

# Mobility Exchange™ MX-216R™

The Trapeze Mobility Exchange™ (MX™) family of intelligent WLAN controllers provide the platform for Trapeze Smart Mobile™ wireless networks. Smart Mobile is the only WLAN architecture with intelligent switching, which combines both centralized and distributed data forwarding based on the requirements of the underlying application. Operating in conjunction with Trapeze Mobility Point™ (MP™) access points, and Mobility System Software™ (MSS), MX controllers can offload policy enforcement and data forwarding to the MPs, resulting in optimized traffic flow, radically reduced latency, and massive scalability. Smart Mobile WLANs can support the most demanding wireless applications indoors and outdoors, including voice over WLAN for thousands of users, and are 802.11n ready without the need for expensive controller upgrades. MX controllers are available in multiple models to meet the entire range of enterprise WLAN needs, from small branch offices to large data centers, at the lowest total cost.



The MX-216R is designed for data center, or distributed wiring closet installations, and enables seamless and secure deployment of enterprise class wireless networks over any existing L2/L3 network without disruption. The MX-216R supports up to 192 access points with flexible licensing bundles of 32 supported MPs™ for optimum price performance throughout the growth of your wireless LAN. It also features 2 Gigabit Ethernet ports which accept Small-Form Pluggable (SFP) optics for 1000BASE-SX/LX fiber connectivity, or 1000BASE-T unshielded twisted-pair (UTP) environments, 16 10/100 Fast Ethernet ports with Power-over-Ethernet (PoE) support, and comes with a redundant power supply as standard.

The MX-216R combines L2 Ethernet switching, statefull LAN-speed per user and per service firewalls, wireless intrusion protection, 802.1Q trunking and per VLAN spanning tree (PVST+), complete wired to wireless quality of service (QoS), and automated RF management. Clusters of MXs called a Mobility Domain™ provide seamless roaming, intrusion protection and RF management over the largest single site wireless LAN deployments. A Network Domain™ interconnects and distributes Mobility Domains to span wide geographic regions with secure, seamless mobility applications and Smart Mobile services.

## Key Features

SCALABILITY AND RELIABILITY	
<b>Number of managed Access Points</b>	• From 32 to 192 depending upon the licensing options ordered
<b>Mobility Domain™ service for seamless mobility services</b>	• Mobility service across 32 MX controllers and 4,096 Mobility Points
<b>Network Domain™ service extends the reach of Mobility Domain across a global network</b>	• Cluster of 1,024 Mobility Domains, extending mobility across 32,768 MX controllers
<b>Reliability</b>	<ul style="list-style-type: none"> <li>• Redundant Power Module as standard</li> <li>• EtherChannel™ load-shared, redundant links</li> <li>• Spanning tree and per-VLAN spanning tree (PVST+)</li> <li>• Resilient network attachment via any MX port</li> <li>• N:1 redundant MX capabilities</li> </ul>

**SECURITY**
**Authentication**

- Supports complete local AAA authentication, including 802.1x, as primary or backup to a centralized AAA server
- Supports multiple AAA server groups and can load share across multiple AAA servers or within a server group
- Generates and manages X.509 digital certificates
- Assigns and enforces per-user authorization policies that are managed centrally from the AAA back-end
- Authorizations include virtual private group membership, personal firewall filters, time-of-day/day-of-week access, encryption type, and location-specific policies
- IEEE 802.1x with multiple EAP types (TLS, PEAP/MSCHAP,TTLS)
- WebAAA, MAC, Open
- WiFi WPA2 Enterprise certified

**Encryption Key Management**

- Encryption distributed in Mobility Points
- MX generates master and session keys
- Provides key management for each encryption technique

**Identity-based Networking**

- User credentials define access and network resource privileges
- Privileges and services follow users as they roam
- Maintains a user's membership in the right virtual private group based on the user's authenticated identity
- Dynamically enables Virtual Private Groups to support roaming across router boundaries
- Centralized management and control

**Endpoint Assurance**

- Trusted Computing Group (TCG) - Trusted Network Connect (TNC) compliant

**Intrusion Detection and Protection**

- ActiveScan™ rogue and denial-of-service (DoS) attack detection — Scan all bands, associated channels and VLANs, while simultaneously providing wireless connectivity to mobile clients
- SentryScan™ — Scan the air nonstop on both bands and their associated channel while other MPs support wireless LAN clients
- Rogue detection, Intrusion Detection System (IDS) and RF countermeasures
- Trapeze/AirDefense integrated Intrusion Detection and Prevention
  - Best in class IDS/IPS
  - Common Trapeze MP hardware for sensor and service APs
  - Dynamic threat management- convert MPs to sensors on demand
  - Threat location and mitigation

**MOBILITY SERVICES**
**Data Services**

- Data-intensive applications
- Latency-sensitive applications

**Standards-based toll quality voice service**

- VoIP protocol support
- 802.11 e/WMM compliant
- Queuing and priority (802.11 e/WMM)
- Preserve voice priority across network (802.11 i PMK cache, WMM)
- Bandwidth control for voice (TSPEC)
- Maximize handset battery life (U-APSD)
- Neighbor report assisted roaming (802.11k)

<b>Virtual service sets</b>	<ul style="list-style-type: none"> <li>• Multiple SSID support (64 per MP, 32 per radio)</li> <li>• Any mix of crypto and authentication per SSID</li> <li>• Any VLAN topology per SSID</li> <li>• Unique portal page per SSID</li> <li>• Private or shared authentication</li> </ul>
<b>Guest Services</b>	<ul style="list-style-type: none"> <li>• SmartPass™ enables fast and simple configuration for Guest access</li> <li>• 64 web portals for customized user group profiles</li> <li>• Guest Tunneling to isolate Guest traffic across the corporate network</li> </ul>
<b>High speed data services (802.11n)</b>	<ul style="list-style-type: none"> <li>• 802.11n ready</li> <li>• Direct Data Path Forwarding enables local switching of data traffic in the Mobility Point or forwarding of data to Mobility Point upstream or downstream</li> <li>• Mobility Point configured by MX for Direct Data Path Forwarding™</li> </ul>
<b>Outdoor services</b>	<ul style="list-style-type: none"> <li>• Wireless backhaul (P-P, P-MP) and Wireless bridging (P-P, P-MP)</li> <li>• Enterprise Ethernet mesh service with Mesh Portal and Mesh Access Point Services with Direct Data Path support</li> <li>• Integrated control and management with indoor Smart Mobile services</li> </ul>
<b>Real time location services</b>	<ul style="list-style-type: none"> <li>• WiFi based active RFID location technology (client and network based)</li> <li>• Integrated with Location appliance</li> </ul>
<b>MANAGEMENT AND CONTROL</b>	
<b>Management access</b>	<ul style="list-style-type: none"> <li>• Command Line Interface (SSH v2)</li> <li>• WebView™ web access (https)</li> <li>• SSL, XML (to RingMaster™)</li> <li>• SNMP v1, v2c, v3</li> </ul>
<b>RF management</b>	<ul style="list-style-type: none"> <li>• Automated MP Power/channel auto-tuning</li> <li>• Dynamic Frequency Selection (DFS)</li> </ul>
<b>User management and statistics</b>	<ul style="list-style-type: none"> <li>• Detailed per user session RF accounting statistics management</li> <li>• Tracks the location, roaming history, virtual private group, network addresses, state, activity, errors, usage and other attributes by user name, session, VLAN, user group or other</li> <li>• Categories selected by IT</li> <li>• Provides per user audit trail and chargeback capability through the accounting component of AAA</li> </ul>
<b>MP management and control</b>	<ul style="list-style-type: none"> <li>• Configures and controls MPs; controls third party APs</li> <li>• Boot, configuration and management model compliant with the IETF CAPWAP architecture. The MX is categorized as an access controller (AC) that supports direct, switched, and routed connections.</li> <li>• Enable Data forwarding in MX or in MP with Smart Mobile technology</li> <li>• Multiple MXs provide resilient control</li> </ul>
<b>Direct Data Path Forwarding</b>	<ul style="list-style-type: none"> <li>• MP configured to switch data traffic locally or forwarded to the MPs downstream or upstream</li> <li>• Optimizes network and MX capacity and performance</li> <li>• Control retained in MX</li> </ul>
<b>Client load balancing</b>	<ul style="list-style-type: none"> <li>• Equalize the number of client sessions amongst groups of radios that have substantially overlapping coverage areas</li> <li>• Restore equality of numbers of sessions when an AP is added to a group or is brought back up after a transient failure</li> <li>• Allow a balanced group of APs to span multiple MX's in a mobility domain</li> </ul>
<b>Client steering</b>	<ul style="list-style-type: none"> <li>• Enable client steering across bands for efficient usage of the available spectrum, and reduce network load on the congested 802.11b/g band</li> </ul>

## Specifications

### HARDWARE SPECIFICATIONS

<b>Dimensions (W x D x H)</b>	<ul style="list-style-type: none"> <li>• 17.4 in x 12.1 in x 1.7 in</li> <li>• (44.2 cm x 30.7 cm x 4.3 cm)</li> </ul>
<b>Weight</b>	<ul style="list-style-type: none"> <li>• 11.5 lbs (5.2 kg) with one power supply</li> <li>• 13.5 lbs (6.1 kg) with 2 power supplies</li> </ul>
<b>Interfaces</b>	<ul style="list-style-type: none"> <li>• 2 Gigabit Ethernet Small Form-Factor Pluggable (SFP) ports</li> <li>• 16 10/100 Fast Ethernet ports with integrated Power-over-Ethernet (PoE)</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>• Operating temperature: 0°C to 50°C</li> <li>• Storage temperature: -20°C to 70°C</li> <li>• Humidity: 10% - 90% (non-condensing)</li> </ul>
<b>Power</b>	<ul style="list-style-type: none"> <li>• 100-240 VAC 50-60 Hz</li> <li>• Two 300 watts power supply</li> <li>• Max Amperage draw: 4.5 Arms at 120 Vrms, 1.7 Arms at 230 Vrms</li> </ul>
<b>Power over Ethernet</b>	<ul style="list-style-type: none"> <li>• Voltage output: 48VDC nominal</li> <li>• Total power budget (all ports): 250 W</li> <li>• Power per port: 15.4 W</li> <li>• Cable requirements: PoE on 10/100 Mbps RJ-45 ports using pins 4, 5 (node) and 7, 8 (return) on standard Category 5 UTP</li> </ul>
<b>Regulatory Safety</b>	<ul style="list-style-type: none"> <li>• UL 609501-1, CB IEC 609501-1, EN 60950-1</li> </ul>
<b>EMI / EMC</b>	<ul style="list-style-type: none"> <li>• FCC PART 15 Class A</li> <li>• ICES 003</li> <li>• VCCI</li> <li>• EN 55022, EN 55024</li> </ul>

### SUPPORTED STANDARDS

<b>Security and AAA RFCs</b>	<ul style="list-style-type: none"> <li>• RFC 2246 Transport Layer Security (TLS)</li> <li>• RFC 2284 EAP</li> <li>• RFC 2315 PKCS #7: Cryptographic Message Syntax Ver 1.5</li> <li>• RFC 2548 Microsoft RADIUS VSAs</li> <li>• RFC 2716 PPP EAPTLS Authentication Protocol</li> <li>• RFC 2759 Microsoft PPP CHAP Extensions, Version 2</li> <li>• RFC 2865 RADIUS Authentication</li> <li>• RFC 2866 RADIUS Accounting</li> <li>• RFC 2869 RADIUS Extensions</li> <li>• RFC 2986 PKCS #10: Certification Request Syntax Ver 1.7</li> <li>• RFC 3580 IEEE 802.1x RADIUS Guidelines</li> </ul>
<b>IEEE Standards</b>	<ul style="list-style-type: none"> <li>• 802.1x: Port Based Network Access Control</li> <li>• 802.3: 100BASE-T</li> <li>• 802.3u: 1000BASE-TX Gigabit Ethernet</li> <li>• 802.3af: Power over Ethernet</li> <li>• 802.11 a/b/g, 802.11d, 802.11e, 802.11h, 802.11i</li> </ul>

<b>General</b>	<ul style="list-style-type: none"> <li>• RFC 1122 Host requirements</li> <li>• RFC 1393 Traceroute</li> <li>• RFC 1519 CIDR</li> <li>• RFC 1591 DNS</li> <li>• RFC 2030 Sntp</li> <li>• RFC 768 UDP</li> <li>• RFC 783 TFTP</li> <li>• RFC 791 IP</li> <li>• RFC 792 ICMP</li> <li>• RFC 793 TCP</li> <li>• RFC 826 ARP</li> <li>• IEEE 802.1D Spanning Tree</li> <li>• IEEE 802.1Q VLAN tagging</li> <li>• IEEE 802.3ad (static config)</li> </ul>
<b>Management and Control</b>	<ul style="list-style-type: none"> <li>• RFC 854 Telnet (server and client)</li> <li>• SSHv2 - Secure Shell V2</li> <li>• SNMP v1, v2c, v3</li> <li>• RFC 1213 MIB-II</li> <li>• RFC 1866 HTML</li> <li>• RFC 2068 HTTP</li> <li>• RFC 3164 Syslog</li> <li>• Trapeze private MIB</li> <li>• IETF CAPWAP</li> </ul>
<b>IP Multicast</b>	<ul style="list-style-type: none"> <li>• RFC 1112 IGMP v1</li> <li>• RFC 2236 IGMP v2</li> </ul>
<b>Quality of Service (QoS)</b>	<ul style="list-style-type: none"> <li>• 802.11e, Wi-Fi Multimedia (WMM)</li> <li>• SpectraLink Voice Priority (SVP)</li> <li>• RFC 2472 DiffServ precedence</li> <li>• RFC 2597 DiffServ Assured Forwarding</li> <li>• RFC 2598 DiffServ Expedited Forwarding</li> </ul>
<b>ORDERING INFORMATION</b>	
<b>MX-216R-xx</b>	• MX 216 with 2 x GigE (SFP), 16 x 10/100Base-T PoE, with dual integrated PSU. Includes 32 AP license
<b>MX-2xx-U32</b>	• 32 AP license upgrade for MX-200R or MX-216R
<b>SFP-SX</b>	• 850nm SFP transceiver
<b>SFP-LX</b>	• 1300nm SFP transceiver
<b>SFP-UTP</b>	• 1000BASE-T SFP transceiver, RJ-45 connector
	• xx = NA - North America, EU - Europe, UK - United Kingdom, JP - Japan, AU - Australia

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