HPE MSM Controller Series

Key features

- Ease of use, scalability, and redundancy
- Enhanced architecture for flexible network design
- Supports IEEE 802.11a/b/g/n and .11ac AP and access devices
- Comprehensive WLAN security
- Appliance and blade form factors

Product overview

Working in unison with HPE Access Points, the HPE MSM Controller Series delivers a high-performance networking solution. The enhanced controller architecture scales to new WLAN standards without requiring a controller replacement. The MSM controllers provide advanced Radio Resource Management (RRM), including client load balancing and interference mitigation. The MSM wireless controllers also support a fast-roaming capability.

Wireless security is comprehensive with integrated wireless IDS and support for internal and external Authentication, Authorization, and Accounting (AAA) servers; a built-in stateful firewall; per-user VLAN mapping, and authentication.
Features and benefits

Management

• Wi-Fi Clear Connect
  Provides a system-wide approach to delivering WLAN reliability by proactively determining and adjusting to changing RF conditions; optimizes WLAN performance by detecting interference from Wi-Fi and non-Wi-Fi sources—by using spectrum analysis capabilities built into the specific access points (refer to the HPE Access Point—Controller compatibility matrix), identifying rogue activity and making decisions at a system-wide level.

• Advanced radio resource management
  – Automatic radio power adjustments
    Include real-time power adjustments based on changing environmental conditions and signal coverage adjustment
  – Automatic radio channel
    Provides intelligent channel switching and real-time interference detection
  – Intelligent client load balancing
    Determines the number of clients across neighboring APs and adjusts client allocation to balance the load
  – Airtime fairness
    Helps ensure equal RF transmission time for wireless clients

• Spectrum analysis
  – Power/frequency spectrum analysis
    Measures noise from IEEE 802.11 remote sources
  – Signal detection/classification
    Identifies source of RF interference; for example, Bluetooth, cordless phones, and microwave ovens
  – Evaluation of channel quality
    Helps detect severe channel degradation and improves the reporting of poor RF performance

• Automated work flows
  – Initial controller settings
    Defines basic operational settings for the controller; for example, network connections, security settings, and system time
  – Wireless network for employees
    Enables setup of a new wireless network for employees; for example, network and security settings, and basic voice and video settings
  – Wireless network for guests
    Provides wireless access for guest users; for example, network and security settings specific to guest access
• Dashboard Monitoring and Analytics
  – Allow administrators to monitor and troubleshoot their HPE WLAN infrastructure at a glance
  – Provide analytical visibility into multiple areas such as Wireless Clients, Access Points and Alarms utilizing intuitive graphics and colors
  – Display a quick operational health assessment of the Wi-Fi network and easy identification of potential issues

• Support for environments using Bonjour services
  – Gateway
    Allows discovery of Bonjour services located in a different layer-3 network
  – Hewlett Packard Enterprise Zerocast
    Eliminates Bonjour multicast traffic from the WLAN enabling scalable deployment of Apple devices with no performance impact on the Wi-Fi network
  – Access control
    Enables filters to be applied inbound and outbound (on the AP) to SSIDs, groups of or specific APs. User based filtering can block Bonjour traffic until the user is authenticated

• Remote configuration and management
  Are available through a secure Web browser, command-line interface (console port or SSH), SOAP, or SNMP

• Management interface control
  Allows interfaces to be enabled or disabled depending on security preferences

• Management VLAN
  Segments traffic to and from management interfaces, including CLI, Web browser interface, and SNMP

• RADIUS accounting support
  Separates RADIUS accounting server support per SSID; provides detailed session, usage, and billing information for each client activity

• Logging
  Provides local and remote logging of events via SNMP (v2c and v3) and syslog; provides log throttling and log filtering to reduce the number of log events generated

• Controller networking
  Includes IEEE 802.1D-compliant bridging and bridge MIB (RFC 4188), which is supported only on a primary bridge interface; stateful firewall; PPPoE client (RFC 2516); ICMP (RFC 792); IEEE 802.1Q VLAN tagging; NAT (RFC 1631); CIDR (RFC 1519); L2TP and PPTP servers for wireless clients; VPN client, which establishes PPTP or IPSec tunnels to other devices; and IGMP snooping (IGMP proxy v1 and v2), which is supported on the wireless interfaces of APs

• DHCP support
  Includes RFC 2131 and RFC 3046 (DHCP relay option 82) for server and built-in DHCP client for client

• Band steering
  Redirects 5 GHz-capable clients automatically to the less-congested 5 GHz spectrum
• Controller management

Provides a secure Web browser (Secure Sockets Layer [SSL] and VPN), command-line interface, SOAP, SNMP v2c and v3, MIB-II with traps, RADIUS Authentication Client MIB (RFC 2618), and RIPv2 MIB extension (RFC 1724); implements scheduled configuration and firmware upgrades from a central server; offers per-user activity records by time used or data transferred; and supports remote syslog

• HPE Intelligent Management Center (IMC) and Wireless Services Manager Software

Provide centralized management for discovery, logging, status, and configuration management

• Unified network visibility

Provides visibility between a wired and wireless network, using the IEEE 802.1AB Link Layer Discovery Protocol (LLDP) and sFlow

• Diagnostics

Records association, authentication, and DHCP events in client event log; includes a packet capture tool for Ethernet and IEEE 802.11 interfaces (PCAP format), a wireless client data rate matrix, and a client status page; complete session logging provides detailed information for problem identification and resolution

• New Group Bandwidth Management

Ability to assign users to groups and control bandwidth by group

Firewall

• Stateful firewall

Enforces firewall policies to control traffic and filter access to network services; maintains session information for every connection passing through it, enabling the firewall to control packets based on existing sessions

• NAT/PAT

Leverages a choice of dynamic partial address translation (PAT) or static network address translation (NAT) preserves a network’s IP address pool or conceals the private address of network resources such as Web servers, which are made accessible to users of a guest or public wireless LAN

• Authenticated network access

Authenticates users with an internal or external RADIUS server or Microsoft® Active Directory before allowing full network connectivity

Quality of Service (QoS)

• Rate limiting

Supports per-wireless client, ingress-enforced maximums and per-wireless client, per-queue guaranteed minimums

• Centralized traffic

Layer 2 and Layer 3 QoS settings are maintained when using the Mobility Traffic Manager or guest access

Mobility

• HPE MSM solutions enhanced for businesses

Delivers services for a range of vertical markets, including healthcare, hospitality, education, manufacturing, transportation, and service providers

• Powerful security capabilities

Enables robust identity- and role-based user account profiles to use internal or external AAA services
• Solutions that cover the most important WLAN applications
   Deliver rich application support, including guest access, location-based services, Voice over Wi-Fi (VoW), hotspot, surveillance, and secure point of sale

• Capacity that scales from small office to large campus
   Deploy wireless LANs (WLANs) efficiently with the MSM720 controller (which supports 10 to 40 APs) and the MSM760 and MSM775 zl controllers (which control 40 to 200 APs)

• Premium Mobility scalability features
  – Virtual Controller
    Managed by a single IP address the MSM760 and MSM775 zl each support a team of up to 800 APs and five controllers and the MSM720 a team of up to 40 APs across two controllers (a team requires the same controller type)
  – N+1 redundancy
    Teaming provides N+1 redundancy
  – Seamless failover
    APs can fail-over without rebooting, preserving mobility services when client traffic is bridged locally at the AP
  – 64 VSC profiles
    Can be defined

• Mobility Traffic Manager
   Provides flexible and multiple network distribution schemes address a range of business needs; policies for user network and security profiles are consistently applied and enforced; wireless traffic can be directed anywhere in the network as required; enterprise businesses can easily migrate to the MSM mobility solution, preserving prior network designs

• Controller client access control
   Provides SSL-protected universal access method, MAC address authentication, and IEEE 802.1x authentication; Web proxy server; support for centralized portal; AAA Security; WPA and WPA2 encryption; client-fixed IP address spoofing; per-site and per-user access lists; white list and black list support; bandwidth limiting per user, per VLAN, or per VSC; and concurrent users (250 for the MSM720, and 2,000 for the MSM760 and MSM775 zl controllers)

• Simplified management with central control
   Reduces the time and complexity of managing a wireless network; the solution controls up to hundreds of APs (depending on the controller) from a single management interface and helps ensure that a consistent set of services is delivered throughout the wireless network; and the controllers push authentication, encryption, QoS enforcement, and access policies to the APs, delivering intelligence to the edge of mobile networks

• Services
   Provides standard L2 roaming and VoWLAN support on all controllers, advanced fast roaming on mobility controllers, plug-and-play AP management, as well as public and guest Internet access

• Advanced fast roaming (requires a mobility controller or upgrade)
   Provides WPA2 opportunistic key caching through controller support as well as inter/intra-subnet roaming and seamless roaming (less than 50 ms roaming delay) support for VoW deployments
**Security**

- Integrated IDS support (Premium Mobility version required)
  - Automated AP and client classification
    - Reduces manual effort (administrator can override AP classification)
  - Comprehensive detection capabilities
    - Detects a wide range of attacks
  - Flexible event reporting
    - Enables configuration of which events will result in notifications
  - Location tracking capabilities
    - Helps identify the location of a rogue device
  - Flexible deployment models
    - Supports time slicing or dedicating a radio to detect full time

- Secure shell
  Encrypts all transmitted data for secure remote CLI access over IP networks

- Secure Sockets Layer (SSL)
  Encrypts all HTTP traffic, allowing secure access to the browser-based management GUI in the switch

- IEEE 802.1X, Active Directory, and RADIUS network logins
  Control wireless network access for authentication and accountability, using the IEEE 802.1X, Microsoft Active Directory, and RADIUS

- RADIUS-based MAC authentication
  Authenticates a wireless client with a RADIUS server based on the MAC address of the client; this is useful for clients with minimal or no user interface

- Web-based authentication
  Provides a Web browser-based environment to authenticate clients that may not support the IEEE 802.1X supplicant

- IEEE 802.1X supplicant on MSM APs
  Helps prevent deployment of rogue networking equipment

- Secure management access
  Encrypts all access methods (CLI, GUI, or MIb) securely through SSH v2c, SSL, and/or SNMPv3

**Policy management**

- Standards-based authentication support for Microsoft Active Directory and IEEE 802.1X
  Integrates seamlessly into existing authentication services or uses the built-in database

- Integration with HPE IMC Network Management software
  Helps ensure consistent policy enforcement across wired and wireless networks
Connectivity
- 10GbE connections to the switch fabric (the MSM765 zl and MSM775 zl premium mobility controller only)

Leverages two 10GbE wire-speed internal connections to help ensure that the network connections from the application to the switch backplane do not limit application performance
- IPv6 wireless client traffic forwarding

Is supported for L2 and L3 mobility (MTM) and for client traffic directly bridged at the APs
- IEEE 802.3ad link-aggregation control protocol (LACP) and HPE port trunking (the MSM720 controller only)

Support up to six ports bonded via LACP, and facilitates manually configured trunks between an HPE switch and the controller

Comprehensive portfolio
- Access point support

Refer to the HPE Access Point—Controller Compatibility

Performance
- High-performance processor system
  - MSM720 controllers
    Freescale Dual Core 800 MHz P1020 Processor, 256 KB cache, and 1 GB DDR3 memory
  - MSM760 controllers
    Intel® Core™ 2 Duo Processor E6400, 2.13 GHz, and 2 MB cache
  - MSM775 zl controller
    Intel® Ivy Bridge Dual Core CPU Core i3-3120ME, 2.4 GHz, and 3 MB cache
- Memory subsystems
  - MSM720 controllers
    1 GB of DDR3 memory
  - MSM760 controllers
    2 GB of DDR2 memory
  - MSM775 zl controllers
    4 GB ECC DDR3-1333 SO-DIMM
- Disk drive (MSM760 models)
  Enables rapid data reads/writes via the 250 GB SATA II 7200 rpm hard disk drive, providing improved application performance
- Solid state drive (MSM775 zl model)
  Enables rapid data reads/writes via the 32 GB SATA solid state drive (SSD), providing improved application performance
Additional information

• Licensing model for guest user access (v5.7 and later)

The full number of supported guest access user sessions is enabled with the base-level controller models and is no longer tied to the AP upgrade license; for example, the base MSM720 (access and premium mobility) controllers will now support 250 concurrent guest access user sessions and the MSM760 base controllers will now support 2,000 guest access user sessions without requiring additional AP license upgrades.

• 10-AP license upgrade option

This can be used on the MSM720, MSM760, and MSM775 zl products on all supported firmware releases.

• Licensing model for the MSM317 access device (v5.7 and later)

No additional AP license is required for the MSM317, non-MSM317 devices are subject to AP licensing; maximum wireless device limits per controller and team are unchanged, and all devices count toward these maximums; for example, an MSM760 could manage 200 MSM317 devices with no additional AP license, 40 APs and 160 MSM317 devices with no additional AP license, or 80 APs and 120 MSM317 devices with an additional 40-AP license.

• AP support

Refer to the HPE Access Point—Controller Compatibility.
Warranty and support

- 1-year Warranty - HPE MSM760
- Limited Lifetime Warranty - HPE MSM720 and MSM775 zl

See hpe.com/networking/warrantysummary for warranty and support information included with your product purchase. Visit hpe.com/networking/support
## HPE MSM Controller Series

### SPECIFICATIONS

#### I/O ports and slots

<table>
<thead>
<tr>
<th>HPE MSM720 Premium Mobility Controller (WW) (J9694A)</th>
<th>HPE MSM720 Access Controller (WW) (J9693A)</th>
<th>HPE MSM760 Premium Mobility Controller (J9420A)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 RJ-45 autosensing 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T); Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only</td>
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<td>2 RJ-45 dual-personality 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T)</td>
</tr>
<tr>
<td>2 RJ-45 dual-personality 10/100/1000 ports (IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T)</td>
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<td></td>
</tr>
</tbody>
</table>

#### Additional ports and slots

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<tr>
<th>HPE MSM720 Premium Mobility Controller (WW) (J9694A)</th>
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<tbody>
<tr>
<td>1 RJ-45 serial console port</td>
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</tr>
</tbody>
</table>

#### Physical characteristics

<table>
<thead>
<tr>
<th>Dimensions</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.28(w) x 10(d) x 1.75(h) in (15.95 x 25.4 x 4.45 cm) (1U height)</td>
<td>3.62 lb (1.64 kg)</td>
</tr>
<tr>
<td>6.28(w) x 10(d) x 1.75(h) in (15.95 x 25.4 x 4.45 cm) (1U height)</td>
<td>3.62 lb (1.64 kg)</td>
</tr>
<tr>
<td>17.32(w) x 15.38(d) x 1.75(h) in (43.99 x 39.07 x 4.45 cm) (1U height)</td>
<td>13.45 lb (6.1 kg)</td>
</tr>
</tbody>
</table>

#### Mounting and enclosure

<table>
<thead>
<tr>
<th>Performance</th>
<th>Physicals</th>
</tr>
</thead>
<tbody>
<tr>
<td>100 Mb Latency</td>
<td>1000 Mb Latency</td>
</tr>
<tr>
<td>Throughput</td>
<td>Throughput</td>
</tr>
<tr>
<td>&lt; 20.4 µs (LIFO 64-byte packets)</td>
<td>&lt; 20.4 µs (LIFO 64-byte packets)</td>
</tr>
<tr>
<td>up to 8.9 million pps</td>
<td>up to 8.9 million pps</td>
</tr>
</tbody>
</table>

#### Environment

<table>
<thead>
<tr>
<th>Operating temperature</th>
<th>Operating relative humidity</th>
<th>Nonoperating/Storage temperature</th>
<th>Nonoperating/Storage relative humidity</th>
</tr>
</thead>
<tbody>
<tr>
<td>41°F to 113°F (5°C to 45°C)</td>
<td>15% to 95% @ 104°F (40°C)</td>
<td>-40°F to 158°F (-40°C to 70°C)</td>
<td>15% to 95% @ 149°F (65°C)</td>
</tr>
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<td>15% to 95% @ 104°F (40°C)</td>
<td>-40°F to 158°F (-40°C to 70°C)</td>
<td>15% to 95% @ 149°F (65°C)</td>
</tr>
<tr>
<td>4°F to 104°F (5°C to 45°C)</td>
<td>15% to 80%, noncondensing</td>
<td>-4°F to 149°F (-4°C to 65°C)</td>
<td>15% to 80%, noncondensing</td>
</tr>
</tbody>
</table>
### SPECIFICATIONS

<table>
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<tr>
<th>Feature</th>
<th>HPE MSM720 Premium Mobility Controller (WW) (J9694A)</th>
<th>HPE MSM720 Access Controller (WW) (J9693A)</th>
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<tbody>
<tr>
<td><strong>Electrical characteristics</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<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>70 BTU/hr (73.85 kJ/hr)</td>
<td>70 BTU/hr (73.85 kJ/hr)</td>
<td>434 BTU/hr (45787 kJ/hr)</td>
</tr>
<tr>
<td>AC voltage</td>
<td>100 - 240 VAC</td>
<td>100 - 240 VAC</td>
<td>100 - 240 VAC</td>
</tr>
<tr>
<td>Current</td>
<td>.2/.1 A</td>
<td>.2/.1 A</td>
<td>.2/.1 A</td>
</tr>
<tr>
<td>Maximum power rating</td>
<td>20 W</td>
<td>20 W</td>
<td>127 W</td>
</tr>
<tr>
<td><strong>Safety</strong></td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1</td>
<td>UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1</td>
<td>UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1</td>
</tr>
<tr>
<td><strong>Emissions</strong></td>
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<tr>
<td></td>
<td>FCC part 15 Class A; CISPR 22 Class A; ICES-003</td>
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<td>FCC part 15 Class A; CISPR 22 Class A; ICES-003</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>Supported:</td>
<td>Supported:</td>
<td>Supported:</td>
</tr>
<tr>
<td></td>
<td>• IEEE 802.11 a/b/g/n and 11ac access points and devices</td>
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<td>• IEEE 802.11 a/b/g/n and 11ac access points and devices</td>
</tr>
<tr>
<td></td>
<td>• 10 to 60 access points and/or access devices (in increments of 10)</td>
<td>• 10 to 60 access points and/or access devices (in increments of 10)</td>
<td>• 10 to 200 access points and/or access devices (in increments of 10 or 40)</td>
</tr>
<tr>
<td></td>
<td>• IEEE 802.3ad Link Aggregation Control Protocol (LACP)</td>
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</tr>
<tr>
<td></td>
<td>• Up to 250 concurrent total users</td>
<td>• Up to 250 concurrent total users</td>
<td>• Up to a maximum of 2,000 concurrent total users</td>
</tr>
<tr>
<td></td>
<td>• Up to 80 VLAN interfaces</td>
<td>• Up to 80 VLAN interfaces</td>
<td>• Up to 200 VLAN interfaces</td>
</tr>
<tr>
<td></td>
<td>• Up to 4094 VLAN ID's</td>
<td>• Up to 4094 VLAN ID's</td>
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<tr>
<td></td>
<td>Included services:</td>
<td>Included services:</td>
<td>Included services:</td>
</tr>
<tr>
<td></td>
<td>• Plug-and-play AP management and WLAN management</td>
<td>• Plug-and-play AP management and WLAN management</td>
<td>• Plug-and-play AP management and WLAN management</td>
</tr>
<tr>
<td></td>
<td>• Guest access</td>
<td>• Guest access</td>
<td>• Guest access</td>
</tr>
<tr>
<td></td>
<td>• Captive portal</td>
<td>• Captive portal</td>
<td>• Captive portal</td>
</tr>
<tr>
<td></td>
<td>• PCI DSS compliance for wireless PoS traffic</td>
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</tr>
<tr>
<td></td>
<td>• Support for Real-Time Location Services (RTLS)</td>
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<td>• Support for Real-Time Location Services (RTLS)</td>
</tr>
<tr>
<td></td>
<td>• Advanced fast roaming with VoWLAN support</td>
<td>• Standard Layer 2 roaming with VoWLAN support</td>
<td>• Advanced fast roaming with VoWLAN support</td>
</tr>
<tr>
<td></td>
<td>• Mobility Traffic Manager (MTM)</td>
<td>• Support for up to 16 VSC profiles</td>
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</tr>
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<td></td>
<td>• Support for up to 64 VSC profiles</td>
<td>• Unified policy enforcement and network visibility</td>
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<tr>
<td></td>
<td>• Unified policy enforcement and network visibility</td>
<td>• Group bandwidth management</td>
<td>• Unified policy enforcement and network visibility</td>
</tr>
<tr>
<td></td>
<td>• Virtual controller (up to two MSM720 controllers and 40 APs with resiliency; 250 maximum concurrent users)</td>
<td>• Group bandwidth management</td>
<td>• Virtual controller (up to five MSM760 controllers and 800 APs with resiliency). When controllers are teamed the limit remains 2000 concurrent users regardless of the number of controllers in the team.</td>
</tr>
<tr>
<td></td>
<td>• Group bandwidth management</td>
<td></td>
<td>• Group bandwidth management</td>
</tr>
</tbody>
</table>

### Notes
Latency values refer to client traffic bridged locally at the AP.
Not all services are supported with the Virtual Controller feature. Please refer to the user documentation for more detail.

### 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.
## HPE MSM Controller Series

### SPECIFICATIONS (CONTINUED)

<table>
<thead>
<tr>
<th>HPE MSM760 Access Controller (J9421A)</th>
<th>HPE MSM775 zl Premium Controller Module (J9840A)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>I/O ports and slots</strong></td>
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</tr>
<tr>
<td>2 RJ-45 autosensing 10/100/1000 ports</td>
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</tr>
<tr>
<td>(IEEE 802.3 Type 10BASE-T, IEEE 802.3u Type 100BASE-TX, IEEE 802.3ab Type 1000BASE-T)</td>
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</tr>
<tr>
<td>Duplex: 10BASE-T/100BASE-TX: half or full; 1000BASE-T: full only</td>
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</tr>
<tr>
<td><strong>Additional ports and slots</strong></td>
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</tr>
<tr>
<td>1 RJ-45 serial console port</td>
<td>1 RJ-45 serial console port</td>
</tr>
<tr>
<td><strong>Physical characteristics</strong></td>
<td><strong>Physical characteristics</strong></td>
</tr>
<tr>
<td>Dimensions</td>
<td>Dimensions</td>
</tr>
<tr>
<td>17.32(w) x 15.38(d) x 1.75(h) in (43.99 x 39.07 x 4.45 cm) (1U height)</td>
<td>8.13(w) x 9.75(d) x 1.75(h) in (20.65 x 24.77 x 4.45 cm)</td>
</tr>
<tr>
<td>Weight</td>
<td>Weight</td>
</tr>
<tr>
<td>13.45 lb (6.1 kg)</td>
<td>2.65 lb (1.2 kg)</td>
</tr>
<tr>
<td><strong>Mounting and enclosure</strong></td>
<td><strong>Mounting and enclosure</strong></td>
</tr>
<tr>
<td>Mounts in an EIA-standard 19 in telco rack or equipment cabinet (hardware included); horizontal surface mounting only</td>
<td>Can be installed in any of the following chassis: HPE5406R zl2 (J9821A), 5412R zl2 (J9822A), HPE 5406 zl (J8697A), 5412 zl (J8698A), HPE 8206 zl (J9640A), and 8212 zl (J8715A).</td>
</tr>
<tr>
<td><strong>Environment</strong></td>
<td><strong>Environment</strong></td>
</tr>
<tr>
<td>Operating temperature</td>
<td>Operating temperature</td>
</tr>
<tr>
<td>41°F to 104°F (5°C to 40°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>15% to 80%, noncondensing</td>
<td>15% to 95% @ 104°F (40°C), noncondensing</td>
</tr>
<tr>
<td>Nonoperating/Storage temperature</td>
<td>Nonoperating/Storage temperature</td>
</tr>
<tr>
<td>-40°F to 169°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>15% to 80%, noncondensing</td>
<td>15% to 90% @ 129°F (65°C), noncondensing up to 10,000 ft (3 km)</td>
</tr>
<tr>
<td>Altitude</td>
<td>Altitude</td>
</tr>
<tr>
<td></td>
<td>Note</td>
</tr>
<tr>
<td></td>
<td>Non-operating/Storage Altitude up to 15,000 ft (4.6 km) The SSD has a maximum operational wet bulb temperature of 35°C (95°F) and a maximum non-operational wet bulb temperature of 40°C (104°F)</td>
</tr>
</tbody>
</table>

Note
<table>
<thead>
<tr>
<th><strong>SPECIFICATIONS (CONTINUED)</strong></th>
<th><strong>HPE MSM760 Access Controller (J9421A)</strong></th>
<th><strong>HPE MSM775 zl Premium Controller Module (J9840A)</strong></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>188 BTU/hr (198.34 kJ/hr)</td>
</tr>
<tr>
<td>Maximum heat dissipation</td>
<td>434 BTU/hr (457.87 kJ/hr)</td>
<td></td>
</tr>
<tr>
<td>AC voltage</td>
<td>100 - 240 VAC</td>
<td>55 W</td>
</tr>
<tr>
<td>Current</td>
<td>2/1 A</td>
<td>30 W</td>
</tr>
<tr>
<td>Maximum power rating</td>
<td>127 W</td>
<td></td>
</tr>
<tr>
<td>Idle power</td>
<td></td>
<td>Note</td>
</tr>
<tr>
<td></td>
<td>Idle power is the actual power consumption of the device with no ports connected.</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Safety</strong></th>
<th>UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1</th>
<th>UL 60950-1; IEC 60950-1; EN 60950-1; CAN/CSA-C22.2 No. 60950-1</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Emissions</strong></td>
<td>FCC part 15 Class A; EN 55022 Class A; CISPR 22 Class A; ICES-003</td>
<td>FCC part 15 Class A; EN 55022 Class A; CISPR 22 Class A; ICES-003</td>
</tr>
<tr>
<td><strong>Features</strong></td>
<td>Supported: • IEEE 802.11 a/b/g/n and .11ac access points and devices • 40 to 200 access points and/or access devices (in increments of 10 or 40) • Up to a maximum of 2,000 guest access users • Up to 200 VLAN interfaces • Up to 4094 VLAN ID's Included services: • Plug-and-play AP management and WLAN management • Guest access • Captive portal • PCI DSS compliance for wireless PoS traffic • Support for Real-Time Location Services (RTLS) • Standard Layer 2 roaming with VoWLAN support • Support for up to 16 VSC profiles • Unified policy enforcement and network visibility • Group bandwidth management</td>
<td>Supported: • IEEE 802.11 a/b/g/n and .11ac access points and devices • 40 to 200 access points and/or access devices (in increments of 10 or 40) • Up to a maximum of 2,000 guest access users • Up to 200 VLAN interfaces • Up to 4094 VLAN ID's Included services: • Plug-and-play AP management and WLAN management • Guest access • Captive portal • PCI DSS compliance for wireless PoS traffic • Support for Real-Time Location Services (RTLS) • Advanced fast roaming with VoWLAN support • Mobility Traffic Manager (MTM) • Support for up to 64 VSC profiles • Unified policy enforcement and network visibility • Group bandwidth management • Virtual controller (up to five MSM775 zl controllers and 800 APs with resiliency) • The MSM775zI module has a 2000 concurrent user limit. When controllers are teamed the limit remains 2000 concurrent users regardless of the number of modules in the team The MSM775 zl module provides a module reset switch on the front panel. Refer to the user documentation for more detail. The MSM775 zl module has a USB port on the front panel. Use of this port is not supported.</td>
</tr>
</tbody>
</table>
### Notes

- Not all services are supported with the Virtual Controller feature. Please refer to the user documentation for more detail.
- MSM775 zl modules can only be teamed with other MSM775 zl modules.
- Chassis Configuration Guidelines:
  - No more than six zl modules can be installed in a zl or zl2 chassis.
  - There are no restrictions on what slots the MSM775 zl modules are inserted into.
- Maximum chassis operating temperature specifications of the zl chassis when the MSM775 zl module is installed is 45°C. Note that the maximum temperature of the chassis is determined by the module with the lowest operating temperature.

### 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.

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<table>
<thead>
<tr>
<th>STANDARDS AND PROTOCOLS</th>
<th></th>
</tr>
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<tbody>
<tr>
<td>(applies to all products in series)</td>
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</tr>
</tbody>
</table>

### Device management
- RFC 1155 Structure of Mgmt Information (SMIv1)
- RFC 1157 SNMPv1/v2c
- RFC 1305 NTPv3
- RFC 1591 DNS (client)
- RFC 1901 (Community based SNMPv2)
- RFC 2030 SNMP
- RFC 2578-2580 SMIv2
- RFC 2580 (SMIv2 Conformance)
- RFC 2616 HTTP
- RFC 2782 DNS SRV
- RFC 3410 (Management Framework)
- RFC 3416 (SNMP Protocol Operations v2)
- RFC 3417 (SNMP Transport Mappings)

### General protocols
- IEEE 802.11i Wireless Security
- IEEE 802.1p Priority
- IEEE 802.1Q VLANs
- IEEE 802.1X PAE
- IEEE 802.3ab 1000BASE-T Gigabit Ethernet over twisted pair (1G/10G models only)
- IEEE 802.3x Flow Control
- RFC 791 IP
- RFC 792 ICMP
- RFC 793 TCP
- RFC 826 ARP
- RFC 1122 Host Requirements
- RFC 1215 Management Information Base for Network Management of CP/IP-based Internets
- RFC 1305 NTPv3 (IPv4 only)
- RFC 1519 CIDR
- RFC 1542 BOOTP
- RFC 2030 SNTP
- RFC 2131 DHCP
- RFC 2376 sFlow
- RFC 3410 (Community based SNMPv2)
- RFC 3416 (SNMP Protocol Operations v2)
- RFC 3417 (SNMP Transport Mappings)

### MIBs
- RFC 1156 (TCP/IP MIB)
- RFC 1157 A Simple Network Management Protocol (SNMP)
- RFC 1212 Concise MIB Definitions
- RFC 1213 MIB II
- RFC 2578 Structure of Management Information Version 2 (SMIv2)
- RFC 2863 The Interfaces Group MIB

### Network management
- IEEE 802.1AB Link Layer Discovery Protocol (LLDP)
- IEEE 802.1D (STP)
- RFC 1155 Structure of Management Information
- RFC 1157 SMIv1
- RFC 1212 Concise MIB definitions
- RFC 1215 Convention for defining traps for use with the SNMP
- RFC 1901 SNMPv2 Introduction
- RFC 2578 SMIv2
- RFC 2578 Structure of Management Information Version 2 (SMIv2)
- RFC 2580 Conformance Statements for SMIv2
- RFC 3164 BSD syslog Protocol
- RFC 3410 Introduction to Version 3 of the Internet-standard Network Management Framework
- RFC 3411 SNMP Management Frameworks
- RFC 3412 SNMPv3 Message Processing
- RFC 3413 Simple Network Management Protocol (SNMP) Applications
- RFC 3414 SNMPv3 User-based Security Model (USM)
- RFC 3418 Management Information Base (MIB) for the Simple Network Management Protocol (SNMP)
- RFC 3584 Coexistence between Version 1 and Version 2 of the Internet-standard Network SMIv1/v2/v3

### Security
- RFC 1321 The MD5 Message-Digest Algorithm
- RFC 1851 ESP Triple DES Transform
- RFC 2104 Keyed-Hashing for Message Authentication
- RFC 2246 Transport Layer Security (TLS)
- RFC 2401 Security Architecture for the Internet Protocol
- RFC 2408 Internet Security Association and Key Management Protocol (ISAKMP)
- RFC 2409 The Internet Key Exchange (IKE)
- RFC 2548 Microsoft Vendor-specific RADIUS Attributes
- RFC 2776 PPP EAP TLS Authentication Protocol
- RFC 2865 RADIUS Authentication
- RFC 2866 RADIUS Accounting
- RFC 3579 RADIUS Support For Extensible Authentication Protocol (EAP)
- RFC 3580 IEEE 802.1X RADIUS Guidelines
- RFC 3686 Using AES Counter Mode with IPsec ESP
- AES: CCM, CCM
- SSL and TLS: RC4-128-bit and RSA-1024- and 2048-bit
- Web Authentication
- WPA (Wi-Fi Protected Access)
- WPA (Wi-Fi Protected Access) / WPA2

### IPSec
- RFC 2403 The Use of HMAC-MD5-96 within ESP and AH
- RFC 2404 The Use of HMAC-SHA-1-96 within ESP and AH
- RFC 2406 IP Encapsulating Security Payload
- RFC 2407 - Domain of interpretation
- RFC 2451 The ESP CBC-Mode Cipher Algorithms
- RFC 3602 The AES-CBC Cipher Algorithm and Its Use with IPsec

### IKEv1
- RFC 2407 The Internet IP Security Domain of Interpretation for ISAKMP
- RFC 2408 Internet Security Association and Key Management Protocol (ISAKMP)
- RFC 2409 The Internet Key Exchange (IKE)
- RFC 2865 - Remote Authentication Dial In User Service (RADIUS)
- RFC 3748 - Extensible Authentication Protocol (EAP)

### PKI
- RFC 3280 Internet X.509 Public Key Infrastructure Certificate and Certificate Revocation List (CRL) Profile
# HPE MSM Controller Series accessories

| HPE MSM720 Premium Mobility Controller (WW) (J9694A) | HPE X121 1G SFP LC LX Transceiver (J4859C)  
| HPE X121 1G SFP LC LH Transceiver (J4860C)  
| HPE X121 1G SFP RJ45 T Transceiver (J9177C)  
| HPE X111 100M SFP LC FX Transceiver (J9054C)  
| HPE X112 100M SFP LC BX-D Transceiver (J9099B)  
| HPE X112 100M SFP LC BX-U Transceiver (J9100B)  
| HPE X122 1G SFP LC BX-D Transceiver (J9142B)  
| HPE X122 1G SFP LC BX-U Transceiver (J9143B)  
| HPE MSM Additional 10 Access Point E-LTU (J9677AAE) |

| HPE MSM720 Access Controller (WW) (J9693A) | HPE X121 1G SFP LC LX Transceiver (J4859C)  
| HPE X121 1G SFP LC LH Transceiver (J4860C)  
| HPE X121 1G SFP RJ45 T Transceiver (J9177C)  
| HPE X111 100M SFP LC FX Transceiver (J9054C)  
| HPE X112 100M SFP LC BX-D Transceiver (J9099B)  
| HPE X112 100M SFP LC BX-U Transceiver (J9100B)  
| HPE X122 1G SFP LC BX-D Transceiver (J9142B)  
| HPE X122 1G SFP LC BX-U Transceiver (J9143B)  
| HPE MSM Additional 10 Access Point E-LTU (J9677AAE)  
| HPE MSM720 Premium E-LTU (J9698AAE) |

| HPE MSM760 Premium Mobility Controller (J9420A) | HPE MSM Additional 10 Access Point E-LTU (J9677AAE)  
| HPE MSM Additional 40 Access Point E-LTU (J9371AAE) |

| HPE MSM760 Access Controller (J9421A) | HPE MSM Additional 10 Access Point E-LTU (J9677AAE)  
| HPE MSM Additional 40 Access Point E-LTU (J9371AAE)  
| HPE MSM760 Premium E-LTU (J9491AAE) |

| HPE MSM775 zl Premium Controller Module (J9840A) | HPE MSM Additional 10 Access Point E-LTU (J9677AAE)  
| HPE MSM Additional 40 Access Point E-LTU (J9371AAE) |

Learn more at [hpe.com/networking](http://hpe.com/networking)