HPE MSR1000 Router Series

Key features

• Up to 500 Kpps IP forwarding; converged high-performance routing, switching, security, voice, and mobility
• Embedded security features with hardware-based encryption, firewall, network address translation (NAT), and VPNs
• Industry-leading breadth of LAN and WAN connectivity options
• No additional licensing complexity; no cost for advanced features
• Zero-touch solution, with single-pane-of-glass management

Product overview

The HPE MSR1000 Router Series is a next generation multiservices router designed to deliver unmatched application performance for small branch offices. The MSR1000 series provides a flexible multiservice end point for small branches and remote offices that quickly adapts 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 500 Kpps; meets current and future bandwidth-intensive application demands of enterprise businesses
• Powerful encryption capacity
  Includes embedded hardware encryption accelerator to improve encryption performance

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, wireless LAN, 3G or 4G WAN, firewall, VPN, and SIP or voice gateway all in one box

• High-density voice interfaces
  Provide flexible analog voice interface options for easy integration within a wide range of deployments

• USB interface
  Uses USB memory disk to download and upload configuration files; supports an external USB 3G modem for a 3G WAN uplink

• Advanced hardware architecture
  Delivers Gigabit Ethernet switching and a PCIe bus

Connectivity
• 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, RFC4447, RFC4761 and RFC4762, BFD detection in VPLS, Support hierarchical HOPE(H-VPLS), MAC address recovery in H-VPLS to speed up convergence

• NEMO (Network Mobility)
  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

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

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

• Multiple WAN interfaces
  Provide a traditional link with E1, T1, ADSL, ADSL2, ADSL2+, G.SHDSL, Serial, and ISDN backup; provide high-density Ethernet access with Fast Ethernet/Gigabit Ethernet, mobility access with IEEE 802.11b/g/n Wi-Fi, and 3G/4G LTE options

• High-density port connectivity
  Integrates four or eight Giga LAN switching ports (All switching ports can be configured as routed ports.), two or three SIC slots, and up to 30 module options
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
  Control and manage 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
  Support 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 eight GE 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 (RIPv2)
  Extends RIPv2 to support IPv6 addressing
- OSPFv3
  Provides OSPF support for IPv6
- BGP+
  Extends BGP-4 to support Multiprotocol BGP (MP-BGP), 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

• Multiprotocol 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

• Multiprotocol Label Switching (MPLS) Layer 3 VPN
allows Layer 3 VPNs across a provider network; uses Multiprotocol BGP (MP-BGP) to establish private routes for increased security; supports RFC 2547 multiple autonomous system VPNs for added flexibility; supports IPv6 MPLS VPN

• Multiprotocol 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

• Policy routing
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 RTPQ
• Weighted random early detection (WRED)/Random early detection (RED)
  Delivers congestion avoidance capabilities through the use of queue management algorithms

• Other QoS technologies
  Support traffic shaping, FR QoS, MPLS QoS, and MP QoS/LFI

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

• 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

• Network login
  Standard IEEE 802.1x allows authentication of multiple users per port

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

• Network address translation (NAT)
  Supports one-to-one NAT, many-to-many NAT, and NAT control, enabling NAT-PT to support multiple connections; supports blacklist in NAT/NAT-PT, and 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 or securely login to MSR from a remote location; with authentication and encryption, it protects against IP spoofing and plain text password interception; increases the security of Secure File Transfer Protocol (SFTP) transfers
• 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

• IPSec VPN
  Supports DES, Triple DES (3DES), and Advanced Encryption Standard (AES) 128/192/256 encryption, and MD5 and SHA-1 authentication

• Attack detection and protection
  Responding to network attacks and threats by MSR Comware, support max connection limitation, single-packet attacks protection, scanning attack protection, flood attack protection, TCP and ICMP Attack Protection and so on

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 Multicast (SSM)

• Multicast Source Discovery Protocol (MSDP)
  Allows multiple PIM-SM domains to interoperate; is used for interdomain 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
  Provide enhanced stateful packet inspection and filtering; deliver advanced VPN services with Triple DES (3DES) and Advanced Encryption Standard (AES) encryption at high performance and low latency, and application prioritization and enhancement

Resiliency and high availability
• 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

Management
• Ease of deployment
  Zero-touch deployment, supports TR-069, USB disk auto deployment and 3G SMS auto deployment

• 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 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)
  Analyzes 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

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

• High reliability
  Provides a state-of-the-art unified code base

• 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 for warranty and support information included with your product purchase.

• Software releases
  To find software for your product, refer to hpe.com/networking/support; for details on the software releases available with your product purchase, refer to hpe.com/networking/warrantysummary
# HPE MSR1000 Router Series

## Specifications

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<th>Model</th>
<th>I/O ports and slots</th>
<th>Additional ports and slots</th>
<th>AP characteristics</th>
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<th>Memory and processor</th>
<th>Mounting and enclosure</th>
<th>Performance</th>
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<th>Electrical characteristics</th>
<th>Notes</th>
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<tr>
<td>HPE MSR1002-4 AC Router (JG875A)</td>
<td>2 SIC slots, or 1 DSIC slot 1 RJ-45 autosensing 10/100/1000 WAN port 1 SFP fixed Gigabit Ethernet SFP port 4 RJ-45 autosensing 10/100/1000 LAN ports 1 Serial port</td>
<td>1 USB 2.0 1 RJ-45 console port to access limited CLI port</td>
<td>3G, 4G LTE</td>
<td>14.17(w) x 11.81(d) x 1.74(h) in (36 x 30 x 4.42 cm) (1U height) 6.83 lb (3.10 kg)</td>
<td>RISC @ 667 MHz, 1 GB DDR3 SDRAM, 256 MB flash</td>
<td>Desktop or can be mounted in a EIA standard 19-inch telco rack when used with the rack-mount kit in the package.</td>
<td>Up to 500 Kpps (64-byte packets) 200000 entries (IPv4), 200000 entries (IPv6)</td>
<td>32°F to 113°F (0°C to 45°C) 5% to 95%, noncondensing</td>
<td>50/60 Hz 92 BTU/hr (97.06 kJ/hr) 100—240 VAC, rated</td>
<td>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.</td>
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<td>HPE MSR1003-8 AC Router (JG732A) Comware V5 based</td>
<td>3 SIC slots, or 1 DSIC slot, and 1 SIC slot 2 RJ-45 autosensing 10/100/1000 WAN ports 8 RJ-45 autosensing 10/100/1000 LAN ports</td>
<td>1 USB 2.0 1 RJ-45 console port to access limited CLI port</td>
<td>3G, 4G LTE</td>
<td>14.17(w) x 11.81(d) x 17.4(h) in (36 x 30 x 44.2 cm) 6.94 lb (3.15 kg)</td>
<td>RISC @ 667 MHz, S12 MB DDR3 SDRAM, 256 MB flash</td>
<td>Desktop or can be mounted in a EIA standard 19-inch telco rack when used with the rack-mount kit in the package.</td>
<td>Up to 500 Kpps (64-byte packets) 30000 entries (IPv4), 30000 entries (IPv6)</td>
<td>32°F to 113°F (0°C to 45°C) 5% to 95%, noncondensing</td>
<td>50/60 Hz 65 BTU/hr (68.58 kJ/hr) 100—240 VAC, rated</td>
<td>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.</td>
</tr>
<tr>
<td>HPE MSR1003-8S AC Router (JH060A) Comware V7 based</td>
<td>3 SIC slots, or 1 DSIC slot, and 1 SIC slot 2 RJ-45 autosensing 10/100/1000 WAN ports 8 RJ-45 autosensing 10/100/1000 LAN ports</td>
<td>1 USB 2.0 1 RJ-45 console port to access limited CLI port</td>
<td>3G, 4G LTE</td>
<td>14.17(w) x 11.81(d) x 17.4(h) in (36 x 30 x 44.2 cm) 6.94 lb (3.15 kg)</td>
<td>RISC @ 667 MHz, 1 GB DDR3 SDRAM, 256 MB flash</td>
<td>Desktop or can be mounted in a EIA standard 19-inch telco rack when used with the rack-mount kit in the package.</td>
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<td></td>
<td></td>
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<td><strong>Availability</strong></td>
<td>137.5</td>
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<tr>
<td><strong>Safety</strong></td>
<td>UL 60950-1; 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</td>
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<td><strong>Emissions</strong></td>
<td>VCCI Class A; EN 55022 Class A; CISPR 22 Class A; EN 55024; ICES-003 Class A; EN 300 386; CISPR 24; AS/NZS CISPR 22 Class A; EN 61000-3-2; EN 61000-3-3; FCC (CFR 47, Part 15) Class A</td>
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<td><strong>Telecom</strong></td>
<td>FCC part 68, CS-03</td>
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<td><strong>Management</strong></td>
<td>IMC—Intelligent Management Center; command-line interface; Web browser; out-of-band management (serial RS-232C); out-of-band management (DB-9 serial port console); SNMP Manager; Telnet; RMON1; FTP; IEEE 802.3 Ethernet MIB</td>
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<td><strong>Services</strong></td>
<td>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.</td>
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## Standards and Protocols

*(applies to JG875A and JH060A models)*

### 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
- 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 (BGP)
- RFC 4724 Graceful Restart Mechanism for BGP
- RFC 4760 Multiprotocol Extensions for BGP-4
- RFC 4998 An Application of the BGP Community Attribute in Multi-home Routing

### Denial of service protection

- CPU DoS Protection
- Rate Limiting by ACLs
### Standards and Protocols

**Device management**
- RFC 1155 Structure and Mgmt Information (SMIv1)
- RFC 1157 SNMPv1/v2c
- RFC 1305 NTPv3
- RFC 1591 DNS (client)
- RFC 1902 (SNMPv2)
- RFC 1908 (SNMP v1/2 Coexistence)
- RFC 1945 Hypertext Transfer Protocol—HTTP/1.0
- RFC 2271 Framework
- RFC 2573 (SNMPv3 Applications)
- RFC 2576 (Coexistence between SNMP V1, V2, 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 783 TFTP Protocol (revision 2)
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 813 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 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 895 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 Domain names: Concepts and facilities
- RFC 1058 RIPv1
- RFC 1059 Network Time Protocol (version 2) 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
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- RFC 3247 Supplemental Information for the New Definition of the EF PHB (Expedited Forwarding Per-Hop Behavior)
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### Standards and Protocols
*(applies to JG732A model)*

#### Security
- IEEE 802.1X Port Based Network Access Control
- RFC 1321 The MD5 Message-Digest Algorithm
- RFC 2082 RIPv-2 MDS Authentication
- RFC 2104 Keyed-Hashing for Message Authentication
- RFC 2138 RADIUS Authentication
- RFC 2209 RSVP-Message Processing
- RFC 2246 Transport Layer Security (TLS)
- RFC 2716 PPP EAP TLS Authentication Protocol
- RFC 2796 BGP Route Reflection—An Alternative to Full Mesh IBGP
- RFC 2858 Multiprotocol Extensions for BGP-4
- RFC 2865 RADIUS Authentication
- RFC 2866 RADIUS Accounting
- RFC 3567 Intermediate System (IS) to IS Cryptographic Authentication

#### VPN
- RFC 2403—HMAC-MD5-96
- RFC 2404—HMAC-SHA1-96
- RFC 2547 BGP/MPLS VPNs
- RFC 2796 BGP Route Reflection—An Alternative to Full Mesh IBGP
- RFC 2842 Capabilities Advertisement with BGP-4
- RFC 2716 PPP EAP TLS Authentication Protocol
- RFC 2796 BGP Route Reflection—An Alternative to Full Mesh IBGP
- RFC 2858 Multiprotocol Extensions for BGP-4
- RFC 2865 RADIUS Authentication
- RFC 2866 RADIUS Accounting
- RFC 3567 Intermediate System (IS) to IS Cryptographic Authentication

#### IPSec
- RFC 1828 IP Authentication using Keyed MDS
- RFC 2401 IP Security Architecture
- RFC 2402 IP Authentication Header
- RFC 2406 IP Encapsulating Security Payload
- RFC 2407—Domain of interpretation
- RFC 2410—The NULL Encryption Algorithm and its use with IPSec
- RFC 2411 IP Security Document Roadmap
- RFC 2412—OAKLEY
- RFC 2865—Remote Authentication Dial In User Service (RADIUS)

#### IKEv1
- RFC 2865—Remote Authentication Dial In User Service (RADIUS)
- RFC 3748—Extensible Authentication Protocol (EAP)

### HPE MSR1000 Router Series accessories

#### Transceivers
- HPE X110 100M SFP LC FX Transceiver (JD102B)
- HPE X110 100M SFP LC LX Transceiver (JD120B)
- HPE X110 100M SFP LC LH60 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 (JD099B)
- HPE X120 1G SFP LC BX 10-D Transceiver (JD099B)

#### Cables
- HPE X200 V24 DTE 3m Serial Port Cable (JD519A)
- HPE X200 V24 DCE 3m Serial Port Cable (JD521A)
- HPE X200 V35 DTE 3m Serial Port Cable (JD523A)
- HPE X200 V35 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 (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 2E1 BNC 3m Router Cable (JD643A)
- HPE X260 T1 Router Cable (JD518A)
- HPE X260 SIC-BAS RJ45 0.28m Router Cable (JD642A)
- HPE X260 E1 RJ45 20m Router Cable (JD517A)
- HPE X260 mini D-28 to 4-RJ45 0.3m Router Cable (JD263A)

#### Mounting Kit
- HPE 3100/4210-16/-8 PoE Rack Mount Kit (JD323A)
HPE MSR1000 Router Series accessories (continued)

### Router Modules
- HPE MSR 9-port 10/100Base-T Switch DSIC Module (JD574B)
- HPE MSR 4-port 10/100Base-T Switch SIC Module (JD573B)
- HPE MSR 4-port Gig-T Switch SIC Module (JG739A)
- HPE MSR 1-port GbE Combo SIC Module (JG738A)
- HPE MSR 1-port 10/100Base-T SIC Module (JD545B)
- HPE MSR 1-port 100Base-X SIC Module (JF280A)
- HPE MSR 2-port FXO SIC Module (JD558A)
- HPE MSR 2-port FXS SIC Module (JD560A)
- HPE MSR 2-port FXS/1-port FXO SIC Module (JD632A)
- HPE MSR 1-port 8-wire G.SHDSL (RU4S) DSIC Module (JG191A)
- HPE MSR 1-port E1/Fractional E1 (75ohm) SIC Module (JD634B)
- HPE MSR 2-port E1/Fractional E1 (75ohm) 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 (JD51A)
- HPE MSR 16-port Async Serial SIC Module (JG186A)
- HPE MSR 8-port Async Serial SIC Module (JF281A)
- HPE MSR 1-port E1/CE1/PRI SIC Module (JG604A)
- HPE MSR 4-port FXS/1-port FXO DSIC Module (JG189A)
- HPE Flex Network MSR 4G LTE SIC Module for LTE 700/1700/2100 MHz CDMA UMTS/HSPA+/HSPA/EDGE/GPRS/GSM (JG742B)
- HPE MSR 4G LTE SIC Module for AT&T/LTE 700/1700/2100 MHz and UMTS/HSPA+/HSPA/EDGE/GPRS/GSM (JG743A)
- HPE MSR 4G LTE SIC Module for Global/LTE 800/900/1800/2100/2600MHz UMTS/HSPA+/HSPA/EDGE/GPRS/GSM (JG744B)
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- HPE MSR 1-port E1/T1 Voice SIC Module (JH264A)

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