groups of two routers to dynamically back each other up to create highly available routed environments; supports VRRP load balancing

- Embedded Automation Architecture (EAA)
  Monitors the internal event and status of system hardware and software, identifying potential problems as early as possible; collects field information and attempts to automatically repair the issues; based on the user configuration, onsite information will be sent to technical support

- Bidirectional Forwarding Detection (BFD)
  Detects quickly the failures of the bidirectional forwarding paths between two devices for upper-layer protocols such as routing protocols and MPLS

Management

- HPE Intelligent Management Center (IMC)
  Integrates fault management, element configuration, and network monitoring from a central vantage point; built-in support for third-party devices enables network administrators to centrally manage all network elements with a variety of automated tasks, including discovery, categorization, baseline configurations, and software images; the software also provides configuration comparison tools, version tracking, change alerts, and more

- Industry-standard CLI with a hierarchical structure
  Reduces training time and expenses, and increases productivity in multivendor installations

- Management security
  Restricts access to critical configuration commands; offers multiple privilege levels with password protection; ACLs provide Telnet and Simple Network Management Protocol (SNMP) access; local and remote syslog capabilities allow logging of all access

- SNMPv1, v2, and v3
  Provide complete support of SNMP; provide full support of industry-standard Management Information Base (MIB) plus private extensions; SNMPv3 supports increased security using encryption

- Remote monitoring (RMON)
  Uses standard SNMP to monitor essential network functions; supports events, alarm, history, and statistics group plus a private alarm extension group
• FTP, TFTP, and SFTP support
Offers different mechanisms for configuration updates; FTP allows bidirectional transfers over a TCP/IP network; trivial FTP (TFTP) is a simpler method using User Datagram Protocol (UDP); Secure File Transfer Protocol (SFTP) runs over an SSH tunnel to provide additional security

• Debug and sampler utility
Supports ping and traceroute for both IPv4 and IPv6

• Network Time Protocol (NTP)
Synchronizes timekeeping among distributed time servers and clients, keeps timekeeping consistent among all clock-dependent devices within the network so that the devices can provide diverse applications based on the consistent time

• Information center
Provides a central repository for system and network information, aggregates all logs, traps, and debugging information generated by the system and maintains them in order of severity; outputs the network information to multiple channels based on user-defined rules

• Management interface control
Provides management access through modem port and terminal interface, provides access through terminal interface, Telnet, or SSH

• Network Quality Analyzer (NQA)
Analyses network performance and service quality by sending test packets, and provides network performance and service quality parameters such as jitter, TCP, or FTP connection delays; allows network manager to determine overall network performance and diagnose and locate network congestion points or failures

• Role-based security
Delivers role-based access control (RBAC); supports 16 user levels (0~15)

• Standards-based authentication support for LDAP
Integrates seamlessly into existing authentication services

**Investment protection**
• Re-use of existing SIC and MIM modules
Supports existing SIC and MIM modules, transceivers, and cables for investment protection

**Ease of deployment**
• Zero-touch deployment
Supports both USB disk auto deployment and 3G SMS auto deployment
Additional information

- **OPEX savings**
  
  Simplifies and streamlines deployment, management, and training through the use of a common operating system, thereby cutting costs as well as reducing the risk of human errors associated with having to manage multiple operating systems across different platforms and network layers.

- **Faster time to market**
  
  Allows new and custom features to be brought rapidly to market through engineering efficiencies, delivering better initial and ongoing stability.

- **Green initiative support**
  
  Provides support for RoHS and WEEE regulations.

Warranty and support

- **1-year warranty**
  
  See [hpe.com/networking/warrantysummary](http://hpe.com/networking/warrantysummary) for warranty and support information included with your product purchase.

- **Software releases**
  
  To find software for your product, refer to [hpe.com/networking/support](http://hpe.com/networking/support); for details on the software releases available with your product purchase, refer to [hpe.com/networking/warrantysummary](http://hpe.com/networking/warrantysummary).
# HPE MSR3000 Router Series

<table>
<thead>
<tr>
<th>SPECIFICATIONS</th>
<th>HPE MSR3012 AC Router (JG409B)</th>
<th>HPE MSR3012 DC Router (JG410A)</th>
<th>HPE MSR3024 AC Router (JG406A)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I/O ports and slots</strong></td>
<td>1 HMIM slot 2 SIC slots 3 RJ-45 1000BASE-T ports (IEEE 802.3ab Type 1000BASE-T) 1 SFP fixed Gigabit Ethernet SFP port</td>
<td>1 HMIM slot 2 SIC slots 3 RJ-45 1000BASE-T ports (IEEE 802.3ab Type 1000BASE-T) 1 SFP fixed Gigabit Ethernet SFP port</td>
<td>2 HMIM slots 4 SIC slots, or 2 DSIC slots, or a combination 3 RJ-45 1000BASE-T ports (IEEE 802.3ab Type 1000BASE-T) 1 SFP fixed Gigabit Ethernet SFP port</td>
</tr>
<tr>
<td><strong>Additional ports and slots</strong></td>
<td>1 VPM slot</td>
<td>1 VPM slot</td>
<td>1 VPM slot</td>
</tr>
<tr>
<td><strong>Physical characteristics</strong></td>
<td><strong>Dimensions</strong> 17.32 (w) x 18.9 (d) x 1.74 (h) in. (44 x 48 x 4.42 cm) (1U height)</td>
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</tr>
<tr>
<td><strong>Memory and processor</strong></td>
<td>RISC, 4 cores @ 1 GHz, 256 MB flash capacity, 2 GB DDR3 SDRAM</td>
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<td>RISC, 4 cores @ 1 GHz, 256 MB flash capacity, 2 GB DDR3 SDRAM</td>
</tr>
<tr>
<td><strong>Mounting and enclosure</strong></td>
<td>Desktop or can be mounted in an EIA standard 19-inch telco rack when used with the rack-mount kit in the package</td>
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<tr>
<td><strong>Performance</strong></td>
<td><strong>Throughput</strong> Up to 2.6 Mpps (64-byte packets) 200000 entries (IPv4), 200000 entries (IPv6)</td>
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</tr>
<tr>
<td><strong>Environment</strong></td>
<td><strong>Operating temperature</strong> 32°F to 113°F (0°C to 45°C)</td>
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</tr>
<tr>
<td><strong>Nonoperating/Storage temperature</strong></td>
<td>-40°F to 158°F (-40°C to 70°C)</td>
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</tr>
<tr>
<td><strong>Nonoperating/Storage relative humidity</strong></td>
<td>5% to 90%, noncondensing</td>
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</tr>
<tr>
<td><strong>Altitude</strong></td>
<td>Up to 16,404 ft (5 km)</td>
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## SPECIFICATIONS

### Electrical characteristics

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<tbody>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Maximum heat dissipation</td>
<td>127 BTU/hr (133.98 kJ/hr)</td>
<td>127 BTU/hr (133.98 kJ/hr)</td>
<td>168 BTU/hr (177.24 kJ/hr)</td>
</tr>
<tr>
<td>AC voltage</td>
<td>100–240 VAC</td>
<td>-36 to -75 VDC</td>
<td>100–240 VAC</td>
</tr>
<tr>
<td>DC voltage</td>
<td>100 W</td>
<td>100 W</td>
<td>125 W</td>
</tr>
</tbody>
</table>

**Notes**

Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

### Reliability

| MTBF (years) | 52.56 | 52.56 | 49.61 |

### Safety

- UL 60950-1, EN 60825-1 Safety of Laser Products-Part 1, EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1, EN 60950-1; CAN/CSA-C22.2 No. 60950-1, FDA 21 CFR Subchapter J, AS/NZS 60950-1; GB 4943.1

**Emissions**


### Telecom

- FCC part 68; CS-03

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<tr>
<td>Management</td>
<td>IMC—Intelligent Management Center; command-line interface; limited command-line interface; configuration menu; out-of-band management (RJ-45 Ethernet); SNMP Manager; Telnet; RMON1; FTP; in-line and out-of-band; modem interface; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB</td>
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<tr>
<td>Services</td>
<td>Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.</td>
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## HPE MSR3000 Router Series

### SPECIFICATIONS

#### I/O ports and slots

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<th>HPE MSR3024 PoE Router (JG408A)</th>
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<tbody>
<tr>
<td>2 HMIM slots</td>
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<tr>
<td>3 RJ-45 1000BASE-T ports (IEEE 802.3ab Type 1000BASE-T)</td>
<td>3 RJ-45 1000BASE-T ports (IEEE 802.3ab Type 1000BASE-T)</td>
</tr>
<tr>
<td>1 SFP fixed Gigabit Ethernet SFP port</td>
<td>1 SFP fixed Gigabit Ethernet SFP port</td>
</tr>
</tbody>
</table>

#### Additional ports and slots

<table>
<thead>
<tr>
<th>HPE MSR3024 DC Router (JG407A)</th>
<th>HPE MSR3024 PoE Router (JG408A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 VPM slot</td>
<td>1 VPM slot</td>
</tr>
</tbody>
</table>

#### Physical characteristics

<table>
<thead>
<tr>
<th>HPE MSR3024 DC Router (JG407A)</th>
<th>HPE MSR3024 PoE Router (JG408A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>Dimensions</td>
</tr>
<tr>
<td>Weight</td>
<td>Weight</td>
</tr>
<tr>
<td>17.32 (w) x 18.9 (d) x 1.74 (h) in. (44 x 48 x 4.42 cm) (1U height)</td>
<td>17.32 (w) x 18.9 (d) x 1.74 (h) in. (44 x 48 x 4.42 cm) (1U height)</td>
</tr>
<tr>
<td>16.14 lb (7.32 kg)</td>
<td>17.57 lb (7.97 kg)</td>
</tr>
</tbody>
</table>

#### Memory and processor

<table>
<thead>
<tr>
<th>HPE MSR3024 DC Router (JG407A)</th>
<th>HPE MSR3024 PoE Router (JG408A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RISC, 4 cores @ 1 GHz, 256 MB flash capacity, 2 GB DDR3 SDRAM</td>
<td>RISC, 4 cores @ 1 GHz, 256 MB flash capacity, 2 GB DDR3 SDRAM</td>
</tr>
</tbody>
</table>

#### Mounting and enclosure

<table>
<thead>
<tr>
<th>HPE MSR3024 DC Router (JG407A)</th>
<th>HPE MSR3024 PoE Router (JG408A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Desktop or can be mounted in an EIA standard 19-inch telco rack when used with the rack-mount kit in the package</td>
<td>Desktop or can be mounted in an EIA standard 19-inch telco rack when used with the rack-mount kit in the package</td>
</tr>
</tbody>
</table>

#### Performance

<table>
<thead>
<tr>
<th>HPE MSR3024 DC Router (JG407A)</th>
<th>HPE MSR3024 PoE Router (JG408A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Throughput</td>
<td>Throughput</td>
</tr>
<tr>
<td>Up to 2.6 Mpps (64-byte packets)</td>
<td>Up to 2.6 Mpps (64-byte packets)</td>
</tr>
<tr>
<td>Routing table size</td>
<td>Routing table size</td>
</tr>
<tr>
<td>500000 entries (IPv4), 500000 entries (IPv6)</td>
<td>500000 entries (IPv4), 500000 entries (IPv6)</td>
</tr>
<tr>
<td>Forwarding table size</td>
<td>Forwarding table size</td>
</tr>
<tr>
<td>500000 entries (IPv4), 500000 entries (IPv6)</td>
<td>500000 entries (IPv4), 500000 entries (IPv6)</td>
</tr>
</tbody>
</table>

#### Environment

<table>
<thead>
<tr>
<th>HPE MSR3024 DC Router (JG407A)</th>
<th>HPE MSR3024 PoE Router (JG408A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating temperature</td>
<td>Operating temperature</td>
</tr>
<tr>
<td>32°F to 113°F (0°C to 45°C)</td>
<td>32°F to 113°F (0°C to 45°C)</td>
</tr>
<tr>
<td>Operating relative humidity</td>
<td>Operating relative humidity</td>
</tr>
<tr>
<td>5% to 90%, noncondensing</td>
<td>5% to 90%, noncondensing</td>
</tr>
<tr>
<td>Nonoperating/Storage temperature</td>
<td>Nonoperating/Storage temperature</td>
</tr>
<tr>
<td>-40°F to 158°F (-40°C to 70°C)</td>
<td>-40°F to 158°F (-40°C to 70°C)</td>
</tr>
<tr>
<td>Nonoperating/Storage relative humidity</td>
<td>Nonoperating/Storage relative humidity</td>
</tr>
<tr>
<td>5% to 90%, noncondensing</td>
<td>5% to 90%, noncondensing</td>
</tr>
<tr>
<td>Altitude</td>
<td>Altitude</td>
</tr>
<tr>
<td>Up to 16,404 ft (5 km)</td>
<td>Up to 16,404 ft (5 km)</td>
</tr>
</tbody>
</table>
## SPECIFICATIONS

<table>
<thead>
<tr>
<th></th>
<th>HPE MSR3024 DC Router (JG407A)</th>
<th>HPE MSR3024 PoE Router (JG408A)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Electrical characteristics</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
<td></td>
</tr>
<tr>
<td>Maximum heat dissipation</td>
<td>168 BTU/hr (177.24 kJ/hr)</td>
<td>168 BTU/hr (177.24 kJ/hr)</td>
</tr>
<tr>
<td>AC voltage</td>
<td>100–240 VAC</td>
<td></td>
</tr>
<tr>
<td>DC voltage</td>
<td>-36 to -75 VDC</td>
<td>125 W</td>
</tr>
<tr>
<td>Maximum power rating</td>
<td>125 W</td>
<td>275 W</td>
</tr>
<tr>
<td>PoE power</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Notes

Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

PoE Power is the power supplied by the internal power supply, it is dependent on the type and quantity of power supplies and may be supplemented with the use of an External Power Supply (EPS).

<table>
<thead>
<tr>
<th><strong>Reliability</strong></th>
<th>49.61</th>
<th>49.61</th>
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</thead>
<tbody>
<tr>
<td>MTBF (years)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|---------------------|--------------------------------|---------------------------------|
## SPECIFICATIONS

### Emissions

<table>
<thead>
<tr>
<th>Specification</th>
<th>HPE MSR3024 DC Router (JG407A)</th>
<th>HPE MSR3024 PoE Router (JG408A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>EN 61000-4-11:2004</td>
<td>EN 61000-4-11:2004</td>
<td>ANSi C63.4-2009</td>
</tr>
<tr>
<td>EN 55022:2010</td>
<td>EN 55022:2010</td>
<td>GB 9254-2008</td>
</tr>
<tr>
<td>EN 61000-3-2 Ed3.0 (2009-02)</td>
<td>IEC 61000-3-2 Ed3.0 (2009-02)</td>
<td>EN 61000-3-2 Ed2.0 2008-09</td>
</tr>
<tr>
<td>IEC 61000-3-3 Ed2.0 (2008-06)</td>
<td>VCCI V-4/2012.04</td>
<td>EN 55024:2010</td>
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<td>CISPR 24 Ed2.0 2010-08</td>
<td>EN 55024:2010</td>
<td>EN 61000-3-2 2006+A12009+A2:2009</td>
</tr>
<tr>
<td>EN 61000-3-2 2006</td>
<td>EN 61000-3-2 2006</td>
<td>EN 61000-3-2 2006</td>
</tr>
<tr>
<td>En 61000-4-2:2009</td>
<td>En 61000-4-2:2009</td>
<td>En 61000-4-2:2009</td>
</tr>
<tr>
<td>En 61000-4-4:2006</td>
<td>En 61000-4-4:2006</td>
<td>En 61000-4-4:2006</td>
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<tr>
<td>EN 61000-4-6:2009</td>
<td>EN 61000-4-6:2009</td>
<td>EN 61000-4-6:2009</td>
</tr>
<tr>
<td>EN 61000-4-8:2010</td>
<td>ETSI EN 300 386 V1.6.1 (2012-09)</td>
<td>ETSI EN 300 386 V1.6.1 (2012-09)</td>
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<td>ICES-003 Issue 5</td>
<td>IEC 61000-4-11 Ed2.0 (2004-03)</td>
<td>IEC 61000-4-11 Ed2.0 (2004-03)</td>
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<td>IEC 61000-4-2 Ed2.0 (2008-12)</td>
<td>IEC 61000-4-2 Ed2.0 (2008-12)</td>
<td>IEC 61000-4-2 Ed2.0 (2008-12)</td>
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<tr>
<td>IEC 61000-4-3 Ed3.2 (2010-04)</td>
<td>IEC 61000-4-3 Ed3.2 (2010-04)</td>
<td>IEC 61000-4-3 Ed3.2 (2010-04)</td>
</tr>
<tr>
<td>IEC 61000-4-4 Ed3.0 (2012-04)</td>
<td>IEC 61000-4-4 Ed3.0 (2012-04)</td>
<td>IEC 61000-4-4 Ed3.0 (2012-04)</td>
</tr>
<tr>
<td>IEC 61000-4-6 Ed3.0 (2008-10)</td>
<td>IEC 61000-4-6 Ed3.0 (2008-10)</td>
<td>IEC 61000-4-6 Ed3.0 (2008-10)</td>
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<tr>
<td>IEC 61000-4-8 Ed2.0 (2009-09)</td>
<td>VCCI V-3/2013.04</td>
<td>VCCI V-3/2013.04</td>
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### Telecom

<table>
<thead>
<tr>
<th>Specification</th>
<th>HPE MSR3024 DC Router (JG407A)</th>
<th>HPE MSR3024 PoE Router (JG408A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>FCC Part 68, CS-03</td>
<td>FCC Part 68, CS-03</td>
<td>FCC Part 68, CS-03</td>
</tr>
</tbody>
</table>

### Management

- IMC—Intelligent Management Center; command-line interface; limited command-line interface; configuration menu; out-of-band management (RJ-45 Ethernet); SNMP Manager; Telnet; RMON1; FTP; in-line and out-of-band; modem interface; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB
- IMC—Intelligent Management Center; command-line interface; limited command-line interface; configuration menu; out-of-band management (RJ-45 Ethernet); SNMP Manager; Telnet; RMON1; FTP; in-line and out-of-band; modem interface; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB

### Services

Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.

Refer to the Hewlett Packard Enterprise website at hpe.com/networking/services for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.
HPE MSR3000 Router Series

SPECIFICATIONS

**HPE MSR3044 Router (JG405A)**
- 4 HMIM slots
- 4 SIC slots, or 2 DSIC slots, or a combination
- 3 RJ-45 1000BASE-T ports
  (IEEE 802.3ab Type 1000BASE-T)
- 2 SFP fixed Gigabit Ethernet SFP ports

**HPE MSR3064 Router (JG404A)**
- 6 HMIM slots
- 4 SIC slots, or 2 DSIC slots, or a combination
- 3 RJ-45 1000BASE-T ports
  (IEEE 802.3ab Type 1000BASE-T)
- 2 SFP fixed Gigabit Ethernet SFP ports

**I/O ports and slots**
- 3 RJ-45 1000BASE-T ports
  (IEEE 802.3ab Type 1000BASE-T)
- 2 SFP fixed Gigabit Ethernet SFP ports

**Additional ports and slots**
- 2 VPM slots
- 2 Power Supply slots

**Physical characteristics**

**Dimensions**
- 17.32 (w) x 18.9 (d) x 3.47 (h) in.
  (44 x 48 x 8.81 cm) (2U height)
- 17.32 (w) x 18.9 (d) x 5.31 (h) in.
  (44 x 48 x 13.5 cm) (3U height)

**Weight**
- 27.45 lb (12.45 kg)
- 36.49 lb (16.55 kg)

**Memory and processor**
- RISC, 4 cores @ 1 GHz, 256 MB flash capacity,
  2 GB DDR3 SDRAM
- RISC, 6 cores @ 1.3 GHz, 256 MB flash capacity,
  2 GB DDR3 SDRAM

**Mounting and enclosure**
- Desktop or can be mounted in an EIA standard 19-inch
telco rack when used with the rack-mount kit in
  the package

**Performance**

**Throughput**
- Up to 3.5 Mpps (64-byte packets)
- 5 Mpps (64-byte packets)

**Routing table size**
- 500000 entries (IPv4), 500000 entries (IPv6)
- 500000 entries (IPv4), 500000 entries (IPv6)

**Forwarding table size**
- 500000 entries (IPv4), 500000 entries (IPv6)
- 500000 entries (IPv4), 500000 entries (IPv6)

**Environment**

**Operating temperature**
- 32°F to 113°F (0°C to 45°C)
- 32°F to 113°F (0°C to 45°C)

**Operating relative humidity**
- 5% to 90%, noncondensing
- 5% to 90%, noncondensing

**Nonoperating/Storage temperature**
- -40°F to 158°F (-40°C to 70°C)
- -40°F to 158°F (-40°C to 70°C)

**Nonoperating/Storage relative humidity**
- 5% to 90%, noncondensing
- 5% to 90%, noncondensing

**Altitude**
- Up to 16,404 ft (5 km)
- Up to 16,404 ft (5 km)
### SPECIFICATIONS

#### Electrical characteristics

<table>
<thead>
<tr>
<th>Specification</th>
<th>HPE MSR3044 Router (JG405A)</th>
<th>HPE MSR3064 Router (JG404A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>50/60 Hz</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>Maximum heat dissipation</td>
<td>172 BTU/hr (181.46 kJ/hr)</td>
<td>218 BTU/hr (22999 kJ/hr)</td>
</tr>
<tr>
<td>AC voltage</td>
<td>100–240 VAC</td>
<td>100–240 VAC</td>
</tr>
<tr>
<td>DC voltage</td>
<td>-36 to -75 VDC</td>
<td>-36 to -75 VDC</td>
</tr>
<tr>
<td>Maximum power rating</td>
<td>300 W</td>
<td>300 W</td>
</tr>
<tr>
<td>PoE power</td>
<td>450 W PoE+</td>
<td>450 W PoE+</td>
</tr>
</tbody>
</table>

**Note**

Maximum power rating and maximum heat dissipation are the worst-case theoretical maximum numbers provided for planning the infrastructure with fully loaded PoE (if equipped), 100% traffic, all ports plugged in, and all modules populated.

PoE Power is the power supplied by the internal power supply, it is dependent on the type and quantity of power supplies and may be supplemented with the use of an External Power Supply (EPS).

No default power supply is included in the chassis, a minimum of one/multiple of four power supplies should be ordered.

#### Reliability

| MTBF (years) | 82.57 | 80.58 |

#### Safety

UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; IEC 60950-1; FDA 21 CFR Subchapter J; AS/NZS 60950-1; GB 4943.1

#### Emissions


UL 60950-1; EN 60825-1 Safety of Laser Products-Part 1; EN 60825-2 Safety of Laser Products-Part 2; IEC 60950-1; EN 60950-1; IEC 60950-1; FDA 21 CFR Subchapter J; AS/NZS 60950-1; GB 4943.1

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### SPECIFICATIONS

<table>
<thead>
<tr>
<th>Feature</th>
<th>HPE MSR3044 Router (JG405A)</th>
<th>HPE MSR3064 Router (JG404A)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Telecom</strong></td>
<td>FCC part 68; CS-03</td>
<td>FCC part 68; CS-03</td>
</tr>
<tr>
<td><strong>Management</strong></td>
<td>IMC—Intelligent Management Center; command-line interface; limited command-line interface; configuration menu; out-of-band management (RJ-45 Ethernet); SNMP Manager; Telnet; RMON1; FTP, in-line and out-of-band; modem interface; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB</td>
<td>IMC—Intelligent Management Center; command-line interface; limited command-line interface; configuration menu; out-of-band management (RJ-45 Ethernet); SNMP Manager; Telnet; RMON1; FTP, in-line and out-of-band; modem interface; out-of-band management (serial RS-232C or Micro USB); IEEE 802.3 Ethernet MIB</td>
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<td><strong>Services</strong></td>
<td>Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.</td>
<td>Refer to the Hewlett Packard Enterprise website at <a href="http://hpe.com/networking/services">hpe.com/networking/services</a> for details on the service-level descriptions and product numbers. For details about services, and response times in your area, please contact your local Hewlett Packard Enterprise sales office.</td>
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</tbody>
</table>

### STANDARDS AND PROTOCOLS

*(applies to all products in series)*

**BGP**

- RFC 1163 Border Gateway Protocol (BGP)
- RFC 1267 Border Gateway Protocol 3 (BGP-3)
- RFC 1657 Definitions of Managed Objects for BGPv4
- RFC 1771 BGPv4
- RFC 1772 Application of the BGP Protocol
- RFC 1773 Experience with the BGP-4 Protocol
- RFC 1774 BGP-4 Protocol Analysis
- RFC 1965 BGP-4 Confederations
- RFC 1997 BGP Communities Attribute
- RFC 2439 BGP Route Flap Damping
- RFC 2547 BGP/MPLS VPNs
- RFC 2796 BGP Route Reflection
- RFC 2842 Capability Advertisement with BGP-4
- RFC 2858 BGP-4 Multi-Protocol Extensions
- RFC 2918 Route Refresh Capability
- RFC 3065 Autonomous System Confederations for BGP
- RFC 3107 Support BGP carry Label for MPLS
- RFC 3392 Capabilities Advertisement with BGP-4
- RFC 4271 A Border Gateway Protocol 4 (BGP-4)
- RFC 4273 Definitions of Managed Objects for BGP-4
- RFC 4274 BGP-4 Protocol Analysis
- RFC 4275 BGP-4 MIB Implementation Survey
- RFC 4276 BGP-4 Implementation Report
- RFC 4277 Experience with the BGP-4 Protocol
- RFC 4360 BGP Extended Communities Attribute
- RFC 4456 BGP Route Reflection: An alternative to full mesh internal BGP (IBGP)
- RFC 4724 Graceful Restart Mechanism for BGP
- RFC 4760 Multi-protocol Extensions for BGP-4
- RFC 1998 An Application of the BGP Community Attribute in Multi-Home Routing

**Denial of service protection**

- CPU DoS Protection
- Rate Limiting by ACLs

**Device management**

- RFC 1155 Structure and Mgmt Information (SMIV1)
- RFC 1157 SMIV1/v2c
- RFC 1305 NTPv3
- RFC 1997 DNS (client)
- RFC 1902 (SMIV2)
- RFC 1908 (SMIV1/v2 Coexistence)
- RFC 1945 Hypertext Transfer Protocol—HTTP/1.0
- RFC 2271 Framework
- RFC 2573 (SMIV3 Applications)
- RFC 2576 (Coexistence between (SMIV1, v2, and v3))
- RFC 2578-2580 SMIV2
- RFC 2579 (SMIV2 Text Conventions)
- RFC 2580 (SMIV2 Conformance)
- RFC 3416 SNMP Protocol Operations v2
- RFC 3417 (SNMP Transport Mappings)
General protocols

RFC 768 UDP
RFC 760 DoD Standard Internet Protocol
RFC 764 Telnet Protocol Specification
RFC 777 Internet Control Message Protocol
RFC 785 TFTP Protocol (revision 2)
RFC 791 IP
RFC 792 ICMP
RFC 793 TCP
RFC 815 Window and Acknowledgement Strategy in TCP
RFC 815 IP datagram reassembly algorithms
RFC 826 ARP
RFC 854 Telnet Protocol Specification
RFC 855 Telnet Option Specifications
RFC 856 Telnet Binary Transmission
RFC 857 Telnet Echo Option
RFC 858 Telnet Suppress Go Ahead Option
RFC 862 Echo Service (TCP Echo)
RFC 879 TCP maximum segment size and related topics
RFC 882 Domain names: Concepts and facilities
RFC 883 Domain names: Implementation specification
RFC 894 A Standard for the Transmission of IP Datagrams over Ethernet Networks
RFC 896 Congestion Control in IP/TCP Internetworks
RFC 906 Bootstrap loading using TFTP (Trivial File Transfer Protocol)
RFC 917 Internet Subnets
RFC 919 Broadcasting Internet Datagrams
RFC 922 Broadcasting Internet Datagrams in the Presence of Subnets (IP_BROAD)
RFC 925 Multi-LAN Address Resolution
RFC 926 Protocol for providing the connectionless mode network services
RFC 950 Internet Standard Subnetting Procedure
RFC 951 BOOTP
RFC 958 Network Time Protocol (NTP)
RFC 959 File Transfer Protocol (FTP)
RFC 973 Domain system changes and observations
RFC 988 Host extensions for IP multicasting
RFC 1027 Proxy ARP
RFC 1034 Domain names—concepts and facilities
RFC 1035 Domain names—implementation and specification
RFC 1048 BOOTP (Bootstrap Protocol) vendor information extensions
RFC 1054 Host extensions for IP multicasting
RFC 1058 IPv6
RFC 1059 Network Time Protocol (version 1) specification and implementation
RFC 1060 Assigned Numbers
RFC 1063 IP MTU (Maximum Transmission Unit) discovery options
RFC 1071 Computing the Internet checksum
RFC 1072 TCP extensions for long-delay paths
RFC 1079 Telnet terminal speed option
RFC 1084 BOOTP (Bootstrap Protocol) vendor information extensions
RFC 1091 Telnet Terminal-Type Option
RFC 1093 NSFNET routing architecture
RFC 1101 DNS encoding of network names and other types
RFC 1119 Network Time Protocol (version 2) specification and implementation
RFC 1122 Requirements for Internet Hosts—Communication Layers
RFC 1141 Incremental updating of the Internet checksum
RFC 1142 OSI IS-IS Intra-domain Routing Protocol
RFC 1164 Application of the Border Gateway Protocol in the Internet
RFC 1166 Internet address used by Internet Protocol (IP)
RFC 1171 Point-to-Point Protocol for the transmission of multi-protocol datagrams over Point-to-Point links
RFC 1172 Point-to-Point Protocol (PPP) initial configuration options
RFC 1175 TCP Extension for High-Speed Paths
RFC 1191 Path MTU discovery
RFC 1195 OSI IS-IS for IP and Dual Environments
RFC 1213 Management Information Base for Network Management of TCP/IP-based internets
RFC 1253 (OSPFv2)
RFC 1265 BGP Protocol Analysis
RFC 1266 Experience with the BGP Protocol
RFC 1268 Application of the Border Gateway Protocol in the Internet
RFC 1271 Remote Network Monitoring Management Information Base
RFC 1284 Definitions of Managed Objects for the Ethernet-Like Interface Types
RFC 1286 Definitions of Managed Objects for Bridges
RFC 1294 Multi-protocol Interconnect over Frame Relay
RFC 1305 IPv6 (IPv4 only)
RFC 1321 The MDS Message-Digest Algorithm
RFC 1322 TCP Extensions for High Performance
RFC 1331 The Point-to-Point Protocol (PPP) for the Transmission of Multi-protocol Datagrams over Point-to-Point Links
RFC 1332 The PPP Internet Protocol Control Protocol (IPCP)
RFC 1333 PPP Link Quality Monitoring
RFC 1334 PPP Encryption Protocols
RFC 1349 Type of Service
RFC 1350 TFTP Protocol (revision 2)
RFC 1364 BGP OSPF Interaction
RFC 1370 Applicability Statement for OSPF
RFC 1377 The PPP OSI Network Layer Control Protocol (OSINLCPP)
RFC 1393 Traceroute Using an IP Option
RFC 1395 BOOTP (Bootstrap Protocol) Vendor Information Extensions
RFC 1398 Definitions of Managed Objects for the Ethernet-Like Interface Type
RFC 1403 BGP OSPF Interaction
RFC 1444 Conformance Statements for version 2 of the Simple Network Management Protocol (SNMPv2)
RFC 1449 Transport Mappings for version 2 of the Simple Network Management Protocol (SNMPv2)
RFC 1471 The Definitions of Managed Objects for the Link Control Protocol of the Point-to-Point Protocol
RFC 1473 The Definitions of Managed Objects for the IP Network Control Protocol of the Point-to-Point Protocol
RFC 1483 Multi-protocol Encapsulation over ATM Adaptation Layer 5
RFC 1490 Multi-protocol Interconnect over Frame Relay
RFC 1497 BOOTP (Bootstrap Protocol) Vendor Information Extensions
RFC 1519 CIDR
RFC 1531 Dynamic Host Configuration Protocol
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#### Transceivers

- HPE X110 100M SFP LC FX Transceiver (JD102B)
- HPE X110 100M SFP LC LX Transceiver (JD120B)
- HPE X110 100M SFP LC LH40 Transceiver (JD090A)
- HPE X110 100M SFP LC LH80 Transceiver (JD091A)
- HPE X120 1G SFP LC SX Transceiver (JD118B)
- HPE X120 1G SFP LC LX Transceiver (JD119B)
- HPE X125 1G SFP LC LH40 1310nm Transceiver (JD061A)
- HPE X120 1G SFP LC LH40 1550nm Transceiver (JD062A)
- HPE X125 1G SFP LC LH70 Transceiver (JD063B)
- HPE X120 1G SFP LC LH100 Transceiver (JD103A)
- HPE X120 1G SFP LC BX 10-U Transceiver (JD098B)
- HPE X120 1G SFP LC BX 10-D Transceiver (JD099B)

#### Cables

- HPE X200 V.24 DCE 3m Serial Port Cable (JD519A)
- HPE X200 V.24 DCE 3m Serial Port Cable (JD51A)
- HPE X200 V.35 DTE 3m Serial Port Cable (JD523A)
- HPE X200 V.35 DCE 3m Serial Port Cable (JD525A)
- HPE X260 RS449 3m DTE Serial Port Cable (JF825A)
- HPE X260 RS449 3m DCE Serial Port Cable (JF826A)
- HPE X260 RS530 3m DTE Serial Port Cable (JF827A)
- HPE X260 RS530 3m DCE Serial Port Cable (JF828A)
- HPE X260 Auxiliary Router Cable (JD508A)
- HPE X260 E1 RJ45 3m Router Cable (JD509A)
- HPE X260 E1 RJ45 20m Router Cable (JD517A)
- HPE X260 E1 (2) BNC 75 ohm 3m Router Cable (JD175A)
- HPE X260 E1 BNC 20m Router Cable (JD514A)
- HPE X260 E1 RJ45 BNC 75-120 ohm Conversion Router Cable (JD511A)
- HPE X260 E1 BNC 3m Router Cable (JD663A)
- HPE X260 E1 BNC 75 ohm 3m Router Cable (JD512A)
- HPE X260 T1 Router Cable (JD518A)
- HPE X260 SIC-8AS RJ45 0.28m Router Cable (JD642A)
- HPE X260 mini D-28 to 4-RJ45 0.3m Router Cable (JG263A)
- HPE X260 T3/E3 Router Cable (JD531A)
- HPE X260 E1 RJ45 to 2x BNC 75 ohm 3m Router Cable (JH294A)
- HPE X260 E1 RJ45 120 ohm 2m Router Cable (JC156A)
- HPE X260 E1 RJ45 120 ohm 15m Router Cable (JC151A)
- HPE X260 E1 RJ45 120 ohm 30m Router Cable (JC152A)
- HPE X260 T1 Router Cable (JD518A)

#### Power supply

- HPE X351 300W 100-240VAC to 12VDC Power Supply (JG527A)
- HPE X351 300W -48/-60VDC to 12VDC Power Supply (JG528A)
- HPE 5800 750W AC Power Supply (JC089A)
- HPE RPS 800 Redundant Power Supply (JD183A)
HPE MSR3000 Router Series accessories (continued)

Router Modules

- HPE MSR 1-port E1(CE1)/PRI SIC Module (JG604A)
- HPE MSR 9-port 10/100Base-T Switch DSIC Module (JD574B)
- HPE MSR 9-port 10/100Base-T PoE Switch DSIC Module (JD621A)
- HPE MSR 4-port 10/100Base-T Switch SIC Module (JD572A)
- HPE MSR 4-port Gig-T Switch SIC Module (JD739A)
- HPE MSR 4-port Gig-T PoE Switch SIC Module (JD740A)
- HPE MSR 1-port 10/100Base-T SIC Module (JD545B)
- HPE MSR 1-port 100Base-X SIC Module (JF280A)
- HPE MSR 1-port GbE Combo SIC Module (JG738A)
- HPE MSR 2-port FXO SIC Module (JD558A)
- HPE MSR 2-port FXS SIC Module (JD560A)
- HPE MSR 1-port E1 Voice SIC Module (JD575A)
- HPE MSR 1-port T1 Voice SIC Module (JD576A)
- HPE MSR 2-port FXS/1-port FXO SIC Module (JD632A)
- HPE MSR 4-port FXS/4-port FXD DSIC Module (JG189A)
- HPE MSR 1-port E1/Fractional E1 (75 ohm) SIC Module (JD634B)
- HPE MSR 2-port E1/Fractional E1 (75 ohm) SIC Module (JF842A)
- HPE MSR 1-port T1/Fractional T1 SIC Module (JD538A)
- HPE MSR 1-port Enhanced Serial SIC Module (JD557A)
- HPE MSR 2-port Enhanced Sync/Async Serial SIC Module (JG736A)
- HPE MSR 4-port Enhanced Sync/Async Serial SIC Module (JG737A)
- HPE MSR 1-port ISDN-S/T SIC Module (JD571A)
- HPE MSR 8-port Async Serial SIC Module (JF281A)
- HPE MSR 16-port Async Serial SIC Module (JG186A)
- HPE MSR 1-port 8-wire G.SHDSL (RJ45) DSIC Module (JG91A)
- HPE MSR 4G LTE SIC Module for Verizon/LTE 700 MHz/CDMA Rev A (JG742A)
- HPE MSR 4G LTE SIC Module for ATT/LTE 700/700/2100 MHz and UMTS/HSPA+/HSPA/EDGE/GRPS/HSUPA/UMTS/HSPA/EDGE/GRPS/HSUPA/UMTS/GSM (JG743A)
- HPE MSR 4G LTE SIC Module for Global/LTE 800/900/1800/2100MHz UMTS/HSPA+/HSPA/EDGE/GRPS/HSUPA/UMTS/GSM (JG744B)
- HPE MSR 1-port E1/T1 Voice SIC Module (JH240A)
- HPE MSR HSPA+/WCDMA SIC Module (JG929A)
- HPE MSR 1U HMIM Adapter Module (JG46A)
- HPE MSR 0.5U HMIM Adapter Module (JG415A)
- HPE MSR 1-port E1 Voice HMIM Module (JG429A)
- HPE MSR 1-port T1 Voice HMIM Module (JG430A)
- HPE MSR 2-port E1 Voice HMIM Module (JG431A)
- HPE MSR 2-port T1 Voice HMIM Module (JG432A)
- HPE MSR 4-port FXS HMIM Module (JG446A)
- HPE MSR 4-port FXD HMIM Module (JG447A)
- HPE MSR 4-port E and M HMIM Module (JG448A)
- HPE MSR 16-port FXS HMIM Module (JG434A)
- HPE MSR 4-port Enhanced Sync/Async Serial HMIM Module (JG442A)
- HPE MSR 8-port Enhanced Sync/Async Serial HMIM Module (JG443A)
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- HPE DV Essential IPS Filter Service for MSR3000 1yr E-LTU (JH228AAE)

### Power cords
- HPE X290 MSR30 1m RPS Cable (JD637A)

### Memory
- HPE X600 1G Compact Flash Card (JC686A)
- HPE X600 512M Compact Flash Card (JC685A)
- HPE X600 256M Compact Flash Card (JC684A)
- HPE X610 4GB DDR3 SDRAM UDIMM Memory (JG530A)

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