Cisco MSE Virtual Appliance Installation Guide for Cisco CMX Release 10.1 for Cisco CMX Release 10.1

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Preface

This preface describes the audience for, organization of, and the conventions used in this document. It also provides information about how to obtain related documentation. It includes the following sections:

Audience

This document is for experienced network administrators who install the Cisco Mobility Services Engine (MSE) virtual appliance, and install, configure, and maintain the Cisco Connected Mobile Experiences (CMX) services.

Document Conventions

This document uses the following conventions:

Table 1 Conventions

Convention	Indication
bold font	Commands, keywords, and text entered by users appear in **bold** font.
italic font	Document titles, new or emphasized terms, and arguments for which you supply values are in *italic* font.
Option > Option	Used to describe a series of options.
[ ]	Elements in square brackets are optional.
{x | y | z}	Required alternative keywords are grouped within braces and separated by vertical bars.
[x | y | z}	Optional alternative keywords are grouped within braces and separated by vertical bars.
string	A nonquoted set of characters. Do not use quotation marks around the string, or the string will include the quotation marks.

Table 1 Conventions (continued)

Convention	Indication
`courier` font	Terminal sessions and information the system displays appear in `courier` font.
<>	Nonprinting characters such as passwords are in angle brackets.
[ ]	Default responses to system prompts are in square brackets.
!, #	An exclamation mark (!) or a pound sign (#) at the beginning of a line of code indicates a comment line.

Note Means reader take note.

Tip Means the following information will help you solve a problem.

Caution Means reader be careful. In this situation, you might do something that can result in equipment damage or loss of data.

Warning This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Related Documentation

For more information about Cisco Mobility Services Engine and related products, see:
http://www.cisco.com/c/en/us/support/wireless/mobility-services-engine/tsd-products-support-series-home.html

For more information about Cisco Connected Mobile Experiences (CMX), see:

http://www.cisco.com/c/en/us/solutions/enterprise-networks/connected-mobile-experiences/index.html

Obtaining Documentation and Submitting a Service Request

For information on obtaining documentation, submitting a service request, and gathering additional information, see the monthly *What's New in Cisco Product Documentation*, that also lists all new and revised Cisco technical documentation, at:

http://www.cisco.com/en/US/docs/general/whatsnew/whatsnew.html

Subscribe to the *What's New in Cisco Product Documentation* as an RSS feed and set content to be delivered directly to your desktop using a reader application. The RSS feeds are a free service. Cisco currently supports RSS Version 2.0.

Installing a Cisco MSE Virtual Appliance

This chapter describes how to install and deploy a Cisco Mobility Services Engine (MSE) virtual appliance, which is distributed as an Open Virtual Appliance (OVA) file.

Cisco MSE OVA is a prebuilt software solution that comprises one or more virtual machines (VMs) that are packaged, maintained, updated, and managed as a single unit. Cisco MSE virtual appliance is not offered on an ISO or an Advanced Encryption Standard (AES) image; therefore you cannot perform a manual installation.

Cisco MSE acts as a platform (physical or virtual Cisco MSE appliance) to deploy and run the Cisco Connected Mobile Experiences (CMX) services. The MSE virtual appliance installation provides the choice of installing a single-box solution that supports any of the following Cisco CMX services:

- Detect & Locate, Analytics and Connect & Engage
- Detect & Locate and Connect & Engage
- Detect & Locate and Analytics

This chapter contains the following sections:

Virtualization Concepts

Refer to these documents for information on virtualization:

- https://www.vmware.com/pdfvirtualization.pdf

- http://pubs.vmware.com/vsphere-55/index.jsp#com.vmware.vsphere.vcenterhost.doc/GUID-ED375B12-7D08-4B7E-81EE-DCE83E51B1AF.html
- http://pubs.vmware.com/vsphere-55/index.jsp#com.vmware.vsphere.install.doc/GUID-41638619-B14E-4074-BB90-DACAA1440C1C.html?resultof=%2522%2545%2553%2558%2569%2522%2520%2522%2565%2573%2578%2569%2522%2520

Installation Overview

This table lists the Cisco MSE installation process.

Table 1-1 Installation Overview

Task	See...
1. Review the deployment checklist and prepare for installation of a Cisco MSE virtual appliance.	Cisco MSE Virtual Appliance Deployment Checklist, page 1-2 and Hardware Guidelines, page 1-3
2. Download the Cisco MSE OVA file from Cisco.com.	Downloading the Cisco MSE OVA File, page 1-4
3. Deploy the Cisco MSE OVA file.	Deploying the Cisco MSE OVA File Using the VMware vSphere Client, page 1-4
4. Configure the basic configurations and install the Cisco MSE virtual appliance.	Installing a Cisco MSE Virtual Appliance, page 1-6
5. Set up the Cisco MSE virtual appliance.	Setting Up the Cisco MSE Virtual Appliance and Cisco CMX Services, page 1-8

Note If you are upgrading a 10.0 deployment to 10.1, see the "Upgrading a 10.0 Deployment to 10.1" section on page 2-2.

Cisco MSE Virtual Appliance Deployment Checklist

Review the following checklist before attempting to deploy the Cisco MSE virtual appliance:

- Cisco Wireless LAN Controller (WLC) 7.0 or later.
- SNMP credentials of Cisco WLC (private key for v1 and v2, or username/password for v3).
- Cisco WLC should have an IP connectivity to a Cisco CMX 10.1 instance.
- Port 16113 should be routable from Cisco WLC to the Cisco CMX 10.1 IP address.
- SNMP traffic over port 161 should be routable from Cisco WLC to the Cisco CMX 10.1 IP address.
- Cisco Prime Infrastructure 1.4 or later.
- Cisco WLC is synced with the Cisco Prime Infrastructure 1.4 or later.
- Map size is less than 5 MB in the Cisco Prime Infrastructure.

- There are less than 1000 access points on a single map.
- In Cisco Prime Infrastructure, the hierarchy of maps is campus, building, and zone.
- The following functionalities are not available in Cisco CMX 10.1:
  - Wireless intrusion prevention system (wIPS)
  - Mobile Application Server
- VMware virtualization environment ESXi 5.1 or later.
- Cisco CMX 10.1 should have been tested with the following browser:
  - Google Chrome 40 or later
- Determine the IP address, NetMask, Default Gateway, DNS Server IP address, and NTP Server IP address for the new Virtual Machine (VM).
- SSH client to log in to the root access of the VM.
- The Secure Copy (SCP) client (on MAC native or installed on PC) or a Secure File Transfer Protocol (SFTP) to move files into Cisco MSE OVA (specifically, map files and images to upgrade).
- Time displayed on the Cisco WLC is always ahead of the Cisco MSE time. Use a common Network Time Protocol (NTP) Server to know the time.
- Cisco CMX 10.1 has a mail notification system. Use the SMTP Mail Server name and authentication mechanism.
- Cisco CMX 10.1 does not render any data on Cisco Prime Infrastructure maps. To allow client display in Cisco Prime Infrastructure 1.4 or later, a parallel Cisco MSE 8.0 is also required.

Cisco CMX Services Deployment Checklist

- During the installation of Cisco MSE virtual appliance, you can select the type of CMX services that you want to run on the Cisco MSE virtual appliance.

Requirements for Installing Cisco MSE Virtual Appliance

- VMware ESXi host server (see Table 2).
- vSphere client.
- Cisco MSE 10.1 OVA from www.cisco.com/go/mse.
- Hostname, IP address, network mask, gateway, and DNS IP address for the new VM.
- NTP Server name or IP address.
- Existing exported map file from Cisco Prime Infrastructure.
- IP address of the Cisco Wireless Controller, the Controller type, the Controller IP address, the SNMP version, and the SNMP write community string.
- Mail server settings (port number, security settings) and email address.

Hardware Guidelines

Table 2 lists the hardware guidelines for the Cisco MSE virtual appliance.

Table 2 Hardware Guidelines

Hardware Platform	Basic Appliance	Standard Appliance	High-End Appliance
CPU	8 vCPU (2.4 GHz core)	16 vCPU (2.4 GHz core)	20 vCPU (2.4 GHz core)
RAM	24 GB	32 GB	64 GB
HDD	500 GB	500 GB	1 TB

Downloading the Cisco MSE OVA File

Cisco MSE virtual appliance is distributed as an Open Virtualization Archive (OVA) file.

To download the Cisco MSE OVA file, follow these steps:

Step 1 Access the MSE image from: https://software.cisco.com/download/navigator.html?mdfid=282152561&i=rm

Step 2 Select **Mobility Services Engine Virtual Appliance**.

Step 3 Choose **Latest > 10.1** for download.

Step 4 Save the Cisco MSE OVA installer to your computer and ensure that it is accessible.

Deploying the Cisco MSE OVA File Using the VMware vSphere Client

Note Review the "Requirements for Installing Cisco MSE Virtual Appliance" section on page 1-3 before you start deploying the Cisco MSE OVA.

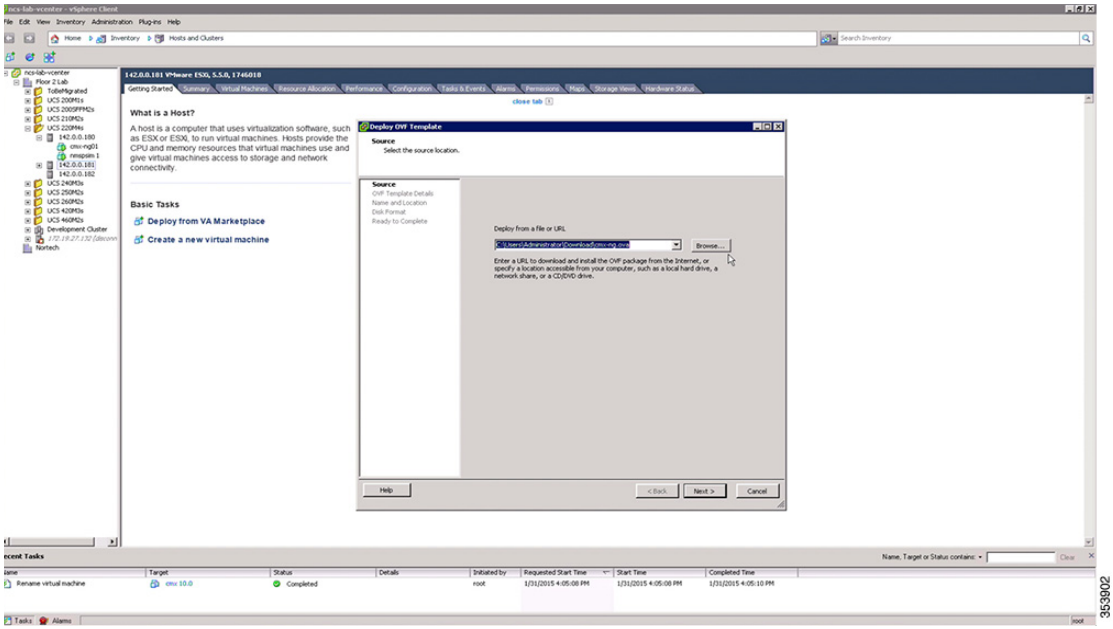
To deploy the Cisco MSE OVA file using the VMware VSphere Client, follow these steps.

Step 1 Download the Cisco MSE OVA file from the following location:

https://software.cisco.com/download/navigator.html?mdfid=282152561&i=rm.

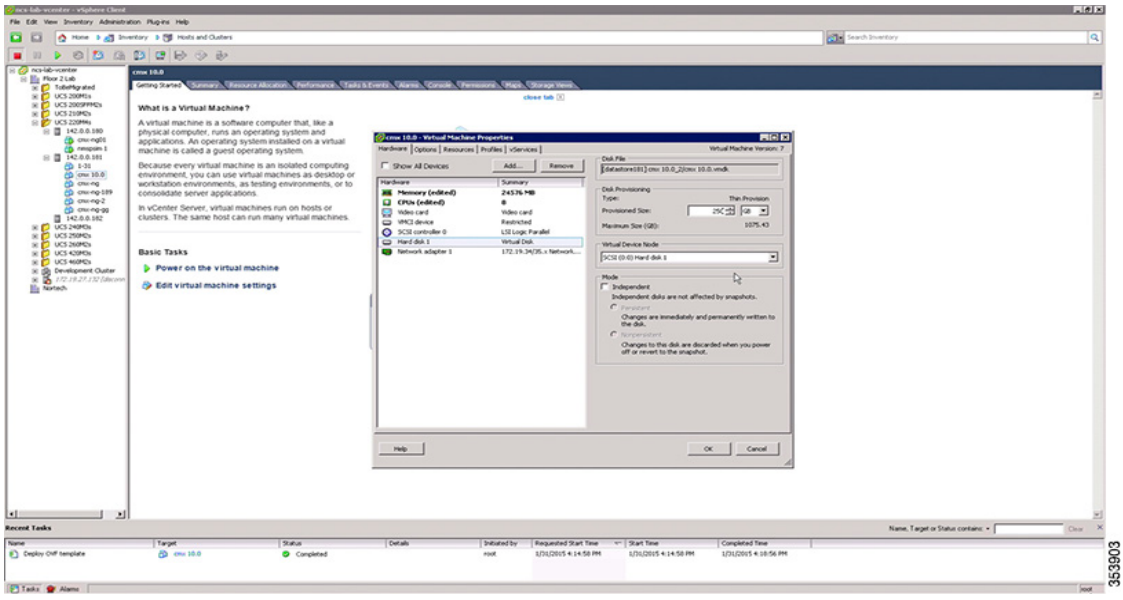
Step 2 Deploy the OVA file by using the VMware vSphere client application on your desktop (see Figure 1-1).

Figure 1-1 VMware vSphere Client

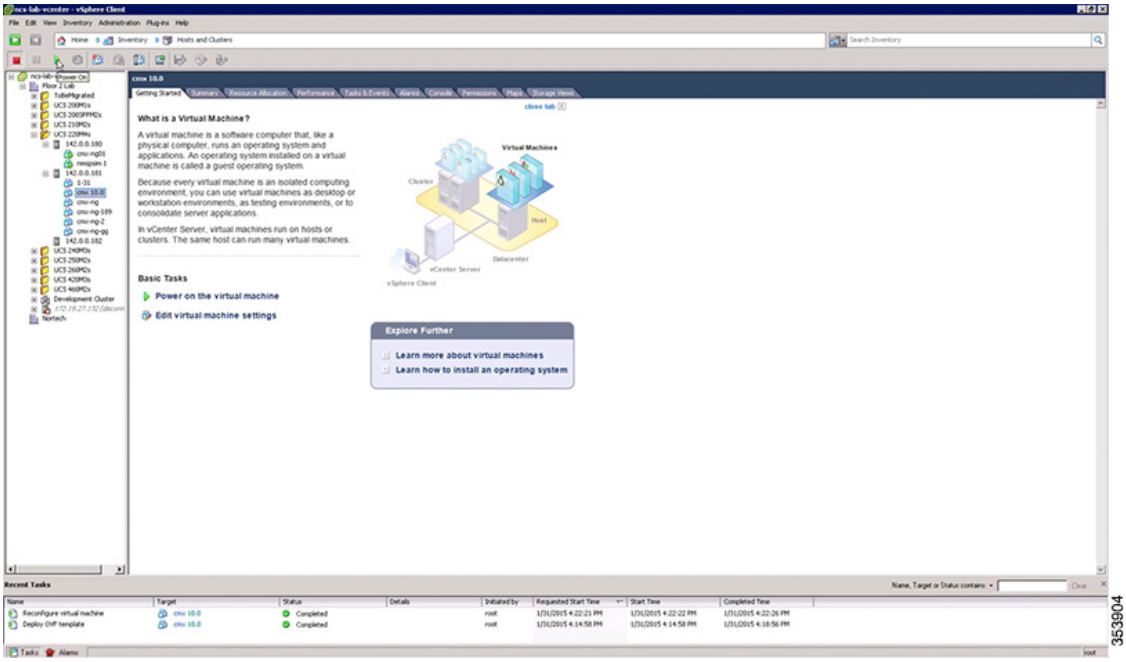


Before powering the newly created virtual machine (VM), edit the virtual machine settings by right-clicking on the VM and selecting **Edit Settings…**.

Step 3 Change the memory, the CPUs, and the provisioned disk size to meet the requirements.



Step 4 Power the Virtual Machine, by selecting the VM and clicking **Power On the Virtual Machine**.



Installing a Cisco MSE Virtual Appliance

After deploying the Cisco MSE OVA file, configure the basic settings, install, and start Cisco MSE.

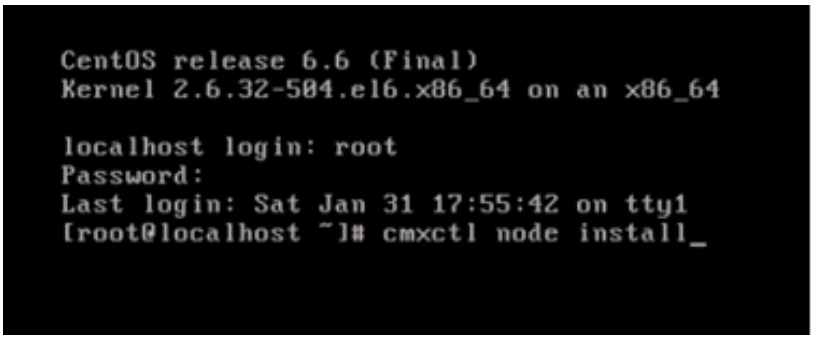
To install and configure a Cisco MSE virtual appliance, follow these steps:

Step 1 Log in and begin the installation.

```
---------------------------------------------------------------------

CentOS release 6.6 (Final)
Kernal 2.6.32-504.e16.x86_64 on an x86_64

localhost login: root
password: cisco
Last login: Sun Feb 15 19:31:03 from 10.0.2.2
```

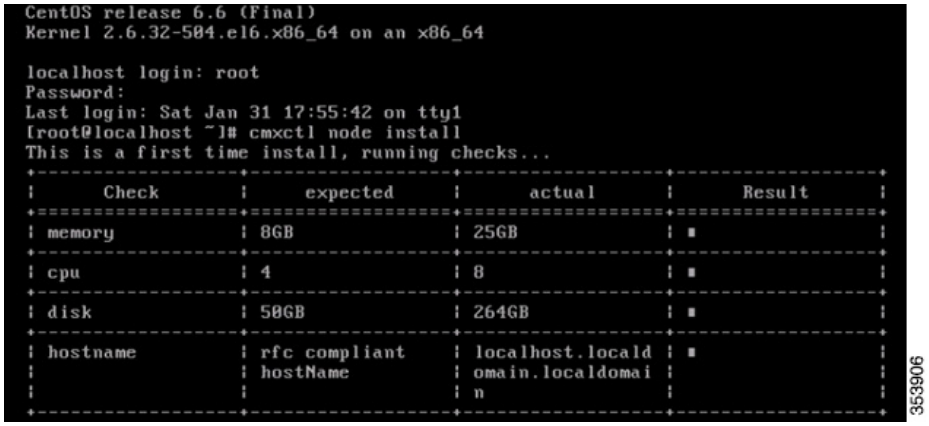


Step 2 Enter the following command:

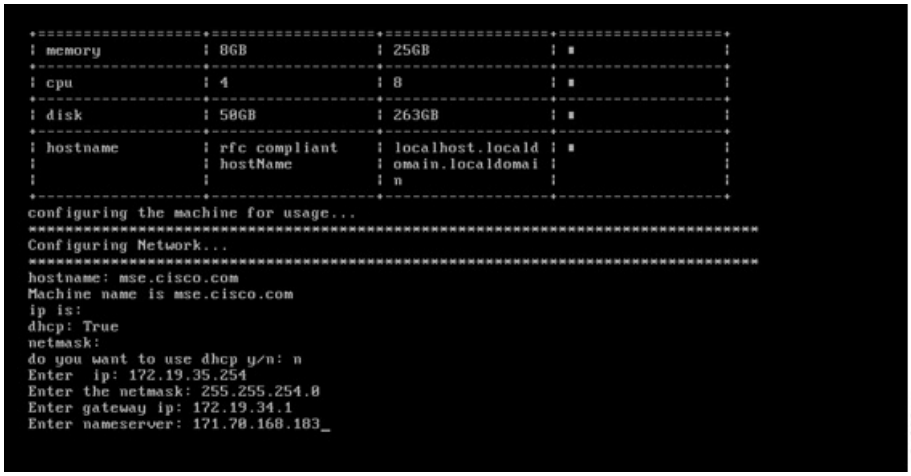
```
cmxctl node install
```

The installation script verifies that the minimum requirements are met:

```
[root@localhost ~]# cmxctl node install
This is a first time install, running checks...
```

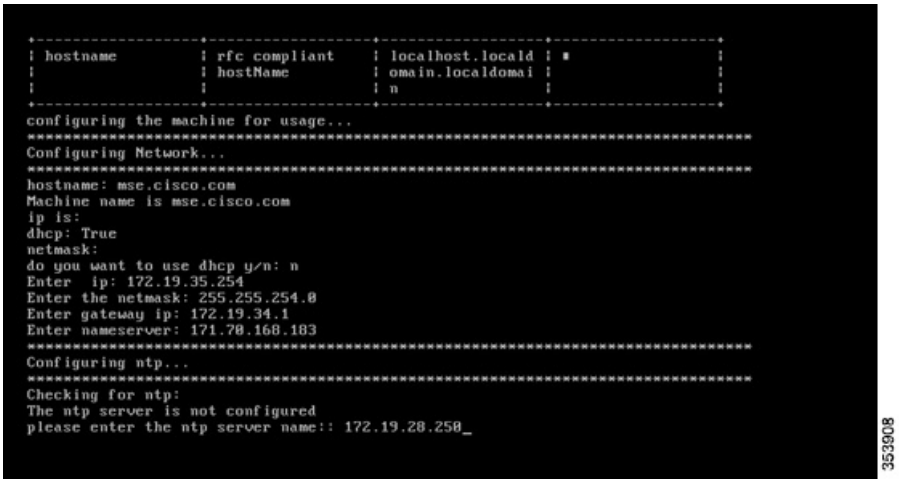


Step 3 Enter the hostname, IP address, network mask, gateway, and DNS.

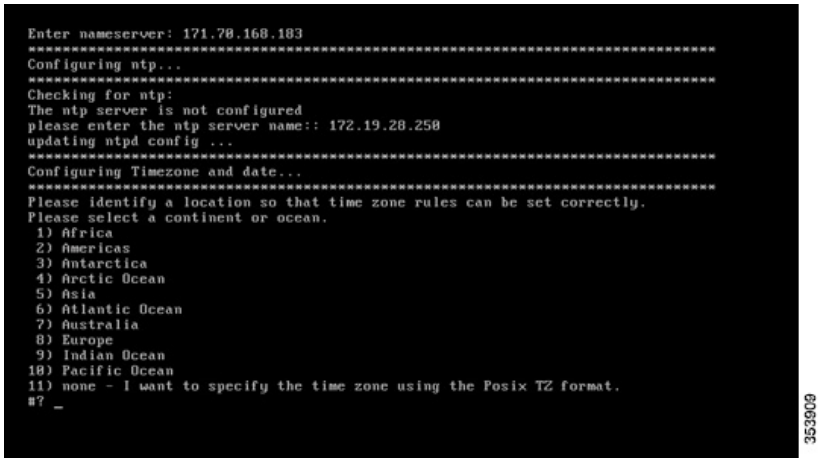


Step 4 Enter the NTP Server name or IP address.

Note If the NTP server is unreachable, use 127.0.0.1 as the server address during installation.

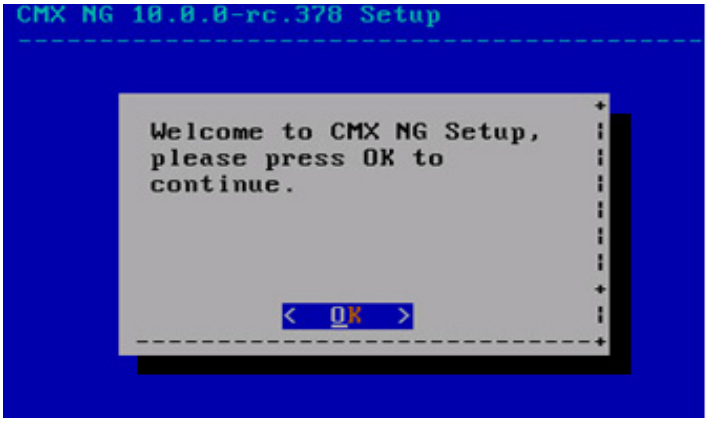


Step 5 Configure the time zone and save the changes.



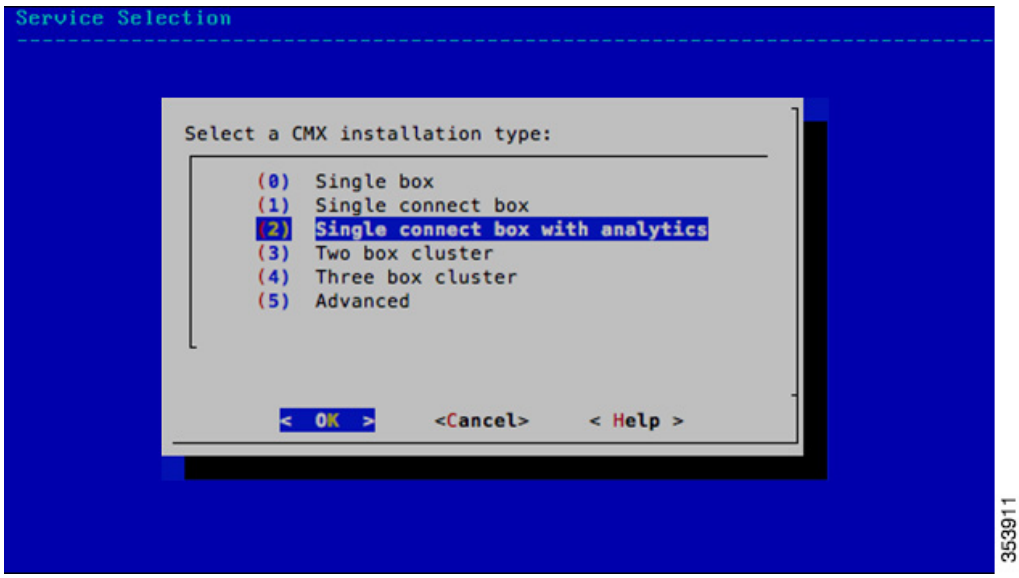
Setting Up the Cisco MSE Virtual Appliance and Cisco CMX Services

Step 1 Press Enter to select **OK** to start the setup.

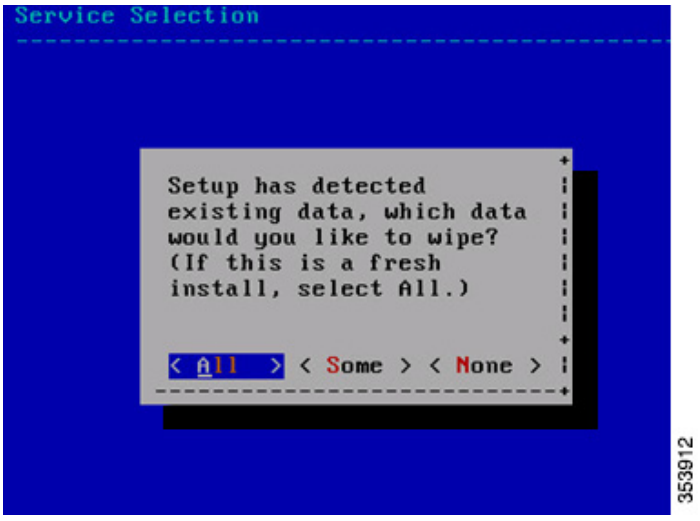


Step 2 Select the installation type, that is, the CMX services, to be deployed on the Cisco MSE virtual appliance of your choice.

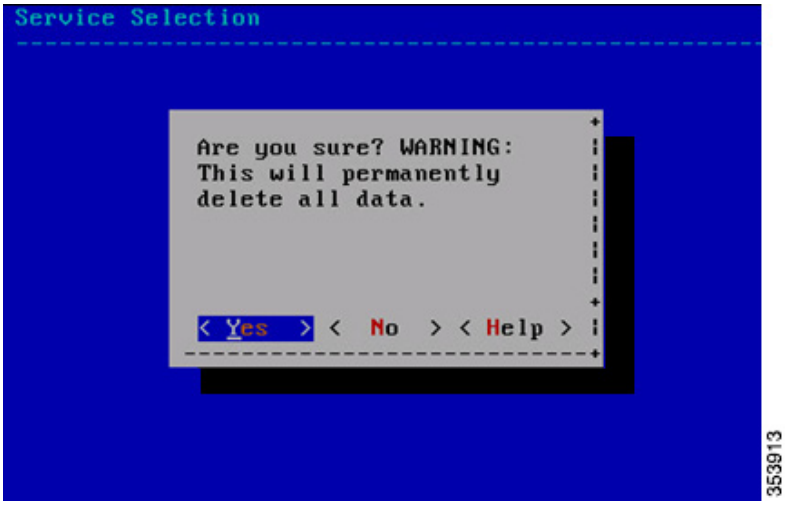
- (0) Single box and press Enter or "OK". This option enables you to install release 10.1 with Analytics and Location.
- (1) Single connect box and press Enter or "OK". This option enables you to install release 10.1 with Connect and Location.
- (2) Single connect box with Analytics and press Enter or "OK". This option enables you to install release 10.1 with Analytics, Location, and Connect.



Step 3 Press Enter to select "All".



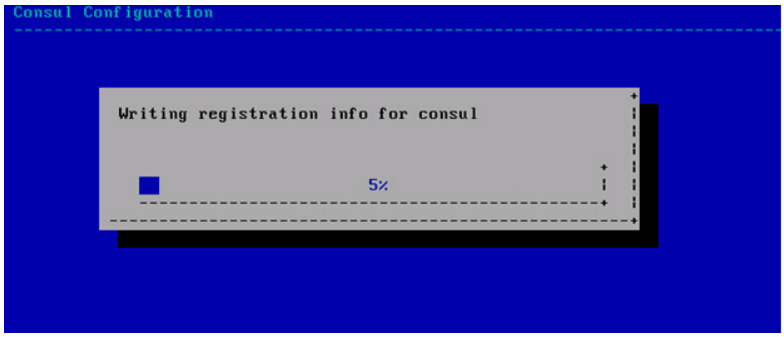
Step 4 Press Enter to select "Yes".



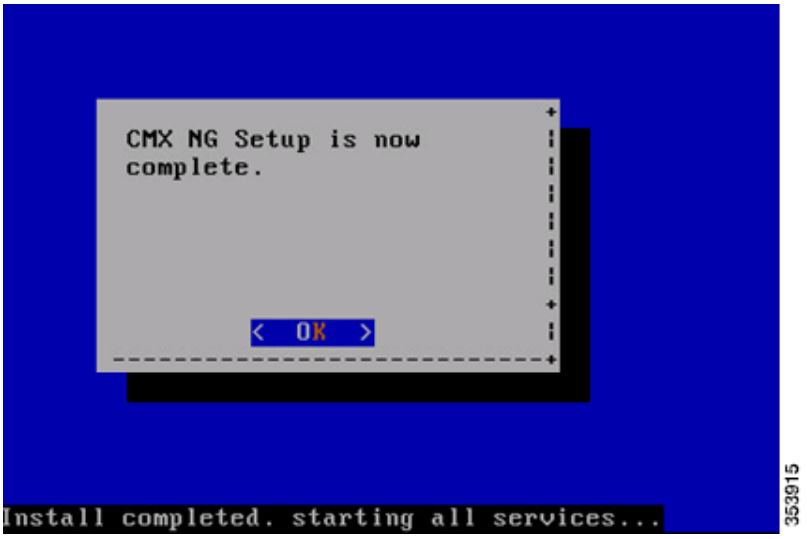
The setup and configuration will start and take a few minutes.

It will go through the following steps:

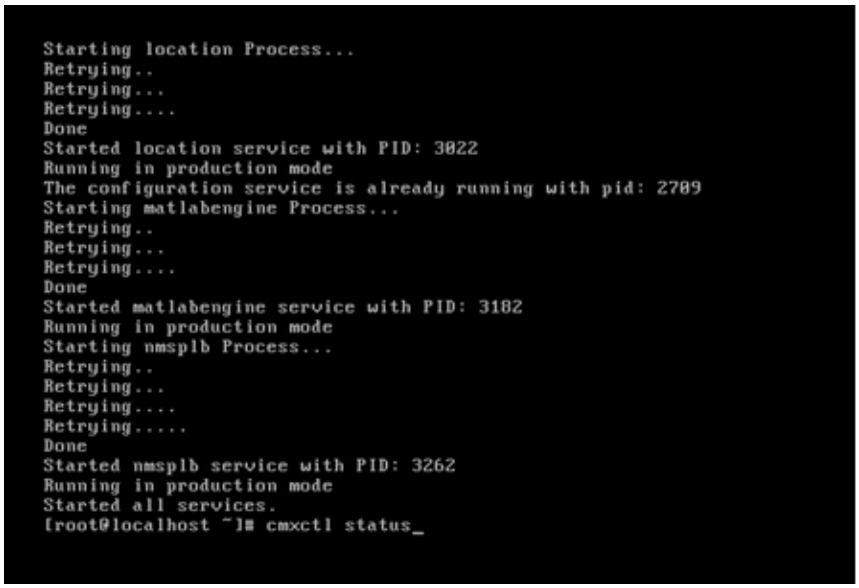
- Consul Configuration
- DB Installation
- Schema Migration
- InfluxDB Configuration
- Cassandra Installation
- Node Registration



Step 5 Press Enter for "OK" to complete the installation and start all the Cisco MSE services.



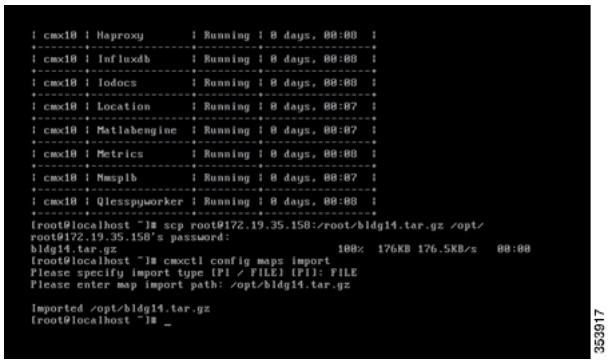
Step 6 Enter the **cmxctl status** command to verify that all services are up and running.



Step 7 Copy the map file from its saved location.

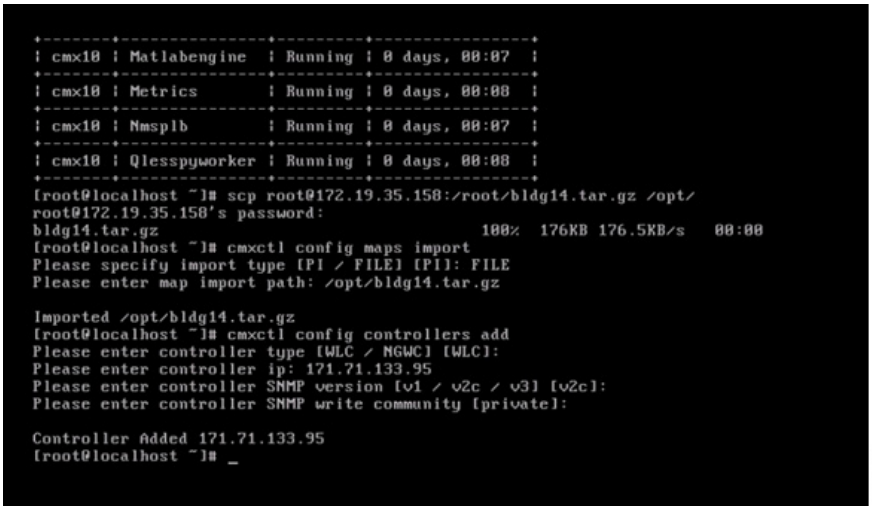
Import the map.

- Copy command: scp username@mapserver:/directory/map.tar.gz /opt/
- Installation command: cmxctl config maps import
- Import type answer: FILE
- Map import path: /opt/map.tar.gz

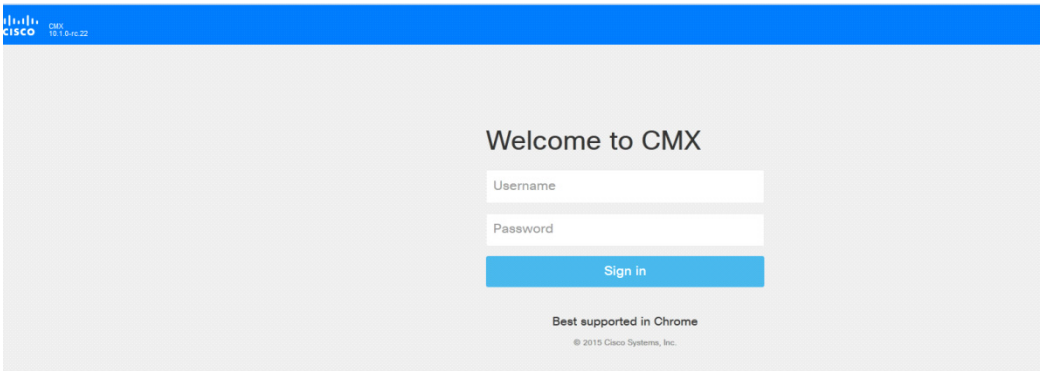


Step 8 Add the Wireless LAN Controller (WLC).

- Add controller command: cmxctl config controllers add
- Enter controller type
- Enter controller IP address
- Enter SNMP version
- Enter SNMP write community string



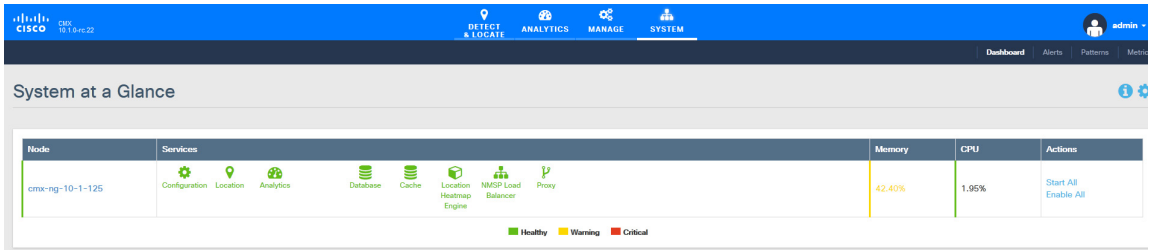
Step 9 Launch the CMX 10.1 user interface and verify the following:



- Cisco WLC and its connection status—Choose **System** > **Dashboard**. The Controller group box lists all the controllers added to the system and the active connections are shown in green color.
- Clients on the map—Click the **Locations** tab to view all clients on the map.
- Network Mobility Services Protocol (NMSP) status—Click the **System** tab to check when was the last time CMX received the NMSP message.
- Current visitor count and dwell time—Click the **Analytics** tab to verify the visitor count and dwell time.

Step 10 Configure the mail server settings to receive system notifications and alerts.

- Choose **SYSTEM** > **Dashboard** from the CMX 10.1 user interface.



- Click the **Settings** icon.

  The DEFAULT CLUSTER > SETTINGS page appears.
- Click the **Mail Server** tab.
- Enter a name for the mail server in the Name text box.
- Enter the email address in the Email Address text box.
- Enter the port number in the Port text box.
- Click **Save** to save the changes.

Verifying CMX Services

You can use the System tab of the CMX 10.1 user interface to verify overall system health including the status of CMX services.

The System tab contains four sub tabs.

- Dashboard—Provides a system at a glance view
- Alerts—Enables you to view live alerts.
- Patterns—Enables you detect patterns of various criteria such as Client Count, CPU Usage, Memory Usage, etc.
- Metrics—Enables you to view system metrics

In the Dashboard of the System tab, make sure all services, memory, and CPU have a healthy status (green) for each Cisco MSE/CMX node and there is at least one active Wireless LAN Controller.

Virtual Machine Setup and Administration

This chapter contains the following sections:

Adding a Hard Disk to a Virtual Machine in the vSphere Client

When you add a hard disk to a virtual machine, you can create a new virtual disk, add an existing virtual disk, or add a mapped Storage Area Network (SAN) Logical Unit Number (LUN).

In most cases, you can accept the default device node. For a hard disk, a non default device node is useful to control the boot order or to have different Small Computer System Interface (SCSI) controller types. For example, you might want to boot from an LSI Logic controller and use a Buslogic controller with bus sharing turned on to share a data disk with another virtual machine.

For more information, see: Add a Hard Disk to a Virtual Machine in the vSphere Client.

Configuring the Network

By default, the virtual machine uses the host network settings. Hence, there is no configuration required for Virtual Machine (VM) adapters on ESXi. If you have both public and private networks connected to the host and want the virtual machine to access to both the networks, then you must configure the VM adapters in the vSphere Client.

For more information, see: Configuring Networking for Host Machines in the vSphere Web Client.

Upgrading the Virtual Appliance

After configuring the virtual appliance, you should treat it like a physical Cisco MSE appliance. Do not deploy a new OVA every time you upgrade to the latest MSE release, instead, you can download the appropriate installer image onto the appliance and follow the steps given for upgrading the physical appliance.

Upgrading a 10.0 Deployment to 10.1

You can upgrade to 10.1, which will be the Cisco supported version of CMX by either:

1. Complete reinstallation of the new OVA.
2. Contact your local SE or Account team and get an RPM and procedure to upgrade from existing 10.0 to 10.1.

Cisco MSE Installation Commands

This appendix lists some of the MSE commands that you use while deploying the MSE virtual appliance.

MSE Installation Commands

Use these commands to install, configure, and monitor tasks while deploying the MSE virtual appliance.

Table A-1 MSE Commands

Command	Explanation
cmxctl node install	Installs MSE for the first time.
cmxctl status	Displays the status of the services.
cmxctl config maps import	Imports map from the Prime Infrastructure.
cmxctl config maps delete	Deletes the campus map.
cmxctl config controllers add	Adds controller to CMX.
cmxctl config controllers delete	Deletes the controller.
cmxctl config controllers show	Shows the controller version that has been added
cmxctl config import status	Displays status of the import
cmxctl version	Print the current MSE version information.