# Cisco Mobility Services Engine Data Sheet

## Overview

Ten billion mobile devices will be in use by 2016.[1] People love their smartphones, tablets, and other devices, and they want to stay connected at home, at work, and on the go. This gives you a great opportunity to engage customers and visitors with an exciting, innovative mobile experience. But how can you provide the dependable, high-quality access people want and create unique, revenue-generating services, yet keep your network safe and manageable? The Cisco® Mobility Services Engine (MSE) makes it easy to roll out new Wi-Fi-based solutions and services - safely and securely. This flexible platform gives you a centralized, scalable way to deliver rich mobility services:

- Get deeper network insight. Base Location services capture and bring together key network information such as device location, RF spectrum details, and sources of RF interference. They also let you support a rich set of real-time location services (RTLS).
- Give people the mobile experience they want with location-based services. Cisco Connected Mobile Experiences (CMX) lets enterprises and service providers deliver customized location-based mobile services to people in retail stores, hospitals, hotels, and other environments. You can offer a personalized mobile experience at the right time and the right place - and understand users better with onsite, online, and social analytics.
- Keep wireless users and your network safe. Cisco Wireless Intrusion Prevention System (wIPS) helps protect the network from wireless threats, rogue wireless devices, and denial-of-service (DoS) attacks. It provides the tools you need to strengthen security and improve compliance.

## Product Benefits

The Cisco MSE with Base Location, CMX, and wIPS lets companies of all kinds unlock the benefits of mobility (Table 1).

**Table 1.** MSE Benefits

| Industry | Solution |
|---|---|
| **Retail** | • Engage shoppers with compelling mobile services such as retail apps with way-finding services<br>• Stop “showrooming” and close more sales with context-sensitive web-based campaigns<br>• Track online, onsite, and social customer trends and identify high-value shoppers<br>• Help meet Payment Card Industry (PCI) requirements |
| **Healthcare** | • Increase patient satisfaction with way-finding apps and mobile location services<br>• Track equipment anywhere with connected medical devices<br>• Help meet Health Insurance Portability and Accountability Act (HIPAA) requirements |
| **Transportation** | • Understand aggregate traveler trends and serve them better through planning and efficiency with tracking and location analytics<br>• Captivate passengers with augmented reality applications such as interactive maps and way-finding services |
| **Hospitality** | • Improve the guest experience with business-friendly, highly secure Wi-Fi, location-based visitor services, and other engaging hospitality offerings<br>• Learn more about guests with location and social analytics, for better planning and efficiency |

## Technology Overview

Designed as an open platform, the Cisco MSE supports mobility services software with a modular approach. So you can set up options based on your network topology or the types of services you offer. But the true value of the MSE is delivered through its support for mobility services applications. Table 2 provides an overview of the APIs, services, and platforms available.

**Table 2.** Mobility Services Overview

| Feature | Benefits |
|---|---|
| **Mobility Services API** | • Lets developers create location-based applications and services |
| **Services** | Base Location license<br>• Track and locate interferers, rogues, Wi-Fi clients, and RF tags<br>• Detect presence and receive geo-fenced or zone-based alerts<br>• Show systemwide interferer details and correlation<br>• Visualize interferer zone of impact<br>• Develop custom applications with open location API wIPS<br>• Discover and stop security penetration and DoS attacks<br>Connected Mobile Experiences (CMX) license<br>• Manage visitors and increase brand presence with location-aware onboarding and visitor management<br>• Engage customers through location-enabled mobile web and social campaigns<br>• Analyze online, onsite, and social customer behavior<br>• Develop and measure targeted, location-based web campaigns |
| **Platform** | • Physical appliance<br>• Virtual appliance |

### Cisco Base Location License: Advanced Spectrum Services

Cisco CleanAir® technology makes it easy to monitor and manage your network's RF conditions. The Cisco MSE extends CleanAir's capabilities (Table 3).

**Table 3.** CleanAir with MSE Offers

| | CleanAir Access Points with Wireless LAN Controller (WLC) | CleanAir Access Points with WLC and MSE |
|---|---|---|
| **Detect, classify, and mitigate interferers** | Yes | Yes |
| **Provide systemwide interferer and event correlation** | No | Yes |
| **Perform zone-of-impact analysis** | No | Yes |
| **Locate interferers on a map** | No | Yes |

### Cisco Base Location License: Real-Time Location Services (RTLS)

The Cisco MSE provides presence detection and real-time location tracking, including track and trace of rogue devices, interferers, Wi-Fi clients, smartphones, and RFID tags.

### Cisco Base Location License: Mobility Services API

The Mobility Services API with support for representational state transfer (REST) and Simple Object Access Protocol (SOAP)/XML enables customers and partners to tightly integrate MSE location information into applications, such as location-aware equipment tracking, guest access, device-based services, browser-based services, mobile apps, online and onsite analytics, social analytics, and ads and offers.

### Cisco Connected Mobile Experiences: Advanced Business Platform for Wi-Fi Services

CMX uses location data to create detailed business analytics and customer engagement applications, including:

- **CMX Connect:** This location-enabled captive portal enables you to create a custom onboarding and landing experience for your customers and better understand visitor behavior while in the venue. Web or social authentication enables easy onboarding to the Wi-Fi network.
- **CMX Analytics:** Onsite analytics show you how, where, and when customers and visitors are moving throughout a venue. Online analytics shows you top visited websites and metrics for online mobile promotions. Social analytics deliver valuable insight into your customer base through demographic data from users who check in, such as age, gender, city (origin), and language.
- **CMX Browser Engage:** Revolutionize the mobile experience with location and context-aware mobile browser marketing capabilities. Customers and visitors can benefit from nearby services, indoor navigation, targeted promotions, and other informational services just by using their mobile device browser.
- **CMX Dashboard:** This location services management tool enables organizations to build and measure context-aware, targeted marketing campaigns. They can view authentications, browser campaign adoption (click-throughs) by particular zones, device types, top websites visited per zone, and more.
- **CMX for Facebook Wi-Fi** allows organizations to extend a seamless Wi-Fi sign-on experience to guests and analyze their in-venue behavior using the Cisco and Facebook Wi-Fi platforms. It uses a software connector to enable end users to authenticate to the Cisco Wi-Fi network and automatically “check-in” to the venue’s Facebook profile to increase brand recognition. Solution benefits include:
  - Increased brand exposure through automated Facebook venue check-in with news feed streaming and increased rankings for the Graph Search and Nearby Facebook features.
  - Ability to gain valuable insight into your customer base through demographic data from users who check in.
  - Ability to deliver targeted advertisements to users who check in and to increase conversion with venue relevancy and social context.

Table 4 provides a detailed comparison of the features offered with the Base Location and CMX licenses.

**Table 4.** MSE Licenses Comparison

| Feature | Base Location License | CMX License |
|---|---|---|
| **Advanced spectrum, location tracking, presence detection, API** | Yes | Yes |
| **CMX Connect, Analytics, Browser Engage, Dashboard, Facebook Wi-Fi** | No | Yes |

### Cisco wIPS

Adding more devices to the network means new compliance concerns and unknown risks. The Cisco wIPS monitors, mitigates, and reports malicious activity on the wireless network, including rogue access points, security penetration attacks, and DoS threats. It helps you reduce liability, protect your reputation, and stay in regulatory compliance. Part of the wIPS solution is available through the wireless LAN controller (WLC). Add the MSE for more features and value.

Table 5 compares the capabilities of the WLC and the WLC plus MSE.

**Table 5.** Cisco wIPS Comparison

| Feature | Base wIPS (WLC) | MSE wIPS (WLC plus MSE) |
|---|---|---|
| **Rogue access point and ad hoc rogue detection, classification, location tracking, and containment** | Yes | Yes |
| **Switch port tracing and disabling** | Yes | Yes |
| **DoS attack identification and classification** | No | Yes |
| **Wireless intrusion attack identification and classification** | No | Yes |
| **Active attack mitigation** | No | Yes |

## MSE Product Specifications

Table 6 provides the specifications of the physical Cisco MSE appliance. Table 7 provides the specifications of the virtual MSE.

**Table 6.** Cisco MSE Product Specifications (Physical Appliance)

| Feature | Cisco MSE 3355 |
|---|---|
| **Supported services** | • Base Location license: 2500 access points<br>• CMX license: 2500 access points<br>• wIPS license: 5000 monitor mode or enhanced local mode (ELM) access points<br>• Maximum number of tracked devices: 25,000 (regardless of number of access point licenses)<br>• Separate MSE appliance is recommended for running wIPS |
| **Evaluation support** | MSE: Physical or virtual appliance ships with the following evaluation licenses:<br>• Base Location: 100 access points<br>• CMX: 100 access points<br>• wIPS: 20 monitor mode or enhanced local mode access points |
| **Processor** | 2 quad-core Intel® Nehalem processors, 2.0 GHz, 4-MB cache |
| **Memory** | 16-GB DDR3 (two 8 GB) |
| **Hard disk** | Four hot-swappable 146-GB SAS drives with up to 6-Gbps transfer rate |
| **Removable media** | DVD-RO drive |
| **Ports** | • Four USB ports: Two in front, two in back<br>• Two VGA ports: One in front and one in back<br>• One RJ-45 management port for out-of-band management<br>• RJ-45: Two rear RJ-45 connectors for connection to two Gigabit Ethernet network adapters |
| **Connectivity** | Network: Two embedded multifunction Gigabit Ethernet network adapters with TCP/IP offload engine |
| **Management** | SNMP v1, v2c, and v3 |
| **Management interface** | Cisco Prime™ Infrastructure |
| **Network devices** | • All WLCs<br>• All 802.11n access points |
| **System specifications** | • Number of MSEs per Prime Infrastructure: 20 |
| **Programming interfaces** | REST and SOAP/XML APIs |
| **Form factor** | 1 rack unit (1RU) |
| **Physical dimensions** | • Height: 1.69 in. (43 mm)<br>• Width: 17.3 in. (440 mm)<br>• Depth: 28.0 in. (711.4 mm)<br>• Weight: 28 (minimum) to 35.1 lb (maximum) (12.7 to 15.9 kg) |

| Feature | Cisco MSE 3355 |
|---|---|
| **Power** | • AC power supply wattage: 625W<br>• AC power supply voltage: 100 to 120V at 50 to 60 Hz; 200 to 240V at 50 to 60 Hz<br>• 92% efficient<br>• Autoswitching, hot-swappable<br>• Redundant power supplies |
| **Cooling fans** | Total of six fans, 3+3 redundant configuration |
| **Environmental** | • Operating temperature:<br>◦ 50°to 95℉ (10°to 35℃) up to 3000 ft (914.4 m)<br>◦ 50°to 90℉ (10°to 32℃) 3000 to 7000 ft (914.4 to 2133 m)<br>• Non-operating temperature:<br>◦ -40°to 140℉ (-40°to 60℃)<br>◦ Maximum rate of change is 36℉/hr (20℃/hr)<br>• v air temperature, server on:<br>◦ 50°to 95℉ (10°to 35℃)<br>◦ Altitude: 3000 ft (0 to 914.4 m), decrease system temperature by 1.0℃ (1.8℉) for every 1000-foot (304.8 m ) increase in altitude<br>• v air temperature, server off:<br>◦ 41°to 113℉ (5°to 45℃)<br>◦ Maximum altitude: 10,000 ft (3048 m)<br>• Shipment:<br>◦ -40°to 140℉ (-40°to 60℃)<br>◦ Maximum altitude: 10,000 ft (3048 m)<br>• v humidity, server on:<br>◦ 20% to 80%<br>◦ Maximum dewpoint: 70℉ (21℃)<br>◦ Maximum rate of change: 9℉/hr (5℃/hr)<br>• v humidity, server off:<br>◦ 8% to 80%<br>◦ Maximum dewpoint: 81℉ (27℃) |
| **Approvals and compliance** | • Safety UL 60950<br>• CAN/CSA -C22.2 No. 60950<br>• EN60950<br>• IEC 60950: EMC FCC Part 15 (CFR 47) Class A<br>• ICES-003 Class A<br>• EN 55022 Class A<br>• CISPR22 Class A<br>• AS/NZS 3548 Class A<br>• VCCI Class A<br>• EN 55024<br>• EN 50082-1<br>• Energy Star compliant |

All listed server resources should be reserved/dedicated for the virtual machine running the MSE virtual appliance. For hard drive configuration, a thick configuration should be used.

All listed specs are minimum requirements.

**Table 7.** Cisco MSE Virtual Appliance Product Specifications

| Feature | Cisco MSE Virtual Appliance |
|---|---|
| **VMware ESXi version (virtual appliance on a customer-supplied server)** | VMware ESX\ESXi version 4.1 or 5.0 |
| **Minimum server requirements** | **Cisco MSE High-End Virtual Appliance**<br>• Base Location license: 5000 access points<br>• CMX license: 5000 access points<br>• wIPS license: 10,000 access points<br>• Maximum number of tracked devices: 50,000 (regardless of number of access point licenses)<br>• Minimum RAM: 24 GB<br>• Minimum hard disk space allocation: 500 GB with SAS drivers and 1600 I/O operations per second (IOPS)<br>• Processors: 16 vCPUs at 2.0 GHz or faster and a passmark (cpubenchmark.net) no less than 4000<br>• Cisco UCS® ref: Cisco UCS C240 M3 Rack Server or C460 M2 High-Performance Rack Server |
| | **Cisco MSE Standard Virtual Appliance**<br>• Base Location license: 2500 access points<br>• CMX license: 2500 access points<br>• wIPS license: 5000 access points<br>• Maximum number of tracked devices: 25,000 (regardless of number of access point licenses)<br>• Minimum RAM: 16 GB<br>• Minimum hard disk space allocation: 500 GB with SAS drivers and 1000 IOPS<br>• Processors: 8 vCPUs at 2.0 GHz or faster and a passmark (cpubenchmark.net) no less than 4000<br>• Cisco UCS ref: Cisco UCS C240 M3 Rack Server |
| | **Cisco MSE Low-End Virtual Appliance**<br>• Base Location license: 200 access points<br>• CMX license: **Does not support CMX license**<br>• wIPS license: 2000 access points<br>• Maximum number of tracked devices: 2000 (regardless of number of access point licenses)<br>• Minimum RAM: 8 GB<br>• Minimum hard disk space allocation: 250 GB with SAS drives and 900 IOPS<br>Processors: 4 vCPUs at 2.0 GHz or faster and a passmark (cpubenchmark.net) no less than 4000 |

## MSE Virtual Appliance Reference Hardware Configurations

**Table 8.** Reference Hardware Configurations

| | MSE Low-End Virtual Appliance | MSE Standard Virtual Appliance | MSE High-End Virtual Appliance |
|---|---|---|---|
| **Processor** | UCS-CPU-E5-2609 (qty 1) | UCS-CPU-E5-2660 (qty 1) | UCS-CPU-E5-2660 (qty 2) |
| **RAM** | UCS-MR-1X082RX-A (qty 1) - 8 GB | UCS-MR-1X082RX-A (qty 2) - 16 GB | UCS-MR-1X041RX-A (qty 4) - 24 GB |
| **Disk** | UCS-HDD300GI2F208 (qty 2, in RAID 1 config) | UCS-HDD300GI2F208 (qty 4, in RAID 10 config) | UCS-HDD300GI2F208 (qty 4, in RAID 10 config) |
| **RAID** | UCS-RAID-9266CV | UCS-RAID-9266CV | UCS-RAID-9266CV |
| | **Example Cisco Unified Computing System™ (Cisco UCS) configurations that match the minimum requirements:** | | |
| | **UCSC-C240-M3L**<br>UCS C240 M3 LFF w/o CPU, mem, HD, PCIe, PSU w/ rail kit, expdr | **UCSC-C240-M3L**<br>UCS C240 M3 LFF w/o CPU,mem, HD, PCIe,PSU w/ rail kit, expdr | **UCSC-C240-M3L**<br>UCS C240 M3 LFF w/o CPU,mem, HD, PCIe, PSU w/ rail kit, expdr |
| | **UCS-CPU-E5-2609**<br>2.4 GHz E5-2609/80W 4C/10MB Cache/DDR3 1066MHz | **UCS-CPU-E5-2660**<br>2.20 GHz E5-2660/95W 8C/20MB Cache/DDR3 1600MHz | **UCS-CPU-E5-2660**<br>2.20 GHz E5-2660/95W 8C/20MB Cache/DDR3 1600MHz |
| | **UCS-MR-1X082RX-A**<br>8GB DDR3-1333-MHz RDIMM/PC3-10600/2R/1.35v | **UCS-MR-1X082RX-A**<br>8GB DDR3-1333-MHz RDIMM/PC3-10600/2R/1.35v | **UCS-MR-1X041RX-A**<br>4GB DDR3-1333-MHz RDIMM/PC3-10600/1R/1.35v |

| | MSE Low-End Virtual Appliance | MSE Standard Virtual Appliance | MSE High-End Virtual Appliance |
|---|---|---|---|
| | **UCS-HDD300GI2F208**<br>300GB SAS 15K RPM 3.5 inch HDD/hot plug/drive sled mounted | **UCS-HDD300GI2F208**<br>300GB SAS 15K RPM 3.5 inch HDD/hot plug/drive sled mounted | **UCS-HDD300GI2F208**<br>300GB SAS 15K RPM 3.5 inch HDD/hot plug/drive sled mounted |
| | **UCS-RAID-9266CV**<br>MegaRAID 9266CV-8i w/TFM + Super Cap | **UCS-RAID-9266CV**<br>MegaRAID 9266CV-8i w/TFM + Super Cap | **UCS-RAID-9266CV**<br>MegaRAID 9266CV-8i w/TFM + Super Cap |
| | **UCSC-PSU-650W**<br>650W power supply for C-Series rack servers | **UCSC-PSU-650W**<br>650W power supply for C-Series rack servers | **UCSC-PSU-650W**<br>650W power supply for C-Series rack servers |
| | **R2XX-DMYMPWRCORD**<br>No power cord option | **R2XX-DMYMPWRCORD**<br>No power cord option | **R2XX-DMYMPWRCORD**<br>No power cord option |

## CMX for Facebook Wi-Fi Product Specifications

1. All listed server resources should be reserved\dedicated for the virtual machine running the virtual instance of CMX for Facebook Wi-Fi. For hard drive configuration a thick configuration should be used.
2. All listed specs are minimum requirements.
3. CMX for Facebook Wi-Fi will be provided as a single OVA file.
4. One VM running a CMX for Facebook Wi-Fi instance is required per location or store, as Facebook social analytics are tied to a physical location.
5. CMX for Facebook Wi-Fi needs a Cisco IOS® Software router configured for Policy-Based Routing (PBR) to redirect guest Wi-Fi traffic. PBR performance varies depending on the router model.
6. CMX for Facebook Wi-Fi can run centrally if guest Internet breakouts are from the data center, or alternately, it can run on the Cisco UCS E-Series blades on branch office Cisco ISR G2 routers in a distributed fashion if Internet breakouts are local.

**Table 9.** Cisco CMX for Facebook Wi-Fi Product Specifications

| Feature | Cisco MSE Virtual Appliance for CMX for Facebook Wi-Fi |
|---|---|
| **VMware ESXi version (virtual appliance on a customer-supplied server)** | VMware ESXi version 4.1 or 5.0 or 5.1 |
| **Minimum server requirements** | • Minimum RAM: 4GB<br>• Minimum hard disk space allocation: 250 GB with SAS drivers and 900 IOPS<br>• Processors: 4 vCPUs at 1.0 GHz or faster and a passmark (cpubenchmark.net) no less than 4000 |

## For More Information

- To learn more about how the Cisco MSE can help you unleash the potential of mobility, visit http://www.cisco.com/go/mse.
- For more information about Cisco Connected Mobile Experiences, visit htttp://www.cisco.com/go/cmx.


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Printed in USA C78-475378-12 10/13