Cisco Mobility Services Engine (up to Release 8.0 software)

This document details the specifications for the Cisco® Mobility Services Engine (MSE) running legacy software up to and including Release 8.0. For details regarding the MSE with Release 10.0 (or newer) software, please see the Cisco MSE 10.0 data sheet.

Overview

More than 10 billion mobile devices will be in use by 2018.1 People love their smartphones, tablets, and other devices, and they want to stay connected when on the go. This gives you a great opportunity to engage customers and visitors with exciting mobile experiences. But how can you provide high-quality connections, create revenue-generating services, and keep your network safe and manageable all at the same time?

The Cisco MSE helps you balance these goals. The platform gives you a centralized way to deliver Wi-Fi-based mobility services that let you:

- Get deep network insight. Base Location services capture and aggregate key network information such as device location, RF spectrum details, and RF interference sources. They also let you support a rich set of real-time location services (RTLS).
- Customize mobile experiences 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 venues. You can offer a personalized mobile experience and understand users better with onsite, online, and social analytics.
- Keep wireless users and your network safe. Cisco MSE Adaptive Wireless Intrusion Prevention System (wIPS) helps protect the network from rogue wireless devices, denial-of-service (DoS) attacks, and other wireless threats. It provides the tools you need to strengthen security and improve compliance.

Product Summary

Designed as an open platform, the Cisco MSE supports mobility services with a modular, licensed 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 1 provides an overview of the services, platforms, and location technologies available.

Table 1.   Mobility Services Overview

Feature	Benefits
Services	**Base Location license** - Track and locate Wi-Fi devices, interferers, rogues, and RFID tags - Detect presence and receive geo-fenced or zone-based alerts - Show system wide interferer details and correlation - Visualize interferer zone of impact - Develop custom applications to engage users with open location API

Feature	Benefits
	• Heighten customer experience by integrating indoor navigation experiences into loyalty apps • Increase app usage by automatically connecting to the Wi-Fi network and launching loyalty apps upon arrival • Discover and stop security penetration and DoS attacks **Connected Mobile Experiences (CMX) license** • Provide simple guest access to end-users with a location-aware captive portal • Manage visitors and increase brand presence with Facebook • Analyze onsite customer behavior and make informed business decisions • Develop custom applications to engage users with the CMX SDK **wIPS license** • Monitor, mitigate and report security threats to the wireless network • Enhance security and regulatory compliance features of WLAN with location intelligence
Platform	• Physical appliance - 3365 • Physical appliance - 3355[*] • Virtual appliance
Location technologies	• Signal strength triangulation: Determines the location of a Wi-Fi device by triangulating the relative signal strength detected by the access points in the WLAN network. This method determines the location only of probing signals emanating from the client Wi-Fi device. • FastLocate: Determines the location of a Wi-Fi device by triangulating the relative signal strength detected by the access points in the WLAN network. This method determines the location of probing signals **as well as data packets** emanating from the client Wi-Fi device. This increases the update rates of location calculations for devices that are connected to the WLAN network. FastLocate requires a <u>Wireless Security Module</u> (WSM) in every access point that takes part in the location calculation • Presence: Determines the location of a Wi-Fi device by gauging the nearest access point to that device. This method provides less granular location accuracy than triangulation; however, it can be deployed in venues with fewer access points. Presence can currently be used only with CMX Analytics or integrated into third-party applications using the northbound notification API.

[*] The MSE 3355 has been announced as end of sale (EoS), with the final date for purchasing being June 2015.

Product Benefits

Companies of all kinds unlock the benefits of mobility with the Cisco MSE with Base Location, CMX, and wIPS licenses (Table 2).

Table 2.   MSE Benefits

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

Base Location License

The Base Location license includes the following:

• Advanced spectrum capabilities

• Real-time location services (RTLS)

• Mobility services API and SDK

Advanced Spectrum Capabilities

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 Functions

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

RTLS

The Cisco MSE provides presence detection and real-time location tracking of Wi-Fi devices (including smartphones, tablets, etc.), rogue devices, interferers, and RFID tags.

Mobility Services API

The Mobility Services API supports representational state transfer (REST) and Simple Object Access Protocol (SOAP)/XML. Using these APIs, customers and partners can tightly integrate MSE location information into applications. Among the applications are location-aware equipment tracking, guest access, device-based services, browser-based services, mobile apps, online and onsite analytics, social analytics, and ads and offers.

CMX License

The CMX license includes the following:

- CMX Analytics
- CMX Connect
- CMX for Facebook Wi-Fi
- CMX SDK

CMX Analytics uses Wi-Fi fingerprints from customer mobile devices to detect customer presence and track customer location and movements. CMX Analytics analyzes the complex location data and delivers meaningful insights to the venue owner. The owner also gets detailed reports on end-user behavior, dynamic onscreen analytics capabilities, and the ability to parse the data by any segment over any time frame or any specific zone on the premises.

CMX Connect is a business-to-consumer (B2C) guest access solution designed for flexible, easy on-boarding to the guest Wi-Fi network. It provides location-aware captive portal, optimized for mobile devices. CMX Connect helps venue owners monetize their guest Wi-Fi networks.

CMX for Facebook Wi-Fi allows venues 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 enables end users to authenticate to the Cisco Wi-Fi network and automatically "check in" to the venue's Facebook profile, which increases venue 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.

The **CMX SDK** enables organizations to build indoor navigation capabilities into loyalty apps. Organizations can define maps, points of interest, and routes, as well as encourage app usage by using the Cisco Wi-Fi network to automatically connect devices to the Wi-Fi network and launch the app upon arrival.

Cisco wIPS License

Adding more devices to the network means new compliance concerns and unknown risks. 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 Cisco wireless LAN controller (WLC). Add the MSE for more features and value.

Table 4 compares the capabilities of the WLC and the WLC plus MSE.

Table 4.   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 Physical Appliance Product Specifications

Table 5 provides the specifications of the physical Cisco MSE appliance.

All listed specifications are for the MSE Release 8.0 software. For MSE Release 10 specifications, please see the Cisco MSE 10 data sheet.

Table 5.   Cisco MSE Product Specifications (Physical Appliance)

Feature	Cisco MSE 3365	Cisco MSE 3355[*]
Supported services	- Base Location license: 5000 access points - CMX license: 5000 access points - wIPS license: 8000 monitor mode or enhanced local mode (ELM) access points - Maximum number of tracked devices: 50,000 (regardless of number of access point licenses). Note that the end device scaling guidelines differ if using FastLocate or presence as a method for determining device location. See the MSE ordering and licensing guide for more details. - Separate MSE appliance is recommended for running wIPS	- Base Location license: 2500 access points - CMX license: 2500 access points - wIPS license: 6000 monitor mode or enhanced local mode (ELM) access points - Maximum number of tracked devices: 25,000 (regardless of number of access point licenses). Note that the end device scaling guidelines differ if using FastLocate or presence as a method for determining device location. See the MSE ordering and licensing guide for more details. - Separate MSE appliance is recommended for running wIPS

Feature	Cisco MSE 3365	Cisco MSE 3355[*]
Evaluation support	MSE: Physical or virtual appliance ships with the following evaluation licenses: • Base Location: 100 access points • CMX: 100 access points • wIPS: 20 monitor mode or enhanced local mode access points	MSE: Physical or virtual appliance ships with the following evaluation licenses: • Base Location: 100 access points • CMX: 100 access points • wIPS: 20 monitor mode or enhanced local mode access points
Processor	10 core Intel e5-2650 2.4GHz	2 quad-core Intel® Nehalem processors, 2.0 GHz, 4-MB cache
Memory	4x16-GB DDR4-2133 MHz	16-GB DDR3 (two 8 GB)
Hard disk	Four hot-swappable 600-GB SAS drives	Four hot-swappable 146-GB SAS drives with up to 6-Gbps transfer rate
Removable media	None	DVD-RO drive
Ports	• One RJ-45 management port for out-of-band management • RJ-45: Two rear RJ-45 connectors for connection to two Gigabit Ethernet network adapters	• Four USB ports: Two in front, two in back • Two VGA ports: One in front and one in back • One RJ-45 management port for out-of-band management • 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	Network: Two embedded multifunction Gigabit Ethernet network adapters with TCP/IP offload engine
Management	SNMP v1, v2c, and v3	SNMP v1, v2c, and v3
Management interface	Cisco Prime™ Infrastructure	Cisco Prime Infrastructure
Network devices	• See MSE release notes for software interoperability with Cisco wireless controllers and access points	• See MSE release notes for software interoperability with Cisco wireless controllers and access points
System specifications	• Number of MSEs per Prime Infrastructure: 20	• Number of MSEs per Prime Infrastructure: 20
Programming interfaces	REST APIs	REST and SOAP/XML APIs
Form factor	1 rack unit (1RU)	1 rack unit (1RU)
Physical dimensions	• Height: 1.7 in. (4.3 cm) • Width: 16.89 in. (43.0 cm) including handles: 18.98 in. (48.2 cm) • Depth: 29.8 in. (75.6 cm) including handles: 30.98 in. (78.7 cm) • Weight: 38 lb (17.2 kg).	• Height: 1.69 in. (43 mm) • Width: 17.3 in. (440 mm) • Depth: 28.0 in. (711.4 mm) • Weight: 28 (minimum) to 35.1 lb (maximum) (12.7 to 15.9 kg)
Power	• AC power supply wattage: 770W • AC power supply voltage: 100 to 120V at 50 to 60 Hz; 200 to 240V at 50 to 60 Hz • 92% efficient • Autoswitching, hot-swappable • Redundant power supplies	• AC power supply wattage: 625W • AC power supply voltage: 100 to 120V at 50 to 60 Hz; 200 to 240V at 50 to 60 Hz • 92% efficient • Autoswitching, hot-swappable • Redundant power supplies
Cooling fans	Six dual redundant hot-swappable fans for front-to-rear cooling	Total of six fans, 3+3 redundant configuration

Feature	Cisco MSE 3365	Cisco MSE 3355[*]
Environmental	- Operating temperature: 41 to 95° F (5 to 35° C) - Derate the maximum temperature by 1°C per every 1000 ft. (305 m) of altitude above sea level - Nonoperating temperature: -40 to 149°F (-40 to 65° C) - Nonoperating temperature: -40 to 149°F (-40 to 65° C) - Humidity (RH) operating: 10 to 90%, noncondensing at 82° F (28° C) - Humidity (RH) nonoperating: 5 to 93% at 82° F (28° C) - Altitude operating: 0 to 3,000 m (0 to 10,000 ft.) - Altitude nonoperating: 0 to 12,192 m (0 to 40,000 ft.) - Sound Power level, Measure A-weighted per ISO7779 LWAd (Bels) Operation at 73°F (23°C): 5.4 - Sound Pressure level, Measure A-weighted per ISO7779 LpAm (dBA) Operation at 73°F (23°C): 37	- Operating temperature: 50° to 95°F (10° to 35°C) up to 3000 ft (914.4 m) 50° to 90°F (10° to 32°C) 3000 to 7000 ft (914.4 to 2133 m) - Nonoperating temperature: -40° to 140°F (-40° to 60°C) - Maximum rate of change is 36°F/hr (20°C/hr) - v air temperature, server on: 50° to 95°F (10° to 35°C) - Altitude: 3000 ft (0 to 914.4 m), decrease system temperature by 1.8°F (1.0°C) for every 1000-foot (304.8 m) increase in altitude - v air temperature, server off: 41° to 113°F (5° to 45°C) - Maximum altitude: 10,000 ft (3048 m) - Shipment: -40° to 140°F (-40° to 60°C) - Maximum altitude: 10,000 ft (3048 m) - v humidity, server on: 20% to 80% - Maximum dewpoint: 70°F (21°C) - Maximum rate of change: 9°F/hr (5°C/hr) - v humidity, server off: 8% to 80% - Maximum dewpoint: 81°F (27°C)
Approvals and compliance	Safety: UL 60950-1 Second Edition, CAN/CSA-C22.2 No. 60950-1 Second Edition, EN 60950-1 Second Edition, IEC 60950-1 Second Edition, AS/NZS 60950-1GB4943 2001 EMC - Emissions: 47CFR Part 15 (CFR 47) Class A AS/NZS CISPR22 Class A CISPR22 Class AEN55022 Class A ICES003 Class A VCCI Class A EN61000-3-2EN61000-3-3KN22 Class A CNS13438 Class A EMC - Immunity: EN55024CISPR24EN300386KN24	- Safety UL 60950 - CAN/CSA -C22.2 No. 60950 - EN60950 - IEC 60950: EMC FCC Part 15 (CFR 47) Class A - ICES-003 Class A - EN 55022 Class A - CISPR22 Class A - AS/NZS 3548 Class A - VCCI Class A - EN 55024 - EN 50082-1 - Energy Star compliant

[*] The MSE 3355 has been announced as end of sale, with the final date for purchasing being June 2015.

MSE Virtual Appliance Product Specifications

Table 6 provides the specifications of the virtual MSE. 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 specifications are minimum requirements.

All listed specifications are for the MSE Release 8.0 software. For MSE Release 10 specifications, please see the MSE 10 data sheet.

Table 6.   Cisco MSE Virtual Appliance Product Specifications

Feature	Cisco MSE Virtual Appliance
Virtual appliance versions (virtual appliance on a customer-supplied server)	VMware ESX/ESXi version 4.1/5.0/5.1/5.5 or higher Xen Server version 6.1 or higher Hyper-V version 2008/2012 or higher (**Note:** Hyper-V version 2012R2, RS3 and future not supported.)
Minimum server requirements	**Cisco MSE High-End Virtual Appliance** • Base Location license: 5000 access points • CMX license: 5000 access points • wIPS license: 10,000 access points • Maximum number of tracked devices: 50,000 (regardless of number of access point licenses). Note that the end device scaling guidelines differ if using FastLocate or presence as a method for determining device location. See the MSE ordering and licensing guide for more details. • Minimum RAM: 24 GB • Minimum hard disk space allocation: 500 GB with SAS drivers and 1600 I/O operations per second (IOPS) • Processors: 16 vCPUs at 2.0 GHz or faster and a passmark (cpubenchmark.net) no less than 4000 • Cisco UCS® ref: Cisco UCS C240 M3 Rack Server or C460 M2 High-Performance Rack Server
	Cisco MSE Standard Virtual Appliance • Base Location license: 2500 access points • CMX license: 2500 access points • wIPS license: 6000 access points • Maximum number of tracked devices: 25,000 (regardless of number of access point licenses). Note that the end device scaling guidelines differ if using FastLocate or presence as a method for determining device location. See the MSE ordering and licensing guide for more details. • Minimum RAM: 16 GB • Minimum hard disk space allocation: 500 GB with SAS drivers and 1000 IOPS • Processors: 8 vCPUs at 2.0 GHz or faster and a passmark (cpubenchmark.net) no less than 4000 • Cisco UCS ref: Cisco UCS C240 M3 Rack Server
	Cisco MSE Low-End Virtual Appliance • Base Location license: 200 access points • CMX license: **Does not support CMX license** • wIPS license: 2000 access points • Maximum number of tracked devices: 2000 (regardless of number of access point licenses). Note that the end device scaling guidelines differ if using FastLocate as a method for determining device location. See the MSE ordering and licensing guide for more details. • Minimum RAM: 8 GB • Minimum hard disk space allocation: 250 GB with SAS drives and 900 IOPS • 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 7 details the available MSE virtual appliance configurations.

Table 7.   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-1X082RY-A (qty 1) - 8 GB	UCS-MR-1X082RY-A (qty 2) - 16 GB	UCS-MR-1X041RY-A (qty 6) - 24 GB
Disk	UCS-HDD1TI2F212* (qty 2, in RAID 1 config)	UCS-HDD1TI2F212* (qty 4, in RAID 10 config)	UCS-HDD1TI2F212* (qty 4, in RAID 10 config)
RAID	UCS-RAID-9271CV	UCS-RAID-9271CV	UCS-RAID-9271CV

	MSE Low-End Virtual Appliance	MSE Standard Virtual Appliance	MSE High-End Virtual Appliance
Example Cisco Unified Computing System™ (Cisco UCS) configurations that match the minimum requirements:			
	UCSC-C240-M3L UCS C240 M3 LFF w/o CPU, mem, HD, PCIe, PSU w/rail kit, expdr	**UCSC-C240-M3L** UCS C240 M3 LFF w/o CPU, mem, HD, PCIe, PSU w/rail kit, expdr	**UCSC-C240-M3L** UCS C240 M3 LFF w/o CPU, mem, HD, PCIe, PSU w/rail kit, expdr
	UCS-CPU-E5-2609 2.4 GHz E5-2609/80W 4C/10MB Cache/DDR3 1066MHz	**UCS-CPU-E5-2660** 2.20 GHz E5-2660/95W 8C/20MB Cache/DDR3 1600MHz	**UCS-CPU-E5-2660** 2.20 GHz E5-2660/95W 8C/20MB Cache/DDR3 1600MHz
	UCS-MR-1X082RY-A 8 GB DDR3 1600-MHz RDIMM/PC3-12800/dual rank/1.35v	**UCS-MR-1X082RY-A** 8 GB DDR3 1600-MHz RDIMM/PC3-12800/dual rank/1.35v	**UCS-MR-1X041RY-A** 4 GB DDR3 1600-MHz RDIMM/PC3-12800/single rank/1.35v
	UCS-HDD1TI2F212[*] 1 TB SAS 7.2K RPM 3.5 inch HDD/hot plug/drive sled mounted	**UCS-HDD1TI2F212**[*] 1 TB SAS 7.2K RPM 3.5 inch HDD/hot plug/drive sled mounted	**UCS-HDD1TI2F212**[*] 1 TB SAS 7.2K RPM 3.5 inch HDD/hot plug/drive sled mounted
	UCS-RAID9271CV-8I MegaRAID 9271CV with 8 internal SAS/SATA ports with Supercap	**UCS-RAID9271CV-8I** MegaRAID 9271CV with 8 internal SAS/SATA ports with Supercap	**UCS-RAID9271CV-8I** MegaRAID 9271CV with 8 internal SAS/SATA ports with Supercap
	UCSC-PSU-65-0W 650W power supply for C-Series rack servers	**UCSC-PSU-650W** 650W power supply for C-Series rack servers	**UCSC-PSU-650W** 650W power supply for C-Series rack servers
	R2XX-DMYMPWRCORD No power cord option	**R2XX-DMYMPWRCORD** No power cord option	**R2XX-DMYMPWRCORD** No power cord option

[*] **Note:** The HD configurations are larger than the minimum HD requirement because the smallest HD size currently available on the UCSC-C240-M3L is 1 TB.

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- 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 http://www.cisco.com/go/cmx.

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