This document provides an overview on installing and configuring the Cisco solution to provide Cisco Unified Communications Manager (UCM) Release 8.6(1) running on VMware ESXi 5.0 on authorized compact-PCI embedded platforms.

The information provided in this document provides information on a solution that includes using non-Cisco components. Those components could change at anytime without Cisco’s knowledge. Always check with the component suppliers to verify that you have the latest information for their solution components.

This document contains the following sections:

- Solution Overview, page 1
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- Installing VMware ESXi on the cPCI Card, page 3
- Installing VMware ESXi 5.0, page 10
- Configuring VMware ESXi 5.0, page 11
- Installing Cisco UCM as a Virtual Machine, page 24
- Customer Deployment Scenarios, page 50
- Support Structure, page 51

Solution Overview

This solution contains the following components. Figure 1 represents how these components fit together.

- Cisco Unified Communications Manager Release 8.6
- VMware ESXi 5.0
Requirements

This section discusses the hardware and software requirements to load and run Cisco UCM version 8.6.1 on a compact-PCI embedded platform:

- Hardware Requirements, page 3
- Software Requirements, page 3
Solutions Guide for Cisco Unified Communications Manager on Cisco Authorized Embedded Platforms

Installing VMware ESXi on the cPCI Card

Hardware Requirements

Cisco supports Unified Communications Manager only on the platforms listed on VMware’s Hardware Compatibility List (http://www.vmware.com/resources/compatibility/search.php) and authorized by Cisco. The following compact-PCI boards are authorized embedded platforms:

**Emerson Network CPCI7203-CC or AC (conduction/air cooled):**
- CPU: Intel Core™ i7 processor operating at 2.00 GHz
- Memory: 8GB soldered ECC DDR3-800/1066
- Storage: On-Board SSD (>= 128GB conduction cooled), External SSD (>= 128GB air cooled)
- Interfaces: CPCI7203-RTM (2 USB, 1 eSATA, 2 Gigabit Ethernet (VGA replaces eSATA on conduction cooled)

2 Gigabit Ethernet ports are required. One port manages the cPCI platform as an ESXi host thru VMware vSphere client. The second port connects the Cisco UCM VM to the network. This avoids using VLAN tagging in VMware vSphere and reduces complexity.

**Extreme Engineering XPedite7332 (conduction/air cooled):**
- CPU: Intel Core™ i7 processor operating at 2.00 GHz
- Memory: 8GB DDR3-1066 ECC SDRAM
- Storage: XPort6103 On-Board SSD (128GB/256GB)
- Interfaces: XIt1033+XIt1034 RTM (5 USB(1back panel), 2 mini-HDMI, 1 eSATA, 2 Gigabit Ethernet, 1 Serial)

Software Requirements

The following software is required to implement this solution:

- Cisco Unified Communications Manager Release 8.6(1)
- Cisco Unified Communications Manager - JITC certified version
- Cisco Unified Communications Manager Open Virtualization Archive (OVA) templates
- VMware ESXi 5.0

For more information on Cisco UCM version 8.0, refer to the following URL:

Installing VMware ESXi on the cPCI Card

The following items are needed to install VMware ESXi onto the cPCI card.

- VMware ESXi 5.0 software on a CD or DVD
- AC Powered USB 2.0 Hub (non-powered USB 2.0 hubs may prevent USB devices from receiving enough power – specifically the CD/DVD drive)
- AC Powered CD/DVD USB drive
Installing VMware ESXi 5.0 on the cPCI Card

- USB Keyboard
- Monitor (Extreme => HDMI, Emerson => VGA)
- cPCI card (Extreme XPedite7332 or Emerson CPCI-7203)
- Rear Transition Module (RTM) for cPCI card (Extreme XIt1033+XIt1034 or Emerson CPCI-7203-RTM)
- Mini-HDMI connector for the video connection to the Extreme XIt1033
- Standard VGA cable for the video connection to the Emerson CPCI7203-RTM

Installing the cPCI Hardware into Chassis

Before you install the cPCI card, verify the slot location and the fit of the cPCI card and RTM. Verify that the chassis is conduction-cooled if you are using a conduction-cooled cPCI card.

Note

Refer to the cPCI card manufacture documentation for further details.

Step 1
Install the cPCI card into its designated slot on the chassis.

There is no requirement that the cards must be installed in the cPCI slot in the system cPCI slot. Typically the cPCI slot is the slot to the furthest right of the card cage – sometimes noted by red rails.

Most systems with a cPCI slot expect a cPCI system controller installed in the system cPCI slot. If your application does not place the Extreme XPedite 7332 or Emerson CPCI7203 card in the system slot, then another cPCI system controller card must be installed in the system slot. The Extreme XPedite 7332 or Emerson CPCI7203 may be used in the cPCI system slot. This may vary by manufacture, refer to the cPCI manufacture documentation for further details.

Step 2
After you inserted the cPCI card a slot, install the RTM into the corresponding slot in the rear of the chassis.

Determining the VMware ESXi 5.0 Target

Before you install VMware ESXi 5.0 onto cPCI card, you must decide which memory location you want to store VMware ESXi 5.0 installation. The following memory locations are available:

- Extreme XPedite7332 has a 8GB onboard Flash device (in BIOS this is seen as a USB DISK)
- Onboard SSD
- An external drive using the eSATA connection on the RTM (Rear Transition Module).
- The air-cooled Emerson cPCI7203 card has microSD.

Cisco testing has not revealed a VMware ESXi 5.0 performance difference between the onboard Flash, the onboard SSD, and an external HDD.

The Cisco UCM over a Virtual Machine (VM) must be installed onto the onboard SSD, if present. If no onboard SSD is available, then you can use a high quality external SSD with a eSATA connection. A high quality SSD is not available at typical mass retail stores.
Installing VMware ESXi on the cPCI Card

**Note**
The SSD must be a high quality SSD. Cisco has tested several SSDs and found that Trident, Foremay and the Extreme XPort6103 work well. Customer off the shelf solid state drives such as a Kingston 512GB SSD did not perform well when used with Cisco UCM in this solution.

**Connecting Peripherals**

After you have determined where you plan to install VMware ESXi 5.0, connect peripherals to the card (or RTM):
- Connect a monitor directly to the cPCI card (or RTM)
- Connect the USB keyboard and USB CD/DVD drive to the powered USB hub
- Connect USB hub to the cPCI card (or RTM)
- Plug an ethernet cable into the an ethernet port on the PCI or RTM

Connect the cPCI card or RTM to the network that will be used to administer the VMware ESXi host (not necessarily the Cisco UCM). This network connection will primarily be used to connect the VMware Sphere client to the host for management of the VMware ESXi host.

**Special Instructions for Installing VMware ESXi 5.0 on an Emerson cPCI Card**

Both the air-cooled and conduction-cooled versions of the CPCI7203 will not boot if the IPMI is enabled on the cards. The VMware ESXi 5.0 installation and boot process will hang at the “Loading ACPI.” status. You must disable the IPMI to install and boot VMware ESXi 5.0 on these cPCI cards.

To disable the IPMIs on the Emerson CPCI7203 conduction-cooled and CPI7203 air-cooled cPCI cards preform the flowing procedure:

**Step 1** To disable the IPMI (S64001) on the Emerson CPCPI7203 conduction-cooled cPCI card, locate the IPMI Debug Setting Connector in Figure 2
Step 2 Verify that the dip switches are set with switches 1/8, 2/7 and 4/5 as open and 3/6 as closed as shown in Figure 3 and listed in Table 1-1.

Figure 3 IPMI with Correct Placement of Dip Switches
Table 1-1  IPMI Dip Switch Settings

<table>
<thead>
<tr>
<th>Switch 1-8</th>
<th>Switch 2-7</th>
<th>Switch 3-6</th>
<th>Switch 4-5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open</td>
<td>MD2= 1</td>
<td>MD1= 1</td>
<td>BMC Normal</td>
</tr>
<tr>
<td>Closed</td>
<td>MD2= 0</td>
<td>MD1= 0</td>
<td>BMC Reset</td>
</tr>
</tbody>
</table>

**Step 3**  Go to Step 6.

**Step 4**  To disable the IPMI (S64001) on the Emerson CPCPI7203 air-cooled cPCI card, locate the IPMI Debug Setting Connector in Figure 2.

**Figure 2  Layout of Emerson CPCPI7203 Air-Cooled Card with S64001 Connector**

**Step 5**  Verify that the dip switches are set with switches 1/8, 2/7 and 4/5 as open and 3/6 as closed as shown in Figure 3 and listed in Table 1-1.
Installing VMware ESXi on the cPCI Card

**Step 6** Enable the 60/40 Emulation for the USB port.

- a. Apply power to the board and boot the cPCI card.
- b. Press the F2 key or DELETE key when the following prompt appears:
  
  Press <DEL> or <F2> to enter Setup. Press <F7> for BBS POPUP Menu.
  
- c. Go to Setup screen.
- d. Go to the Advanced tab and use the arrow keys to scroll down to select USB Configuration (Figure 3).
- e. The USB Configuration window opens.

**Figure 3 Advanced Tab**

- f. Scroll down and select Enable Port 60/64 Emulation
- g. Press either the + or - key to disable the port 60/40 emulation.
- h. Press the F4 key.
  
  The Save & Exit tab appears.

**Step 7** Scroll down to Save Changes and Reset and press the Enter key to save the changes (Figure 4).
Special Instructions for the Emerson Conduction-Cooled cPCI7203 Card

The Emerson CPCI7203 conduction-cooled cPCI cards do not have Ethernet ports on the front panel. There are only two Ethernet ports available on the RTM. You must modify the BIOS to disable the front two non-existent Ethernet ports so that the rear two Ethernet ports function correctly after installing the ESXi installation. Refer to Emerson to verify if a fix for this issue exists. If not, perform the following procedure to disable the front two Ethernet ports:

**Step 1**
Boot the board and press F2 or the Delete key to enter the BIOS Set-up.

**Step 2**
From the Main tab, choose **Chipset > South Bridge Configuration > PCI Express Configuration**

**Step 3**
In the **Express Configuration** window, select PCI Express Root Port 4 X1 - J2.

**Step 4**
Press the + or - key to disable the **PCIe Express Root Port**.

**Step 5**
The **Chipset** tab displays

```
Pci Express Root Port [Disabled]
```

**Step 6**
Press the F4 key.

The **Save & Exit** tab appears.

**Step 7**
Scroll down to **Save Changes and Reset** and press the **Enter** key to save the changes (Figure 4).

**Step 8**
Repeat Steps 1 through Step 4, except select and disable PCI Express Root Port 6 X1 - J2.

**Step 9**
The **Chipset** tab displays

```
Pci Express Root Port [Disabled]
```

**Step 10**
Reboot the board with VMware.
Installing VMware ESXi on the cPCI Card

Step 11 Chose Configure Management Network > Network Adapters.
Step 12 The Network Adapters screen displays only two Ethernet ports connected to the network after you installed VMware ESXi 5.0.

Initially Booting the Hardware

Once you have connected the peripherals to the cPCI card, you can power on the card on and boot it.

To boot the system, perform the following procedure:

Step 1 Verify that the CD/DVD drive has power and insert the VMware ESXi 5.0 installation disk into the drive.
Step 2 Apply power to the cPCI card, and enter BIOS mode by press the following keys:
   - Extreme XPedite 7332: F2 or S
   - Emerson CPCI7203: F2
Step 3 Set the BOOT priority to boot from the CD/DVD.
Step 4 If the card continues to boot without going into BIOS, power the card off and back on and try again.
Step 5 Once the Main BIOS menu appears select the BOOT tab to go to the Boot Options menu.
Step 6 Scroll down and select Advanced Booting Option.
Step 7 In the Boot Device Priority menu, verify that Optiarc: reads DVD RW.

Installing VMware ESXi 5.0

If the BIOS boot order is correct the VMware ESXi 5.0 installation starts from the image on the CD/DVD. The installation scans the system to discover storage, I/O, etc.

To install VMware ESXi 5.0, perform the following procedure:

Step 1 Once VMware ESXi 5.0 has finished scanning the system, a list of possible installation targets appears. Select the VMware ESXi 5.0 installation target.
   All data storage attached to the system will be discovered and formatted by the installation process.

Caution

Any existing data on attached storage will be lost during the installation process.

Step 2 Select where you want VMware ESXi 5.0 to be installed.
Cisco recommends the one of the following locations:
- Onboard Flash if available (Extreme XPedite 7332=>USB DISK)
- Onboard SSD if available
- External SSD via eSATA connection
Installing VMware ESXi on the cPCI Card

Note
The SSD must be a high quality SSD. Cisco has tested several SSDs and found that Trident, Foremay and the Extreme XPort6103 work well. Customer off the shelf solid state drives such as a Kingston 512GB SSD did not perform well when used with Cisco UCM in this solution.

Step 3
After you selected the install target, VMware ESXi 5.0 begins the installation process. A progress bar displays for monitoring of installation progress. Under normal circumstances, a VMware ESXi 5.0 installation will complete in less that 10 minutes.

Step 4
After installation has completed, you must reboot the system. Be sure to remove the VMware ESXi 5.0 install CD/DVD from the drive prior to rebooting.

Note
Some drives automatically open when the system reboots.

Step 5
Depending on your system, you may have to return into BIOS to set the BOOT priority to VMware ESXi 5.0. In most cases this is not required. It is required if VMware ESXi 5.0 has been installed to onboard Flash (USB DISK) of the Extreme Xpedite 7332 cPCI card. You must set the USB DISK as the first BOOT option (highest priority). Once this priority is set, you should not have to change it again.

Tip
The System Integrator (SI) or Reseller is responsible for correct licensing of the VMware ESXi 5.0 host and any VMware applications.

Configuring VMware ESXi 5.0

After VMware ESXi 5.0 has been installed and initially rebooted, you can configure the system. The goal of this configuration is to get the cPCI card (now an VMware ESXi host) onto the network so it can be managed using the VMware vSphere client (or VMware vCenter).

This sections contains the following topics:
- Logging Into the VMware ESXi Host, page 11
- Configuring the Network Adapters, page 12
- Configuring the IP Address, page 14
- Configuring the DNS Server, page 15
- Testing the Network Management Configuration, page 15

Logging Into the VMware ESXi Host

After the reboot, the VMware ESXi 5.0 Login screen appears listing the current version of VMware ESXi 5.0, the hostname, and the configured network IP address.
Your options at this screen are to log into a VMware ESXi 5.0 host by pressing the F2 key, or you can shut down the system by pressing the F12 key.

The initial login is root with no password. Enter the login name as root, and press the Enter key.

Configured Keyboard (Default)
Login Name: root
Password: <Enter>

After logging in as root, the System Customization menu opens (Figure 5). These menu options allow you to configure the VMware ESXi host as needed for your environment.

For this solution, the VMware ESXi host is minimally configured with only an IP address, network mask, default gateway, and the DNS server IP address with the hostname of the VMware ESXi host.

### Figure 5 System Customization Menu

<table>
<thead>
<tr>
<th>System Customization</th>
</tr>
</thead>
<tbody>
<tr>
<td>Configure Password</td>
</tr>
<tr>
<td>Configure Lockdown Mode</td>
</tr>
<tr>
<td><strong>Configure Management Network</strong></td>
</tr>
<tr>
<td>Restart Management Network</td>
</tr>
<tr>
<td>Test Management Network</td>
</tr>
<tr>
<td>Restore Network Settings</td>
</tr>
<tr>
<td>Restore Standard Switch</td>
</tr>
<tr>
<td>Configure Keyboard</td>
</tr>
<tr>
<td>Troubleshooting Options</td>
</tr>
<tr>
<td>View System Logs</td>
</tr>
<tr>
<td>View Support Information</td>
</tr>
<tr>
<td>Reset System Configuration</td>
</tr>
</tbody>
</table>

### Configuring the Network Adapters

**Step 1** From the System Customization menu, use the arrow keys to highlight Configure Management Network.

**Step 2** Press the Enter key.

**Step 3** The Configure Management Network menu opens (Figure 6).
Step 4 Use the arrow key to highlight Network Adapters.

Step 5 Press the Enter key.

The Network Adapters menu opens (Figure 7).

Step 6 Use the arrow keys to highlight the network adapter(s) you want to use for the host default management network.

Step 7 Press the Space key to select a network adapter. An X appears besides the Device Name.
Installing VMware ESXi on the cPCI Card

Step 8 Press the Enter key to save the configuration.

Step 9 Press the Esc key to return to the Configure Management Network menu.

Configuring the IP Address

Step 1 From the Configure Management Network menu, use the arrow key to highlight IP Configuration for an IPv4 network or IPv6 Configuration for an IPv6 network.

Step 2 Press the Enter key.

Step 3 The IP Configuration menu opens (Figure 8).

Figure 8 IP Configuration Menu

This host can only obtain settings automatically if your network includes a DHCP server. If it does not, the following settings must be specified:

( ) Use dynamic IP address and network configuration
(o) Set static IP address and network configuration:

<table>
<thead>
<tr>
<th>IP Address</th>
<th>172.18.153.79</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subnet Mask</td>
<td>255.255.255.0</td>
</tr>
<tr>
<td>Default Gateway</td>
<td>172.18.153.1</td>
</tr>
</tbody>
</table>

Step 4 Use the arrow keys to highlight the row that corresponds to the type of IP address for the cPCI card: dynamic IP addressing or static IP addressing.

Step 5 Press the Space key to select the IP addressing type. An X appears besides the IP addressing type.

Step 6 Press the Enter key to save the configuration.

Step 7 If your network has a DNS server and you selected dynamic IP addressing, then the cPCI card can obtain the IP addresses automatically.

If your network does not have a DNS server, enter the IP Address, Subnet Mask, and Default Gateway.

Step 8 Press the Enter key to save the configuration.

Step 9 Press the Esc key to return to the Configure Management Network menu.
Configuring the DNS Server

Step 1  From the **Configure Management Network** menu, use the arrow key to highlight **DNS Configuration**.

Step 2  Press the **Enter** key.

Step 3  The **DNS Configuration** menu opens (**Figure 9**).

**Figure 9  DNS Configuration Menu**

---

This host can only obtain DNS settings automatically if it also has its IP configuration automatically.

( ) Obtain DNS server addresses and a hostname automatically
(o) Use the following DNS server addresses and hostname:

<table>
<thead>
<tr>
<th>Primary DNS Server</th>
<th>64.182.6.247</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternate DNS Server</td>
<td>cucm1-4-host.cisco.com</td>
</tr>
</tbody>
</table>

<Up/Down> Select   <Space> Mark Selected   <Enter> OK   <Esc> Exit

---

Step 4  If you configured the cPCI card to with dynamic IP addressing, use the arrow keys to highlight **Obtain DNS server addresses and a hostname automatically**.

The cPCI card automatically obtains the DNS servers IP address and a host name from the DNS server.

Step 5  Go to Step 9.

Step 6  If you configured the cPCI card to static IP addressing, use the arrow keys to highlight **Use the following DNS server addresses and hostname**.

Step 7  Enter the IP addresses for the **Primary DNS Server** and **Alternate DNS server**.

Step 8  Enter a **Hostname**.

Step 9  Press the **Enter** key to save the configuration.

Step 10  Press the **Esc** key to return to the **Configure Management Network** menu.

Step 11  Press the **Esc** key to return to the **System Customization** menu.

---

Testing the Network Management Configuration

The **Test Management Network** utility on the **System Customization** menu tests network connectivity. Verify that the network configuration you entered passes before you connect to the cPCI card using VMware vSphereClient.
To run the **Test Management Network** utility, use the arrow keys to scroll down and highlight **Test Management Network** in the **System Configuration** screen, and press **Enter**.

### Managing the VMware ESXi Host with VMware vSphere Client

After the host has been configured and placed on the network, you can manage it using the VMware vSphere Client. VMware vSphere Client is the administrative GUI that VMware provides to manage a single host directly or multiple hosts (using VMware vCenter server). Using VMware vSphere Client, you can create or delete virtual machines (VMs), deploy VM templates, monitor the ESXi hosts, and monitor the virtual machines performance. For more information, refer to VMware’s web site.

This sections contains the following procedures:

- **Installing VMware vSphere Client**, page 16
- **Adding a Host to the vCenter**, page 16
- **Troubleshooting Slow TCP Performance**, page 23

### Installing VMware vSphere Client

VMware vSphere Client is a Microsoft Windows™ application. You can download it from VMware.com or directly from a configured ESXi host.

To download VMware vSphere Client from a configured ESXi host, connect to the ESXi host using a Web browser. Follow the instructions on the ESXi main screen to download and install VMware vSphere Client to your Microsoft Windows system.

After you have installed VMware vSphere Client, you can use it to connect directly to the ESXi host and install the tools necessary to manage the ESXi host. VMware vSphere Client adds the ESXi host to the inventory and can then be managed using VMware vSphere Client.

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**Tip**

VMware software and use of ESXi hosts, VMware vSphere, and VMware vSphere Client are licensed to and the responsibility of the System Integrator or Reseller.

While an ESXi host can be managed using just VMware vSphere Client, VMware vCenter Server has advanced features not available in VMware vSphere Client. VMware vCenter Server can manage multiple ESXi hosts and provide advanced datacenter features such as Dynamic Resource Scheduling (DRS), High Availability (HA), vMotion, and Storage vMotion.

VMware vCenter Server requires a 64-bit server running Microsoft Windows and has more features than VMware vSphere Client. You can get more information about and download it from VMware.com This solution assumes that you have downloaded either VMware vSphere Client or VMware vCenter Server and it is installed and licensed correctly.

### Adding a Host to the vCenter

Use the following procedure to connect to a VMware vCenter and add an ESXi host:

**Step 1** Double-click the **VMware vSphere Client** icon to start the application.
Step 2  In the **Login** dialog box (Figure 10), enter the name of VMware vCenter server or EXSi host or IP address, the user name and password.

Step 3  Click the **Login** button.

*Figure 10  VMware vSphere Client Login Dialog Box*

The VMware vSphere Client open (Figure 11).
Once connected to the vCenter, you can add an ESXi host to a datacenter.

**Note** There are usually multiple methods to accomplish the same task in the VMware vSphere Client. This document will discuss only one method. Refer to the VMware vSphere Client documentation for more information on VMware vSphere Client and vCeter.

**Step 4** To add a host, choose **Inventory** > **Datacenter** > **Add Host**.

The **Add Host Wizard** window opens (Figure 12).
Installing VMware ESXi on the cPCI Card

**Figure 12** Add Host Wizard Window

**Step 5** Enter the name or IP address of the ESXi host you want to add to the network in the **Host** field.

**Step 6** Enter the user name and password for the administrator in the **Authorization** area.

**Step 7** Click the **Next** button.

**Step 8** If VMware vSphere Client can reach the host on the network, the **Security Alert** dialog box opens (Figure 13). Click the **Yes** button to trust the ESXi host.

If VMware vSphere Client cannot reach the host on the network, log into the ESXi host to check the network setting and make sure the **Test Management Network** utility passes.

**Figure 13** Security Alert Dialog Box

After VMware vSphere has collected the ESXi host information, the host information populates the **Add Host Wizard** window (Figure 14).
If any other virtual machines (VMs) exist on the ESXi host, **Add Host Wizard** window displays that host information.

**Figure 14   Add Host Wizard Dialog Box with Host Information**

![Add Host Wizard dialog box](image1.png)

**Step 9**   Click the **Next** button and the **Assign License** area displays in the **Add Host Wizard** window (Figure 15).

**Figure 15   Add Host Wizard Window with Assign License Information**

![Assign License dialog box](image2.png)

**Step 10**   If you have an existing license you want to assign to the ESXi host, click the **Assign an existing license key to the host** radio button and select the license you wish to apply to the ESXi host.

**Step 11**   If you wish to assign a new license to the ESXi host, click the **Assign a new license to this host** radio button and enter the license information.
Step 12  Click the **Next** button.
The **Configure Lockdown Mode** information appears in the **Add Host Wizard** window (Figure 16)
Lockdown mode VMware prevents the ESXi host from being managed directly by VMware vSphere 
Client. The ESXi host can be managed from only the console port or VMware vCenter server.

Step 13  Check the **Enable Lockdown Mode** box if you want Lockdown mode enabled for the ESXi host.

*Figure 16  Add Host Wizard Configure Lockdown Mode*

Step 14  Click the **Next** button to display the **Virtual Machine Location** information in the **Add Host Wizard**
window (Figure 17)

Step 15  Select the data center location from the list presented.
Installing VMware ESXi on the cPCI Card

Step 16  Click the Next button.

The Add Host Wizard window displays the summary information for the ESXi host you just entered (Figure 18).

Figure 17  Add Host Wizard with Virtual Machine Location Information

Step 17  Click the Finish button if the summary is correct.

If the information is not correct, click the Back button to make any changes.

VMware vCenter contacts the ESXi host and adds the host to the VMware vCenter (Figure 19).
Troubleshooting Slow TCP Performance

If you notice that the Cisco UCM VM is experiencing very slow TCP performance – especially when downloading an upgrade file from an SFTP server, then the most likely cause is a TCP setting in VMware vSphere called a Large Receive Order (LRO). If LRO is enabled, then you need to disable it. This issue has been seen in only ESXi 4.1 and it may or may not be an issue in ESXi 5.0.

For more information on this issue, see the following URL: [http://docwiki.cisco.com/wiki/Disable_LRO](http://docwiki.cisco.com/wiki/Disable_LRO)

To disable a LRO, follow this procedure:

**Step 1** Log into the ESXi host or the corresponding VMware vCenter with VMware vSphere Client.

**Step 2** Select the host and then choose **Software:Advanced Settings** from the **Configuration** menu.

**Step 3** Select **Net** and scroll down slightly more than half way.

**Step 4** Change the following parameters from 1 to 0:

- Net.VmxnetSwLROSL
- Net.Vmxnet3SwLRO
- Net.Vmxnet3HwLRO
- Net.Vmxnet2SwLRO
- Net.Vmxnet2HwLRO

**Step 5** Reboot the ESXi host to activate the changes.
After rebooting the ESXi host, VMs should have normal TCP networking performance.
For additional information, refer to the following KB (Knowledge Base) article on the VMware website:
VMware-KB1027511

Installing Cisco UCM as a Virtual Machine

Installing Cisco UCM as a virtual machine is documented on Cisco.com. You must install a virtual machine before you install Cisco UCM software onto the virtual machine.

This section contains the following sections:
• Creating a Cisco UCM Network, page 24
• Deploying the Cisco UCM OVA Template, page 30
• Installing Cisco UCM, page 38

Cisco UCM comes as an ISO file and can be installed by more than one method. These installation methods only vary by how you attach the Cisco UCM installation image to the VM. After you install the VM, installing Cisco UCM itself does not vary. This application discusses the following three possible methods to install Cisco UCM:
1. Use CD/DVD media directly connected to the ESXi host by a USB connection on the RTM.
2. Upload the ISO file to a datastore that is accessible through the VMware vCenter to which the ESXi host is managed.
3. Use a remotely mounted CD/DVD on a laptop (or some other network server) running VMware vSphere (or VMware vCenter) which is managing the ESXi host.

Regardless of how you install Cisco UCM, the OVA template must be used to receive support for the Cisco UCM. The OVA template describes the amount of CPU, RAM, disk space, and other attributes of the Cisco UCM virtual machine. Cisco OVA template align the VM disk partitions, which is crucial for performance and VM stability.

Creating a Cisco UCM Network

Before you deploy Cisco UCM template, a network must be defined in VMware vSphere. A network is the mapping of the physical NIC to the virtual switch assigned to the Cisco UCM VM.

Perform the following procedure to create a Cisco UCM network (VMnic):

Step 1 Determine which interface you plan to use for the Cisco UCM network interface.
This interface is usually not the same Ethernet interface used to manage the ESXi host (although it can be using VLANs - beyond the scope of this document).

Step 2 Select the ESXi host in the left pane and click on the Configuration tab.

Step 3 Click on Network Adaptors in the Hardware pane.
The Network Adapters pane lists the available ESXi vmnics (Figure 20).
Step 4  Select the vmnic device that you want to use.

Step 5  Click on Networking in the Hardware pane.

A logical diagram of the ESXi host management network displays in the Networking pane (Figure 21). This pane may be empty.
You need to create a network to use the VMnic for Cisco UCM

**Step 6**

Add a VMnic to the ESXi host management network by clicking **Add Networking**... in the **Network Adaptors** tab.

The **Add Network** wizard opens (Figure 22).
Step 7  Click the Virtual Machine radio button.

Step 8  Click the Next button.

The available physical ports displaying the right pane (Figure 23)

Step 9  Check the check box that corresponds to the VMnic for the physical port of the vSwitch.
Installing Cisco UCM as a Virtual Machine

**Step 10**  Click the **Next** button.

**Step 11**  The **Port Group Properties** display (Figure 24)

*Figure 24  Add Network Wizard - Port Group Properties*

![Add Network Wizard - Port Group Properties](image)

**Step 12**  Enter the name of the network in the **Network Label** field.

**Step 13**  Enter a **VLAN identifier** in the VLAN ID field if your deployment uses VLAN identifiers.

**Step 14**  Click the **Next** button.

A logical drawing of the VM port group connected to the physical adapter displays (Figure 25).
Step 15  If the network is correct, click the **Finish** button to add the network to the VMware vSphere (Figure 26). If the network is incorrect, use the **Back** button to make changes.

*Figure 26  VMware vSphere Standard Switch Configuration*
Installing Cisco UCM as a Virtual Machine

Deploying the Cisco UCM OVA Template

The procedure for deploying a Cisco UCM OVA template is described briefly in this document. This solution requires Cisco UCM OVA templates Release 8.6.1 with the filename: cucm_8.6_vmv7_v1.5.ova. For more information on Cisco UCM OVA templates or to download this template file, refer to the following URLs:

http://docwiki.cisco.com/wiki/Unified_Communications_Virtualization_Downloads_(including_OVA/OVF_Templates)


A virtual machine template defines the configuration of the virtual machine's virtual hardware. Open Virtualization Format (OVF) is an open standard for describing a virtual machine template, and Open Virtualization Archive (OVA) is an open standard to package and distribute these templates. Files in OVA format have an extension of ".ova".

The template defines certain aspects of the VM depending on the relative size of the deployment. You need to supply information on the size (number of users) during the template deployment via VMware vSphere. This question is critical as hard drive size, number of CPU’s and RAM are configured according to your input. In the case of cPCI card deployments, there is a limited amount of these resources. The target deployments are small and therefore the smallest deployment size is appropriate.

Note

The solution presented in this document has only been thoroughly tested with sizes up to 250 users. This is of important if other applications are running on the cPCI card solution at the same time as Cisco UCM.

Perform the following procedure to deploy the Cisco UCM OVA template:

**Step 1**
From the VMware vSphere Client, select **Deploy OVF Template...** from the **File** menu.

The **Deploy OVF Template Wizard** opens

Click the **Browse** button.

**Step 2**
Navigate to and select the OFV template.

**Step 3**
Click the **OK** button.
The URL or filename path displays in the filename field (Figure 27).

Figure 27  Deploy OVF Template Wizard

Step 4 Click the Next button.

Step 5 The Deploy OVF Template wizard displays details of the template (Figure 28).

Step 6 Verify that the OVF template details are correct.

If the OVF template details are incorrect, click the Back button to select a different template file.
Installing Cisco UCM as a Virtual Machine

Figure 28  Deploy OVF Template Wizard - OVF Template Details

Step 7  Click the Next button.

Step 8  The wizard displays the name and location of the template (Figure 29).

Step 9  Enter a unique name for the VM.
Step 10 Click the Next button.

The wizard displays information on the Deployment Configuration (Figure 30).

Step 11 Select the size of the deployment by clicking the drop-down arrow next to the Configuration field.
Installing Cisco UCM as a Virtual Machine

Figure 30  Deploy OVF Template Wizard - Deployment Configuration

Step 12  Click the Next button.

The wizard displays information about the disk format (Figure 31).

Step 13  Click the Thick Provision radio button.

The solution presented in this document supports only thick provisioning.
Step 14  Click the Next button.

The wizard displays information about the network mapping (Figure 32).

Step 15  Select the **Source Network** and **Destination Networks** for the OVF template.

**Note**  The networks must be created and named before you deploy the template.
Step 16  Click the Next button.

The wizard displays information a summary of the deployment settings (Figure 33).

Step 17  Verify that the deployment settings are correct.

If the deployment settings are incorrect, click the Back button to make changes.
Step 18 Click the Next button.

The Deploying Cisco Unified Communications Manager dialog box opens to display the status of the deployment (Figure 34).

Figure 34 Deploying Cisco Unified Communications Manager Dialog Box
When the deployment has completed, the **Deployment Completed Successfully** dialog box open (Figure 35).

**Step 19**  
Click the **Close** button to close the **Deployment Completed Successfully** dialog box.

**Figure 35**  
**Deployment Completed Successfully Dialog Box**

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**Installing Cisco UCM**

Once the VM deployment is complete, you can now install Cisco UCM on the VM. This document outlines three methods for installing Cisco UCM:

- **Installing Cisco UCM: Method 1, page 38**  
  This method uses a CD/DVD containing the Cisco UCM image.

- **Installing Cisco UCM: Method 2, page 42**  
  This method installs Cisco UCM from an ISO mounted image.

- **Installing Cisco UCM: Method 3, page 47**  
  This method has the VM configured to boot from a remote DVD running VMware vSphere and managing the ESXi host.

**Installing Cisco UCM: Method 1**

This method requires a CD/DVD containing the Cisco UCM image and a USB connection to the RTM attached to the cPCI card. Use and AC powered USB and AC powered CD/DVD drive. Testing has revealed a vast array of variances in non-powered USB devices. The cPCI cards may not have enough power to drive USB hubs, keyboards and especially CD/DVD drives.

Perform the following procedure to install Cisco UCM onto the VM using method 1:

**Step 1**  
Attach the CD/DVD drive to the USB hub and cPCI RTM **before** booting the cPCI chassis and cards.

This ensures that the CD/DVD drive is seen by VMware, can be attached to the VM, and that the actual Cisco UCM DVD is available and installs correctly after the cPCI card has booted VMware ESXi 5.0. If you install the DVD to the ESXi host before booting the cPCI card, the system will attempt to install Cisco UCM.

**Step 2**  
Change the settings on the VM so that it mounts and boots from the CD/DVD drive.

a. From the main VMware vSphere Client window, right click on the ESXi host you want to install Cisco UCM on, and choose **Edit Settings** from the menu.
The Cisco Unified Communications Manager (CUCM) - Virtual Machine Properties window opens (Figure 36).

**Figure 36  Cisco Unified Communications Manager (CUCM) - Virtual Machine Properties**

b. Change the CD/DVD drive settings to point to the USB attached CD/DVD with the Cisco UCM installation software.

   Check the **Connect at power on** check box.
   
   Select the ESXi host in the left pane.
   
   Click the **Host Device** radio button and select the ESXi host path.

c. Click the **OK** button to save the changes and return to the VMware vSphere main window (Figure 37).
InstallingCiscoUCMas aVirtualMachine

Figure 37 VMware vSphere Client Main Window

From this point, the installation process is very similar as installing from a physical server.

Note
When using a virtual Cisco UCM, there are changes in licensing agreements. For more information refer to the following URL:

Step 3 Open a console window to watch and interact with the installation process.
Right-click on the ESXi host, and choose Open Console from the menu.
A Console window opens (Figure 38).
Installing Cisco UCM as a Virtual Machine

Figure 38 VMware vSphere Client Console Window

Step 4 Power on ESXi host by choosing **VM>Power>Power** in the **Console** window. The **DVD Found** dialog box appears (Figure 39).

Step 5 Click the **Yes** button.

Figure 39 DVD Found Dialog Box

Installing Cisco UCM: Method 2

This method involves using a mounted ISO image to install Cisco UCM. The difference between this method and Method 1 is the location of the ISO image. In Method 2, the Cisco UCM installation ISO image has been uploaded to a datastore on the cPCI card itself or another datastore, managed by the same VMware vCenter as the cPCI ESXi host.

You need to upload the Cisco UCM installation ISO to a datastore. A datastore can be either a location available to an ESXi host managed by a central VMware vCenter or the ESXi host itself. Loading the image to either location is the same process.

Perform the following procedure to install Cisco UCM onto the VM using method 2:

**Step 1**
From the main VMware vSphere window, click on Storage in the Hardware pane (Figure 40).

![Figure 40 VMware vSphere Client - Storage Information](image)

**Step 2**
Select the datastore where you want to install the Cisco UCM image (Figure 41).
Installing Cisco UCM as a Virtual Machine

Step 3  Click on Browse this datastore under Basic Tasks in the Getting Started tab. The Datacenter Browse window opens (Figure 42).

Figure 42  Datacenter Browser Window

Step 4  Click on the Upload icon in the toolbar and select Upload File from the menu. The Upload Items window opens (Figure 43).
Installing Cisco UCM as a Virtual Machine

**Figure 43  Upload Items Window**

![Upload Items Window](image)

**Step 5** Navigate to and select the Cisco UCM Installation ISO you want to upload.

**Step 6** Click the Open button.

The Upload Items window closes and VMware vSphere uploads the file to the datastore.

**Step 7** Mount the ISO file to the VM by right-clicking on the VM and select **Edit Settings** from the menu.

The Cisco Unified Communications (CUCM) - Virtual Machine Properties window opens (Figure 44).
Figure 44  Cisco Unified Communications (CUSM) - Virtual Machine Properties

Step 8  Select CD/DVD from the Hardware pane.

Step 9  Check the Connect at power on checkbox.

Step 10  Click the Datastore ISO file radio button in the Device Type area and click the Browse button. The Browse Datastores Window opens (Figure 45).

Figure 45  Browse Datastores Window

Step 11  Navigate to the datastore and select the ISO file you want to use.

Step 12  Click the OK button.
Installing Cisco UCM as a Virtual Machine

The **Browse Datastores** window closes and the file name populates in the **Datastore ISO file** field in the **Cisco Unified Communications (CUCM) - Virtual Machine Properties** window.

**Step 13**

Click the **OK** button to save the changes to the VM and return to the **VMware vSphere** main window.

Upon completing the reconfiguration, the VM to use the ISO image on the datastore, the remainder of the installation procedure is the same as Method 1.

**Note**

When using a virtual Cisco UCM, there are changes in licensing agreements. For more information refer to the following URL:


**Step 14**

Open a console window to watch and interact with the installation process.

Right-click on the ESXi host, and choose **Open Console** from the menu.

A Console window opens (**Figure 46**).

**Figure 46** VMware vSphere Client Console Window

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**Step 15**

Power on ESXi host the by choosing **VM>Power>Power** in the **Console** window.

The **DVD Found** dialog box appears (**Figure 47**).

**Step 16**

Click the **Yes** button.
Installing Cisco UCM as a Virtual Machine

Step 17  Continue the Cisco UCM installation as described at the following URL:

Installing Cisco UCM: Method 3

This method configures the VM to boot from a remote CD/DVD drive located on the server or laptop running VMware vSphere Client (or vCenter) that manages the ESXi host. This is very handy when physical access to media is required but there is no physical access to the ESXi host.

Perform the following procedure to install Cisco UCM onto the VM using method 3:

Step 1  Verify that the Cisco UCM installation ISO is on a DVD installed on the remote server or laptop.
Step 2  Right-click on the device in the left pane, and select Edit Settings from the menu.

The Cisco Unified Communications (CUCM) - Virtual Machine Properties window opens (Figure 48).
Installing Cisco UCM as a Virtual Machine

Step 3 Select CD/DVD from the Hardware pane.

Step 4 Click the Client Device radio button in the Device Type area.

Step 5 Click the OK button to save the changes and return to the VMware vSphere main window.

Step 6 In order to connect to the remote device, you must power on the virtual machine and then click the CD/DVD button in the toolbar.

After the CD/DVD is added to the VM, the remainder of the installation procedure is the same as Method 1.

Note
When using a virtual Cisco UCM, there are changes in licensing agreements. For more information refer to the following URL:

Step 7 Open a console window to watch and interact with the installation process.
Right-click on the ESXi host, and choose Open Console from the menu.
A Console window opens (Figure 49).
Installing Cisco UCM as a Virtual Machine

Figure 49 VMware vSphere Client Console Window

Step 8  
Power on ESXi host by choosing **VM>Power>Power** in the **Console** window. The **DVD Found** dialog box appears (Figure 50).

Step 9  
Click the **Yes** button.

Figure 50 DVD Found Dialog Box

Step 10  
Continue the Cisco UCM installation as described at the following URL:  
Customer Deployment Scenarios

Figure 51 illustrate a typical customer use case, employing the Cisco 5940 Embedded Services Router and Cisco UCM on an embedded platform. The resulting solution delivers, dense, rugged communications capabilities.

This solution offers endpoints a full suite of collaboration, security and routing services in a compact, highly available, embedded package, enabling communications both between local endpoints and, when a suitable satellite or WAN connection is established, to a broader enterprise-wide community. This ability to maintain local communications, in harsh environments even without WAN connectivity, is critical to the customers and industries which employ the Embedded Services Routers and Cisco UCM on embedded hardware.

This solution employs the Cisco Service Advertisement Framework (SAF) across the remote locations and WAN network, enabling Cisco UCM locations to automatically share their dial plans without tedious full-mesh provisioning. Cisco SAF delivers the low-maintenance communications capabilities demanded by customers in these austere environments.

![Possible Customer Deployment Diagram](image-url)
Support Structure

Support for the Cisco UCM on VMware on Embedded Platforms solution will depend on the nature of the issue encountered. Support varies across the three areas of the solution. Support also depends on how the customer acquired the solution components.

System Integrator Deployments

Most deployments for this solution will occur through system integrators. The end customer works with the system integrator as the system integrator provides and supports the Cisco UCM software, VMware software, and embedded hardware, assembles the solution, and deploys it to the end customer.

In this scenario, the system integrator is the first contact point for support for the end customer. The system integrator assists with basic issues and triages more difficult issues to determine the support path. In this model the system integrator is providing Tier 1 support to the customer and serving as a broker for additional levels of support that may require contacting the individual solution component providers.

Direct Customer Deployments

Direct deployments are those that Cisco provides and supports the Cisco UCM software, but the customer provides the VMware software and embedded hardware, arranges support for both the VMware and the third party embedded hardware components, puts them together, and deploys the solution, the following three sections outline the support paths available.

Cisco UCM Issues

For issues with the Cisco Unified Communications Manager (Cisco UCM), customers can contact the Cisco Technical Assistance Center (TAC). The TAC can only assist with issues related to the Cisco UCM; they will not support third party products: VMware products and third party embedded hardware.

TAC also confirms that the Cisco UCM is deployed per the requirements outlined in this document.

If TAC determines that the issue is probably a VMware or platform issue, TAC will refer customers to VMware and/or the hardware vendors for additional support. For customers requiring a more integrated support model, deploy the solution using a system integrator as described in “System Integrator Deployments” section on page 51.

VMware Issues

For issues with VMware, contact VMware for support and utilize the support contract purchased with their VMware license.

The hardware vendors discussed in this document have undergone VMware certification for VMware’s Hardware Compatibility List (HCL). Issues with running VMware on these hardware platforms can be addressed by VMware. For customers requiring a more integrated support model, deploy the solution using a system integrator as described in “System Integrator Deployments” section on page 51.
Hardware Issues

For hardware specific issues, contact the hardware vendor directly. Support terms are dictated by the hardware vendor’s policies and/or agreements in place.