Installing ACS in a VMware Virtual Machine

This chapter describes the system requirements and installation of ACS 5.8.1 in a VMware virtual machine.

This section contains:

Virtual Machine Requirements

The minimum system requirements for the VMware virtual machine (VM) must be similar to the CSACS-1121 appliance hardware configuration.

Table 1 on page 1 lists the minimum system requirements to install ACS 5.8.1 on a VMware virtual machine.

Table 1   Minimum System Requirements

Requirement Type	Minimum Requirements
CPU	- 2 CPUs (dual CPU, Xeon, Core2 Duo or 2 single CPUs) - 2GHz CPU Speed
Memory	4 GB RAM
Hard Disk	A minimum of 60 GB is required. Maximum storage is up to 750 GB. **Note:** ACS partitions the available disk space automatically during the installation process. **Note:** It is recommended that you allocate the hard disk size to be greater than 500 GB for the secondary instance, which acts as a log collector.
NIC (Network Interface Card)	1 Gb dedicated NIC interface
Hypervisor	- VMware ESXi 5.5 - VMware ESXi 5.5 Update 1 - VMware ESXi 5.5 Update 2 - VMware ESXi 5.5 Update 3 - VMware ESXi 6.0 Update 2

Note: If you want to upgrade the ACS installed on virtual machine to ACS 5.8.1, the virtual machine disk size should be greater than or equal to 500 GB.

The disk space management mechanism in ACS 5.8.1 manages the system automatically and configures the available file volumes on the file system per file type, such as local store, logs, configuration, cache, and so on. The actual file size limits are calculated at the time of installation, based on the hard coded relative disk quota configuration (percent based), using the disk size as an input. However, ACS database logs have a fixed size. ACS 5.8.1 gets installed with a variable hard disk size between 60 GB and 750 GB, based on the disk size that was chosen while creating the VMware instance. If you want to change the size of the ACS disk after the installation, complete the following procedure:

- Back up your data.

- Reimage the ACS application or install a fresh application.

- Restore the backed up data.

While restoring the backed up data, a warning message is displayed when the backup size or ACS view database size exceeds the corresponding disk quota. However, the restore operation will not be interrupted. The restore operation fails only when the hard limit of /opt partition size is reached.

In ACS 5.8.1, the log collector server can be installed on a 60 GB disk space. An ACS view log collector node usually requires more space to maintain a database of logs and reports. Therefore, the recommended disk size for the secondary instance, which acts as a log collector server, is 500 GB.

When you allocate 60 GB for the log collector server, the view database gets only 5.8.1 GB as total disk space. As a result of this, some of the functionalities may not work properly. The functionalities that may be affected are backup, full backup, incremental backup, logging recovery, purge, database compress operation, and so on.

While creating the VMware instances, ensure that the resources allocated for VMware instances with respect to CPU cores, RAM, and disk, are not more than the actual physical resources of the VMware host server. For example, if the VMware host server has a total of 10 CPU cores, then the sum of the allocated CPU cores for all the VMware instances that are created on that server should not exceed 10.

Note: In large ACS distributed deployment environments that are hosted on the VM, it is recommended that all VM hosting servers have CPUs from the same vendor.

Note: It is recommended that if hyper threading is enabled on any one of the VMware hosts, it should be enabled on all the VMware hosts that host the ACS VM as part of the same deployment.

Note: ACS 5.8.1 does not get installed over multiple disks (by defining one Logical volume Manager [LVM] disk).

Install VMware Server

Install the VMware server with the default options and proper IP address.

Install VMware vSphere Client

The VMware vSphere client is used to access the VMware server from a remote location.

To install the VMware vSphere Client:

1. Go to the following link.

   http://*IP address of VMware server*

   You should have valid Cisco.com login credentials to access this link.

2. Click **Download** to download the VMware vSphere client software.

3. Run the installer.

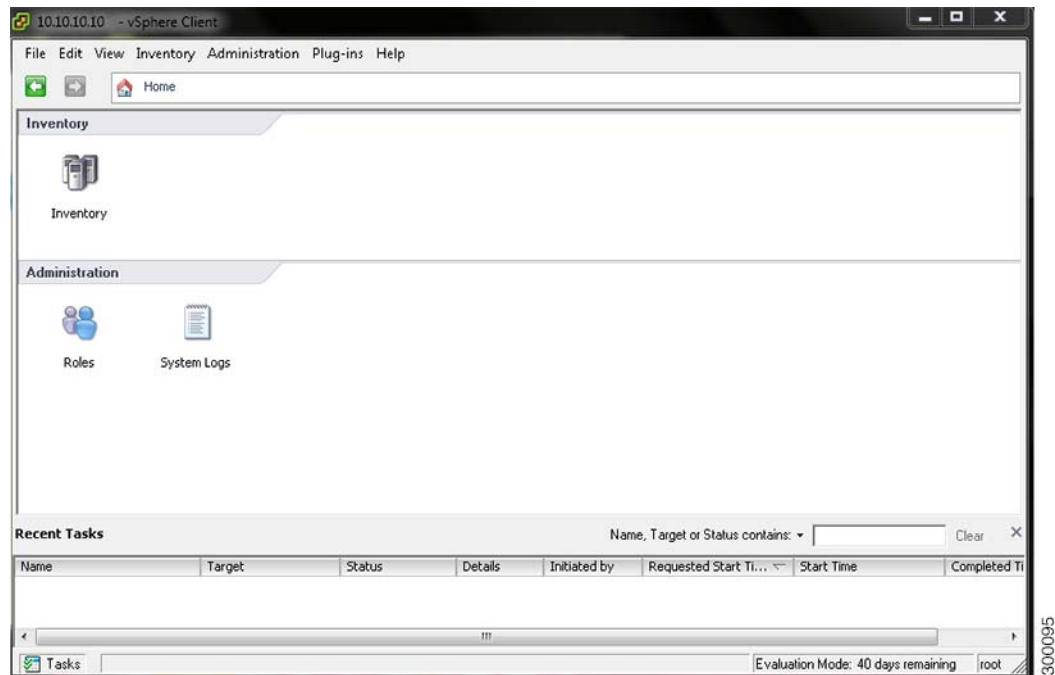**4.** Log into the VMware server.

Figure 1 on page 3 displays the login window of the VMware server.

Figure 1   Login Window

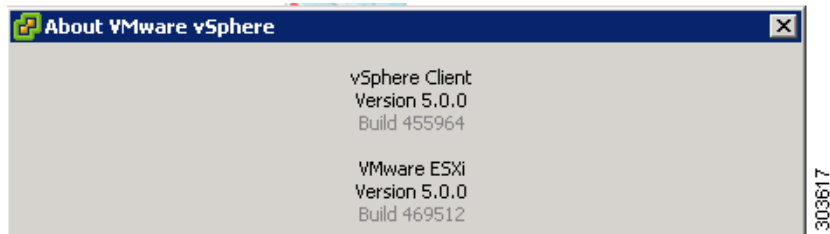The vSphere client window is displayed. (Figure 2 on page 3)

Figure 2   vSphere Client Window

5. Choose **Help** > **About VMware vSphere** to verify the VMware ESX and vSphere client versions.

Figure 3 on page 4 displays the VMware vSphere versions.

Figure 3   About VMware vSphere

Configuring the VM for ESXi 5.5 and 6.0

The host uses virtualization software such as ESX server to run the virtual machine. The host provides the CPU and memory resources to the virtual machine to access storage and to connect to the network.

This section describes the VM configuration process using the VMware vSphere Client.

To configure the VM for ESXi 5.5 and 6.0, complete the following steps:

1. Log in to the ESX server.

2. Click **Inventory**.

3. Right-click the host container on the left-pane of VMware vSphere Client and choose **New Virtual Machine**.

   The Create New Virtual Machine Wizard appears.

4. In the Configuration Type dialog box, choose **Typical** as the VM configuration, as shown in Figure 4 on page 4, and click **Next**.

Figure 4   Virtual Machine Configuration Dialog Box

The Name and Location dialog box appears. (Figure 5 on page 4)

5. Enter the name you will use to reference the VM, and click **Next**.

Figure 5   Name and Location Dialog Box

Note: Use the hostname that you will use for your VM host.

The Data Storage dialog box appears. (Figure 6 on page 5)

6. Choose a data store that has a minimum of 500 GB free space available, and click **Next**.
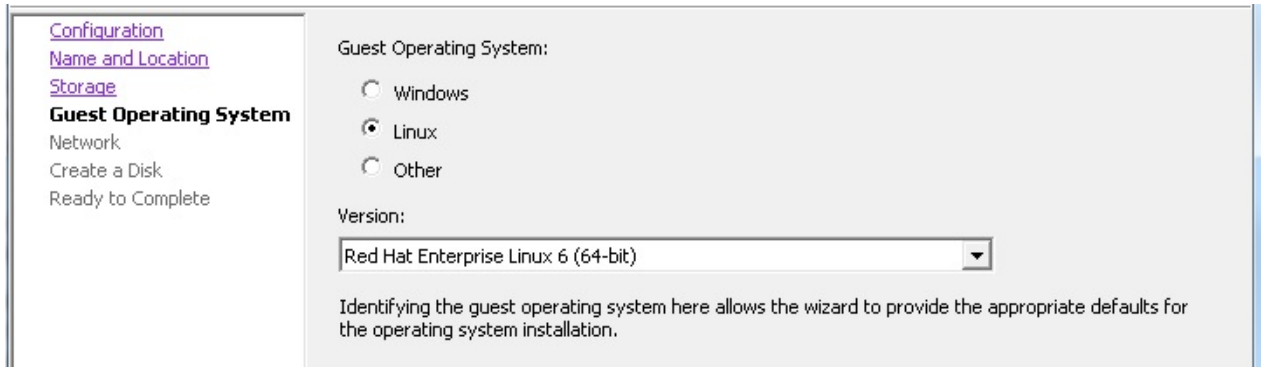
Configuring the VM for ESXi 5.5 and 6.0

Figure 6   Data Storage Dialog Box

Name	Capacity	Free	Type	Access	
[ds1]	519.75 GB	519.20 GB	VMFS	Single host	

The Guest Operating System dialog box appears. ()

7. Click the **Linux** radio button, and from the Version drop-down list, choose **Red Hat Enterprise Linux 6 (64-bit)** and click **Next**.
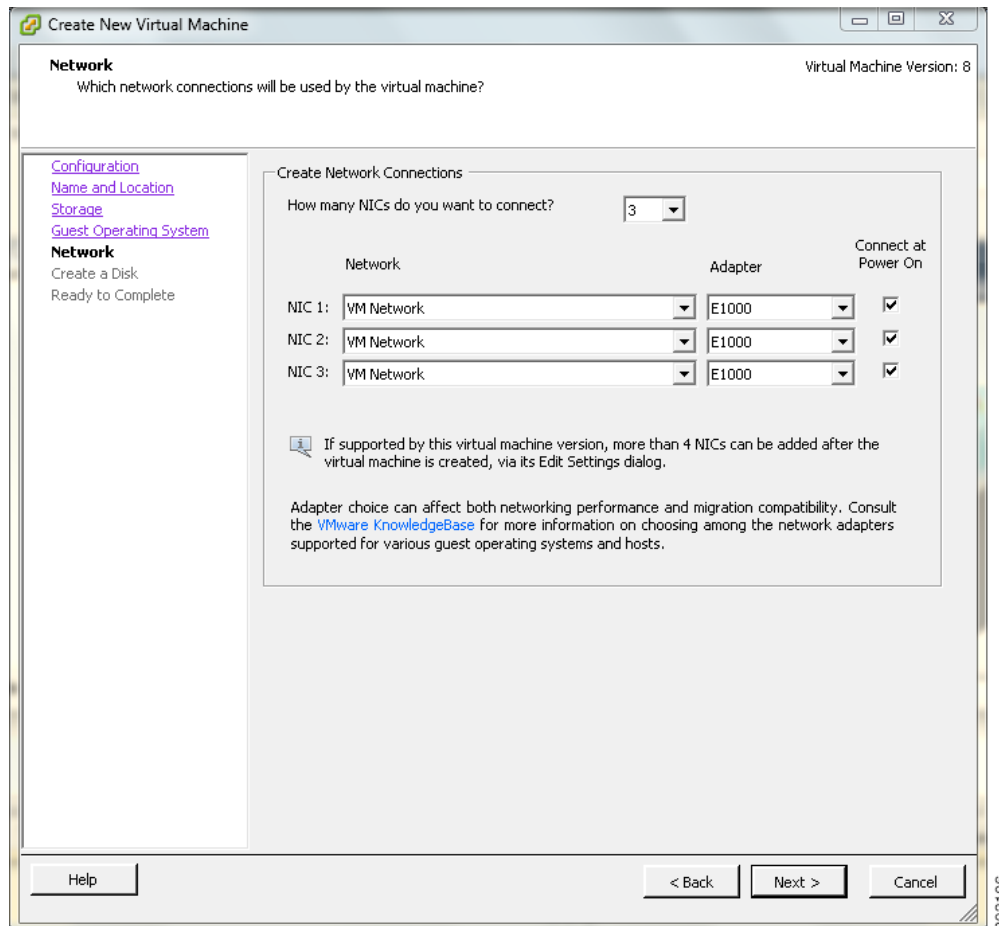
Figure 7   Guest Operating System Dialog Box

The Network dialog box appears. ()

8. Select the number of NICs that you want to use in the network window, and click **Next**. You can use up to four NICs.

   **Note:** ACS does not support VMXNET2 (Enhanced) and VMXNET3 adapters.

Figure 8   Network Dialog Box

The Create a Disk dialog box appears. ()

9. Select the disk size as 500 GB in the virtual disk capacity window, and click **Next**.

Note: You can configure the minimum virtual disk space requirement to be 60 GB. There may be a critical issue if you use 60 GB as virtual disk space. You can view the workaround in the troubleshooting section.

Figure 9   Create a Disk Dialog Box
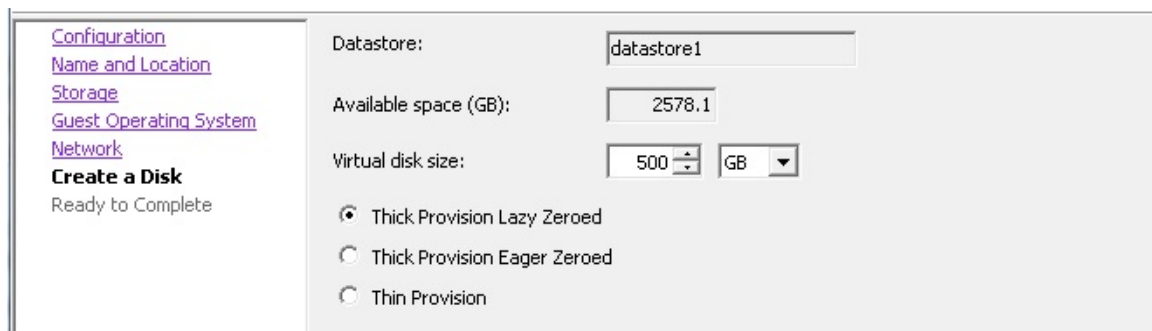
The Ready to Complete dialog box appears.

Note: Do not choose VMware thin provisioning as a storage type because ACS supports only thick provisioning on all supported VMware servers.

If ACS is installed in a VMware with thin provisioning storage type, you are recommended to:

1. Take a backup of the ACS configuration.

2. Reimage the VMware with the thick provisioning storage type.

3. Restore the backup in the newly converted thick provisioned storage VMware.

   Note: Do not over-provision hardware resources such as RAM, CPU, and disks for your virtual machines.

4. Verify the configuration details—such as Name, Guest OS, Virtual CPU, Memory, and Virtual Disk Size—of the newly created VM.

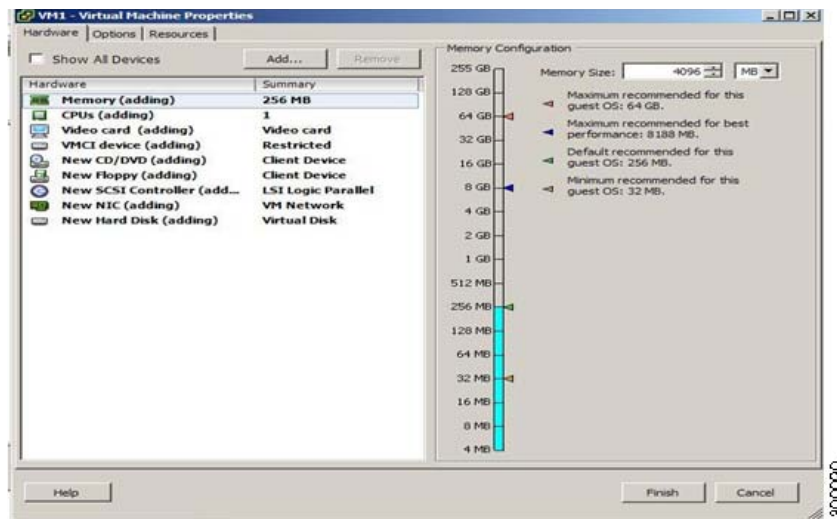**Figure 10   Ready to Complete Dialog Box**
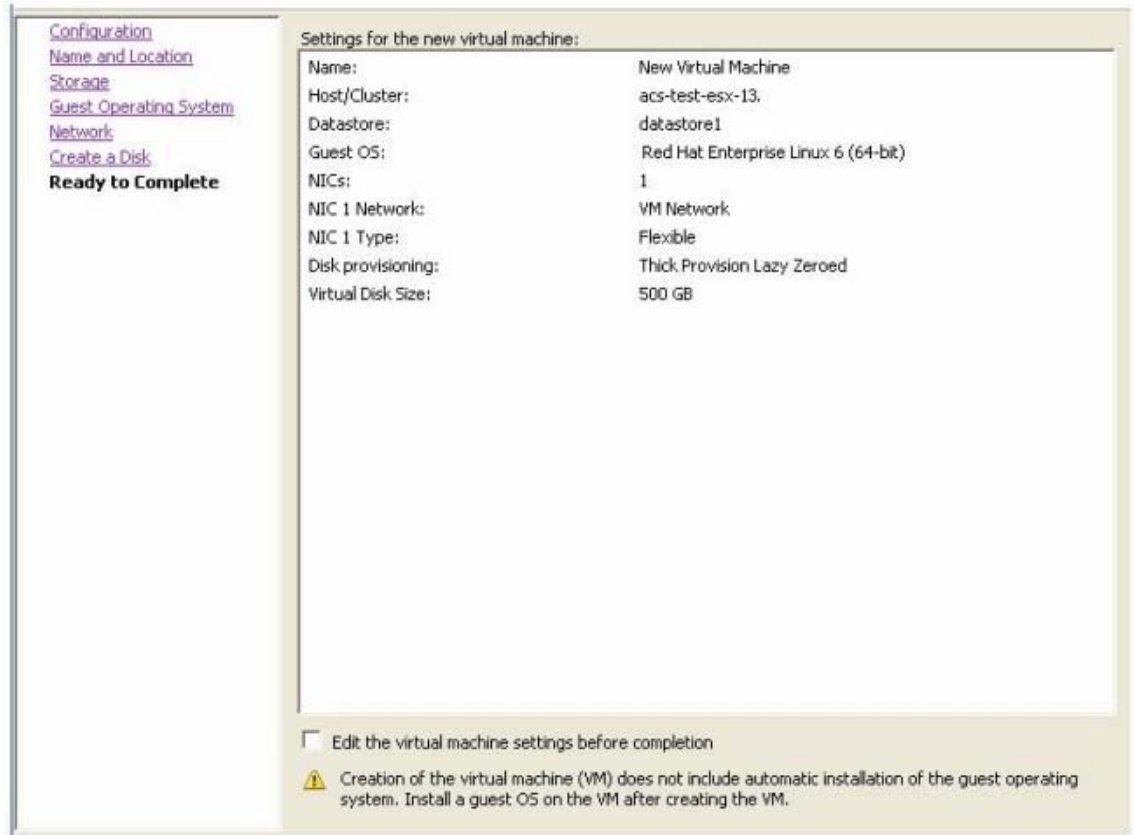
5. Check the **Edit the virtual machine settings before completion** check box, and click **Next**.

   The Memory Configuration dialog box appears. (Figure 11 on page 8)

6. Enter **4096 MB**, and click **Next**.

Figure 11   Memory Configuration Dialog Box

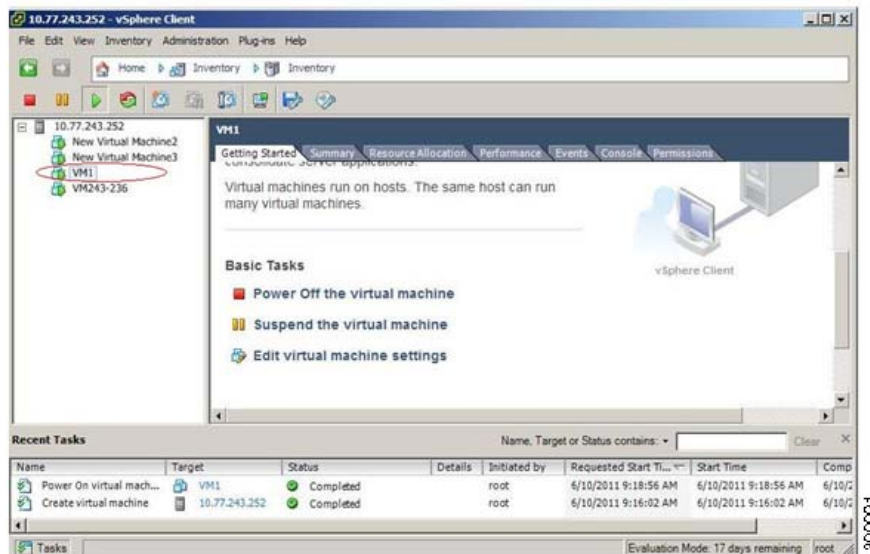The Number of Virtual Processors dialog box appears. (Figure 12 on page 8)

7. From the Number of virtual processors drop-down list, choose 2 (if 2 is available), or you can choose any number and click **Finish**.

Figure 12   Number of Virtual Processors Dialog Box

8. The virtual machine is installed and will be listed in the VMware drawer, as follows.

Figure 13   vSphere Client

Preparing the VM for ACS Server Installation

After configuring the VM, you are ready to install ACS, Release 5.8.1. To install the ACS server from your ACS Install Disk, you need to configure the VM to boot from the ACS Install Disk.

The VM must be configured with a virtual DVD drive, in order to boot from the ACS 5.8.1 DVD.

This can be performed using different methods, depending on your environment.

See Configuring the VM Using the DVD Drive, page 9 to configure the VM using the DVD drive of your VMware ESX server host.

Configuring the VM Using the DVD Drive

This section describes how to configure the VM to boot from the ACS Install Disk using the DVD drive of the VMware ESX server host.

To configure the VM using the DVD drive:

1. In the VMware vSphere Client, highlight the newly created VM, and choose **Edit Virtual Machine Settings**.

    The Virtual Machine Properties window appears. Figure 14 on page 9 displays the properties of a VM that was created with the name ACS 5.8.1.

Figure 14   Virtual Machine Properties Dialog Box
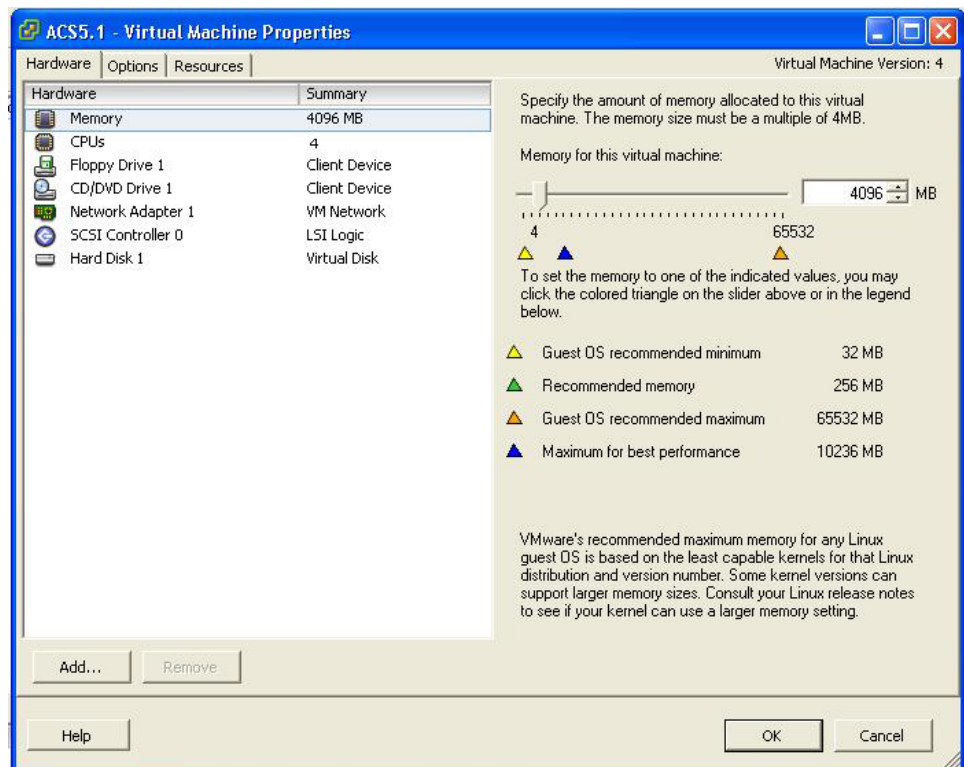
2. In the Virtual Machine Properties dialog box, choose **CD/DVD Drive 1**.

    The CD/DVD Drive 1 properties dialog box appears.

3. Choose the **Host Device** option, and from the drop-down list, choose your DVD host device.

4. Choose the **Connect at Power On** option, and click **OK** to save your settings.

   You can now use the DVD drive of the VMware ESX server to install the ACS server.

When you complete the configuration, click the **Console** tab, right-click the VM from the left pane, and choose **GUEST > Send Ctrl+Alt+Del** to restart the VM.
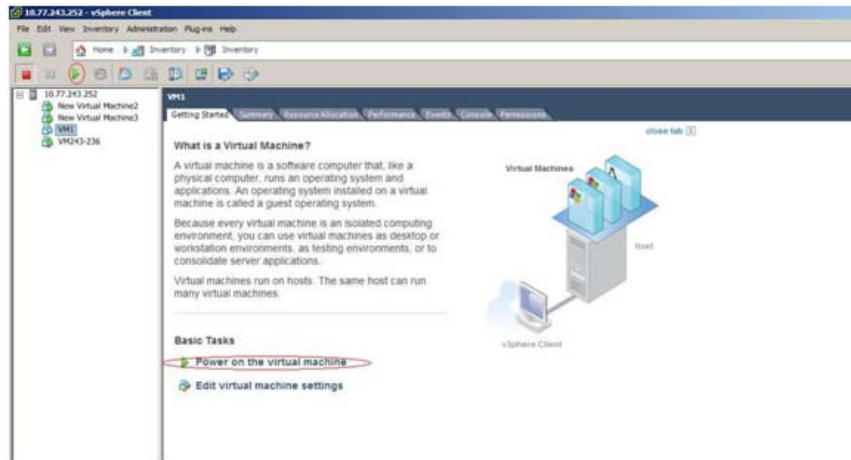
Installing the ACS Server on ESXi 5.5 and 6.0

This section describes how to install ACS 5.8.1 on VMware ESXi 5.5 and 6.0.

To install the ACS 5.8.1 server, complete the following steps:

1. Log in to the VMware vSphere Client.

2. Insert the ACS 5.8.1 Install Disk in to the VMware ESX host CD/DVD drive, and power on the VM.

Figure 15   Power on the Virtual Machine

3. Store the ACS 5.8.1 recovery ISO image in the VMware vSphere client, to access the VMware Server.

4. Click the CD icon on the tool bar and choose **Connect CD/DVD 1** > **Connect to ISO image on local disk**.

Figure 16   Connecting to ISO image on Local Disk
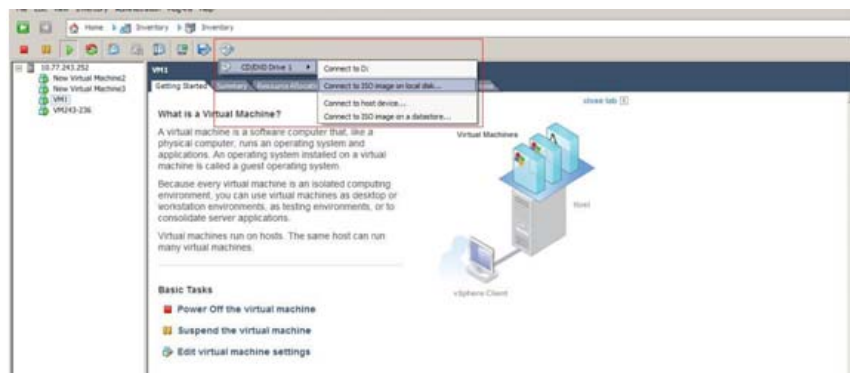
5. Browse and locate the ACS 5.8.1 ISO image.

   Move to the console tab. You will lose your cursor control as soon as you enter the console tab.

6. Press **Ctrl + Alt** to get cursor control.

7. Press **Enter**.

   The machine restarts with the ACS 5.8.1 recovery ISO image loaded. Now, the user is prompted with the install option for ACS 5.8.1.

   When the ACS 5.8.1 Install Disk boots, the console displays:

   ```
   Welcome to Cisco Secure ACS 5.8.1 Recovery
   To boot from the hard disk press <Enter>
   Available boot options:
   [1] Cisco Secure ACS 5.8.1 Installation (Monitor/Keyboard)
   [2] Cisco Secure ACS 5.8.1 Installation (Serial Console)
   [3] Reset Administrator Password (Keyboard/Monitor)
   [4] Reset Administrator Password (Serial Console)
   <Enter> Boot from hard disk
   Please enter boot option and press <Enter>.
   boot: 1
   ```

   You can select either the monitor and keyboard port, or the console port to perform the initial setup.

8. At the system prompt, type `1` to select a monitor and keyboard port, or type `2` to select a console port, and press **Enter**.

   ACS installation begins on the VM.

   Note: Allow 20 minutes for the installation process to complete.

   When the installation process finishes, the VM reboots automatically.

   When the VM reboots, the console displays:

   ```
   Type 'setup' to configure your appliance
   localhost:
   ```

9. At the system prompt, type `setup`, and press **Enter**.

   The Setup Wizard appears and guides you through the initial configuration.

   The console requests for the parameters, as shown below.

```
localhost login: setup
Enter hostname[]: acs54-server-1
Enter IP address[]: a.b.c.d
Enter IP default netmask[]: 255.255.255.255
Enter IP default gateway[]: a.b.c.d
Enter default DNS domain[]: mycompany.com
Enter primary nameserver[]: a.b.c.d
Add secondary nameserver? Y/N : n
Add primary NTP server [time.nist.gov]: a.b.c.d
Add secondary NTP server? Y/N : n
Enter system timezone[UTC]:
Enable SSH service? Y/N [N[ : y
Enter username [admin]: admin
Enter password:
Enter password again:
Bringing up network interface...
Pinging the gateway...
Pinging the primary nameserver...
Virtual machine detected, configuring VMware tools...
File descriptor 4 (/opt/system/etc/debugd-fifo) leaked on lvm.static invocation
Parent PID 3036: /bin/bash
Do not use `Ctrl-C' from this point on...
debugd[2455]: [2809]: config:network: main.c[252] [setup]: Setup is complete.
Installing applications...
Installing acs...
Generating configuration...
Rebooting...
```

For more information on the setup process, see Running the Setup Program, page 2.

VMware Hardening Requirements

Both the VMware server and the operating system on which the VMware virtual machine is running must be hardened according to the guidelines that are specified by the VMware and operating system vendors.

See the VMware support website for more details. Some helpful links are:

- http://www.vmware.com/support/

- http://kb.vmware.com/selfservice/microsites/search.do?language=en_US&cmd=displayKC&externalId=1017910

- http://communities.vmware.com/community/vmtn

VMware Tools Support

ACS 5.8.1 supports VMware Tools 9.0.0. The benefits of using VMware Tools in ACS 5.8.1 are:

- Improved NIC performance

- Improved Small Computer System Interface (SCSI) I/O performance

- Synchronization of guest operating system time with the host time

A new line of text appears, which says `Virtual machine detected, configuring VMware Tools` when you run the initial Setup Wizard. You can also do the following to check if the VMware Tools are installed:

Click the Summary tab of the virtual machine in the vSphere client. You can see that the text "Running" appears against VMware Tools. This confirms that the VMware Tools are installed and running.

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You can use the CLI command **show inventory**. When you run this CLI, a list appears that shows the NIC driver information. If the VMware Tools are installed, then the driver information is listed as `VMware Virtual Ethernet Driver`.

VMware Tools Support