INSTALLING AND CONFIGURING THE SIMULATE ONTAP 8.1.1 CLUSTER-MODE SIMULATOR

The Simulate ONTAP 8.1.1 Cluster-Mode simulator is a virtual simulator (vsim) that you can use to experiment with, learn about, and explore the operation of the NetApp® Data ONTAP® operating system.

This guide provides step-by-step instructions for installing VMware® Player on Windows® and loading and configuring the Simulate ONTAP 8.1.1 Cluster-Mode simulator. If you are not working in a Windows® environment, consult the "Simulate ONTAP 8.1.1 Installation and Setup Guide," located on the NetApp Support site.

The steps are grouped into the following tasks:

- Task 01: Change the system BIOS settings
- Task 02: Verify that your system meets system requirements and download files
- Task 03: Install VMware® Player
- Task 04: Prepare and open the simulator files with VMware® Player
- Task 05: Run the simulator for the first time and create a cluster
- Task 06: Join a second node to the cluster
- Task 07: Managing the cluster using the Command Line Interface (CLI)
- Task 08: Managing the cluster using the OnCommand System Manager
- Task 09: Shut down the cluster properly
- Task 10: Restarting the cluster
- Task 11: Adding disks to the simulator (optional)

TASK 1: CHANGE YOUR SYSTEM'S BIOS SETTINGS

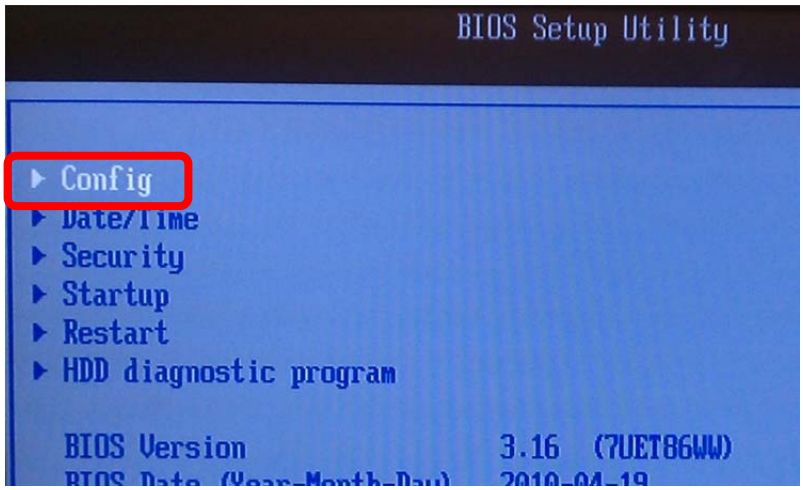
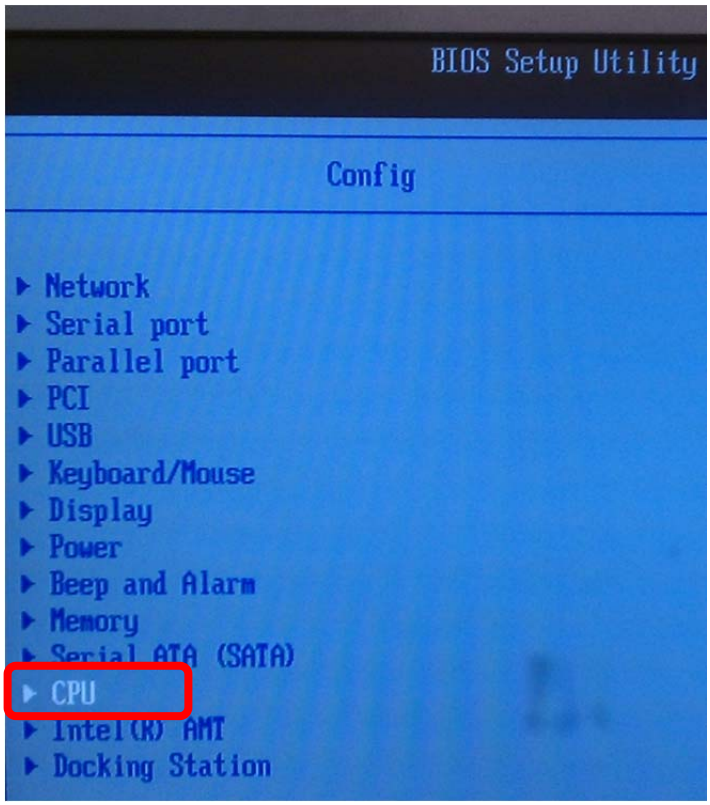
In this task, you change three BIOS settings on your system. Your goal is to turn on the Intel® Virtualization Technology (VT) features to enable VMware Player to access your 64-bit CPU directly.

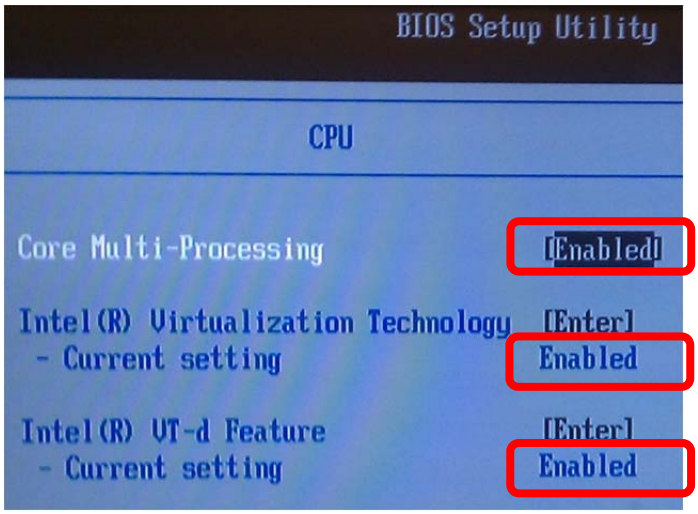
NOTE: If your system does not have the appropriate settings, you may not be able to run the simulator on your system.

Before you begin the task, consider the following points:

- Because the BIOS changes require a complete shutdown (not just a restart), you may want to print this task before performing it.
- You must change the BIOS settings because the Simulate ONTAP 8.1.1 Cluster-Mode simulator is 64-bit. The changes allow VMware Player to access the 64-bit processor on your system directly.
- The settings must be changed only once. If they have already been changed, you can skip this task.

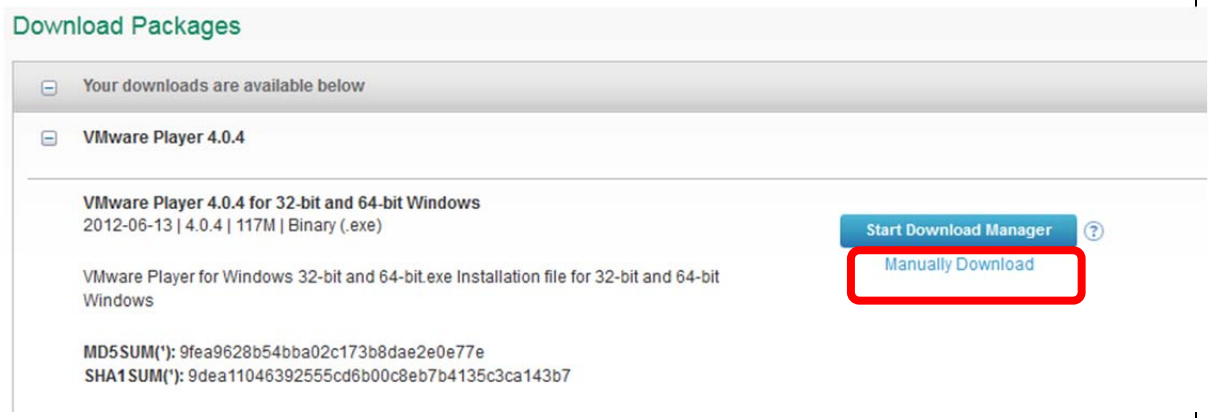
STEP	ACTION
1.	Read the following cautions, and perform the actions that apply to you: • Changing your system's BIOS settings can be dangerous to your computer's stability. If you are uncomfortable with changing the settings, consult someone who is more experienced. • Change only the BIOS settings that are specified in this task. Do not change any other setting. • The examples provided in this task are from a Lenovo T400 laptop. Do not expect your system and the Lenovo T400 system to be exactly the same. • To access the BIOS Setup Utility, you must press a specific key on your keyboard at a precise time during the system boot. Different systems may require different keys or combinations of keys. Obtain the correct information from your system's documentation. • Because you are changing low-level hardware settings, you must power off and power on your system completely. Do not use the Restart option.
2.	With your system turned off, locate the F1 function key on your keyboard, and prepare to press it
3.	Press the power button, and, when the logo screen opens, press **F1** to enter the BIOS Setup Utility.

STEP	ACTION
4.	Using the direction keys on your keyboard, highlight Config, and then press the **Enter** key. 
5.	In the Config menu, navigate to CPU and then press the **Enter** key. 

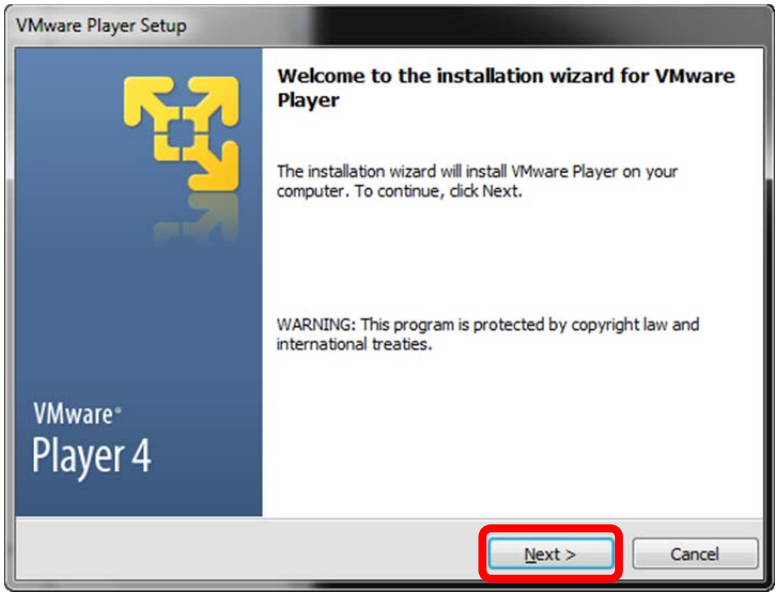
STEP	ACTION
6.	If Core Multi-Processing is not enabled, highlight Core Multi-Processing, press the **Enter** key, select **Enabled** and press **Enter** key again. If Intel Virtualization Technology (VT) or Intel VT-d Feature is not enabled, highlight the setting that is not enabled, press the **Enter** key, select **Enabled**, and press the **Enter** key again. **Note:** The virtualization settings may also be located in the Security>Virtualization menu on some models (Lenovo T520). Some models and versions of BIOS do not have the VT-d feature. The feature is not required. 
7.	Save your changes by performing the following actions: 1. Press the **Esc** key twice to return to the main setup menu (as shown in step 4). 2. Press the **F10** function key, and select **YES**. Your system will restart.
8.	Wait for Windows to load completely.
9.	Select **Start** > **Shutdown** > **Shutdown** to shut down your system completely. **Note:** Because the settings that you changed control low-level hardware, power must be removed from the CPU completely before the virtualization settings can take effect.
10.	After your system is completely shut down, power the system on.

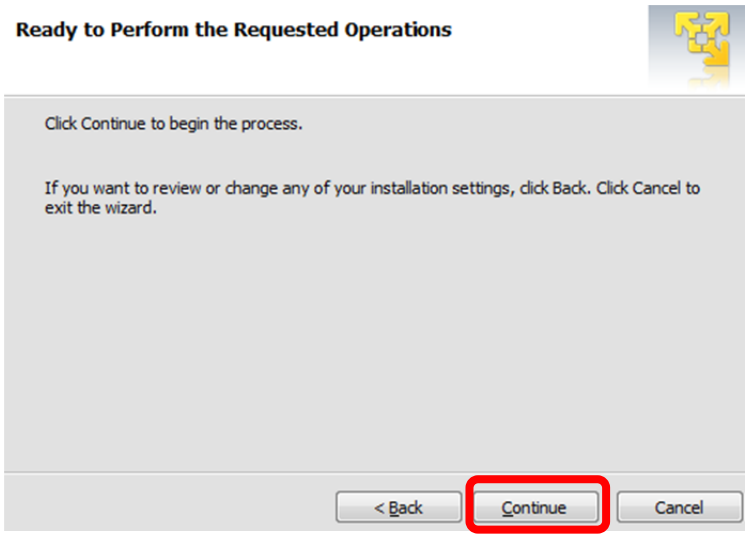
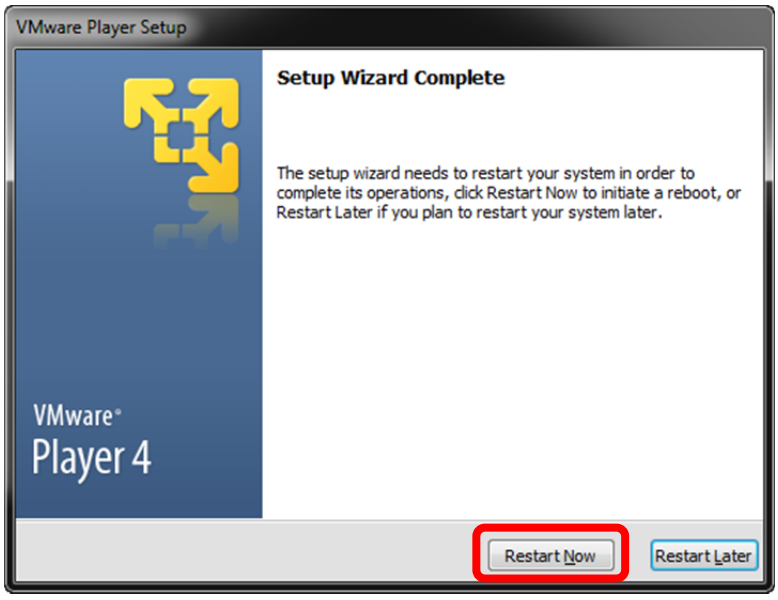
TASK 2: VERIFY THAT YOUR SYSTEM MEETS SIMULATOR REQUIREMENTS AND DOWNLOAD FILES

STEP	ACTION
1.	Ensure that your system meets the following requirements: • Dual-core 64-bit Intel® architecture laptop or desktop (Such as Lenovo T400 or T500 series) with VT support • Microsoft Windows® XP, Windows 7, or Windows Vista • VMware® Player 4.0.1 or greater or VMware® Workstation 8.0.1 or greater • 2 GB of RAM for one instance of the simulator or 3 GB of RAM for two instances of the simulator (4 GB is recommended) • 40 GB free disk space per instance of the simulator
2.	Navigate to the simulator download site that is provided by NetApp Support: http://support.netapp.com/NOW/download/tools/simulator/ontap/8.0/
3.	Download the Simulate ONTAP 8.1.1 for VMware Workstation, VMware Player, and VMware Fusion C-mode files. Also download the "Simulator ONTAP 8.1.1 Installation and Setup Guide" as well as the "VSIM Licenses: 8.1.1 licenses" text files. **NOTE:** You must have a NetApp Support account to download the files. 
4.	Navigate to the VMware Player download site: http://www.vmware.com/go/downloadplayer/

STEP	ACTION
5.	Downloading VMware Player requires an account, enter the username and password for your VMware account. **NOTE:** If you do not have a VMware account, create one (accounts are free). 
6.	After you have logged in, at the top of the list of Download Packages, click **Manually Download**: 

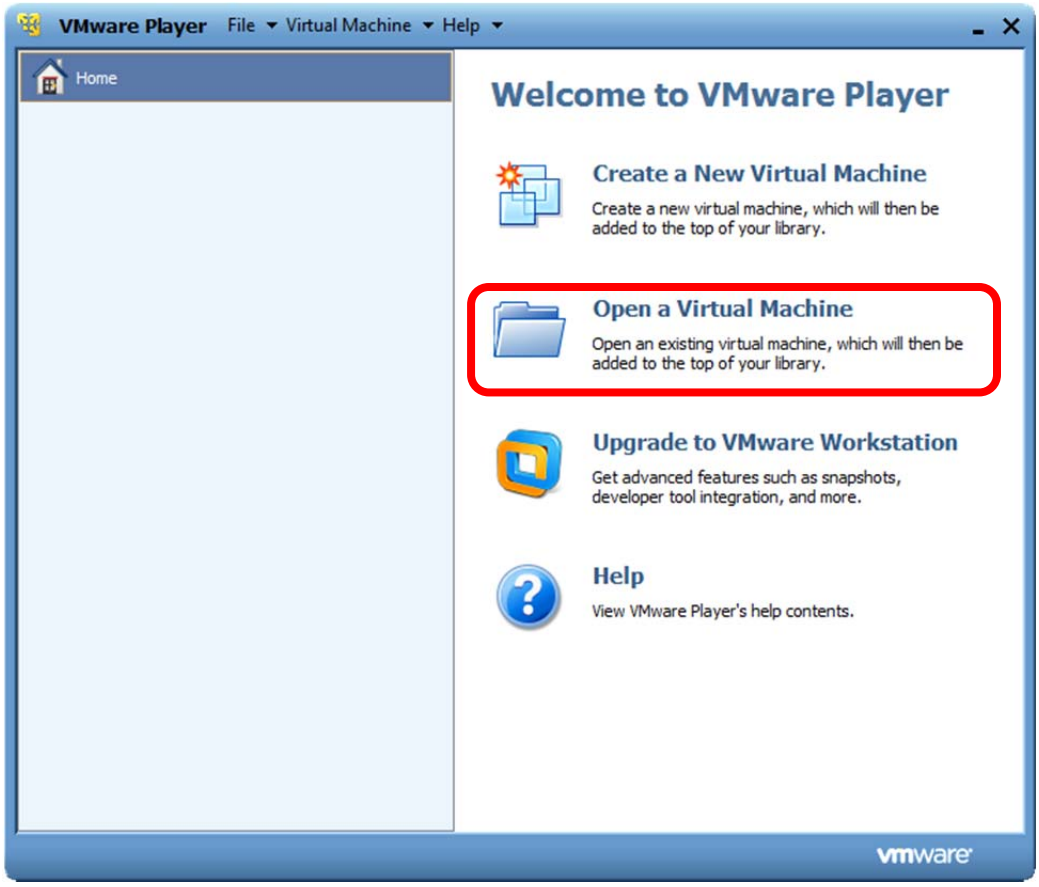
TASK 3: INSTALL VMWARE PLAYER

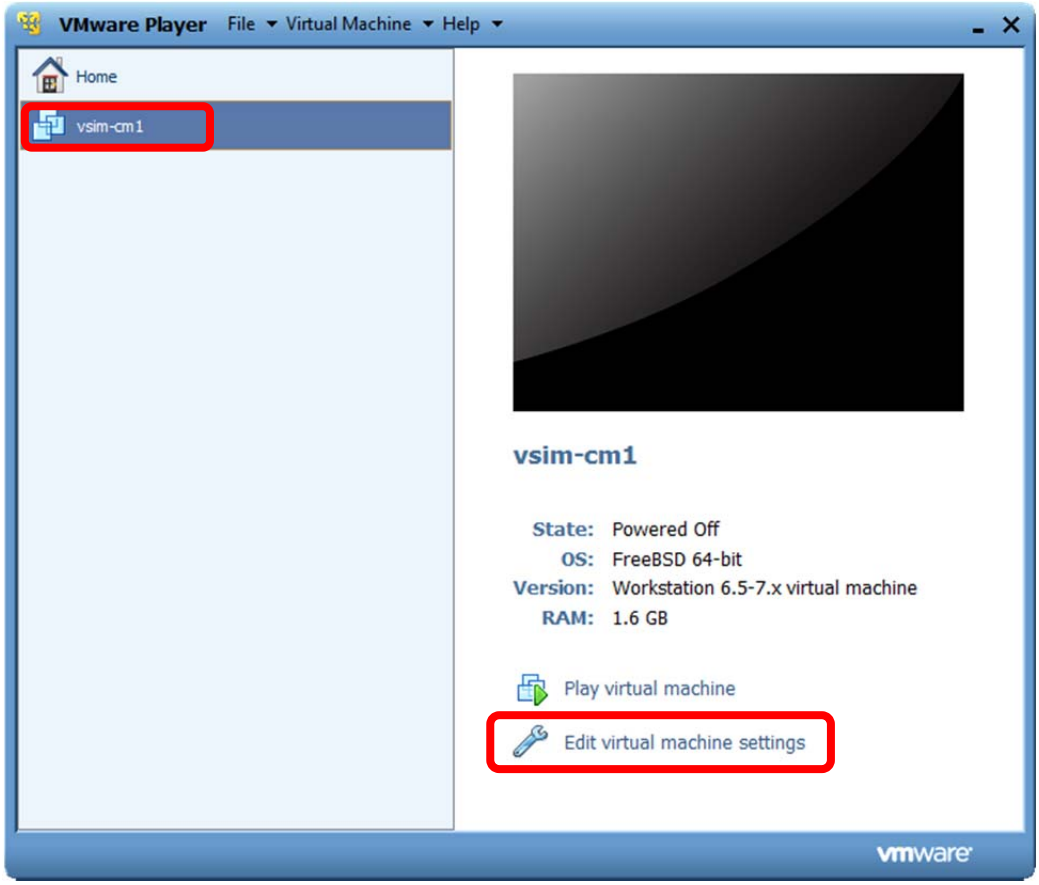
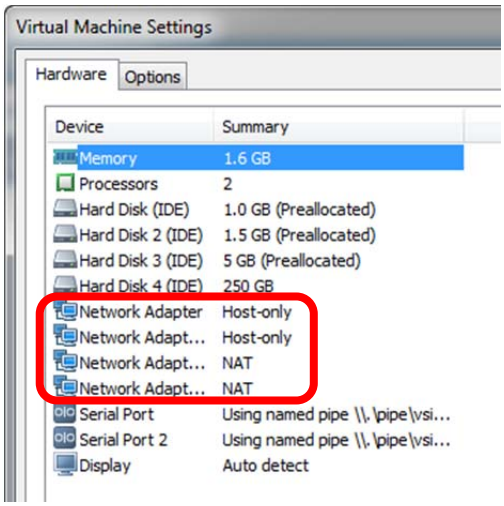
STEP	ACTION
1.	On your Windows system, open Windows Explorer and navigate to the location to which you downloaded the files (such as Documents\Downloads\).
2.	Double-click VMware Player install file (e.g. VMware-player-4.0.x-xxxxxx.exe).
3.	If security warning appears, confirm that you want to perform the installation.
4.	When the Welcome screen appears, click **Next**. 
5.	Leave the default destination folder as is and click **Next**.
6.	On the Software Updates screen, ensure that “Check for product updates on startup” is selected and click **Next**.
7.	On the User Experience Improvement Program screen, the “Help improve VMware Player” can be selected, and click **Next**.
8.	On the Shortcuts screen, select the shortcut options that you prefer, and click **Next**.

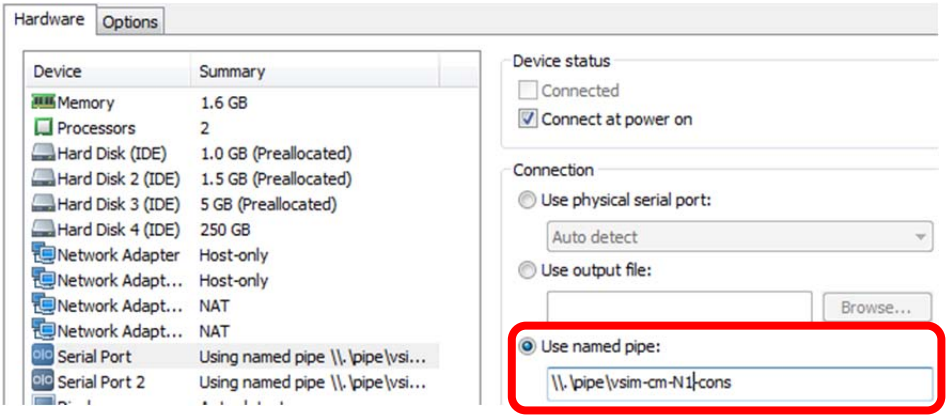
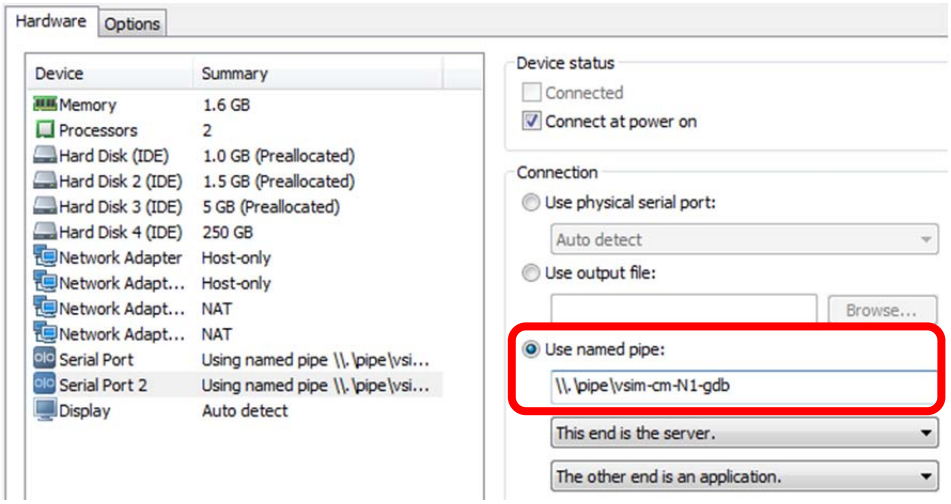
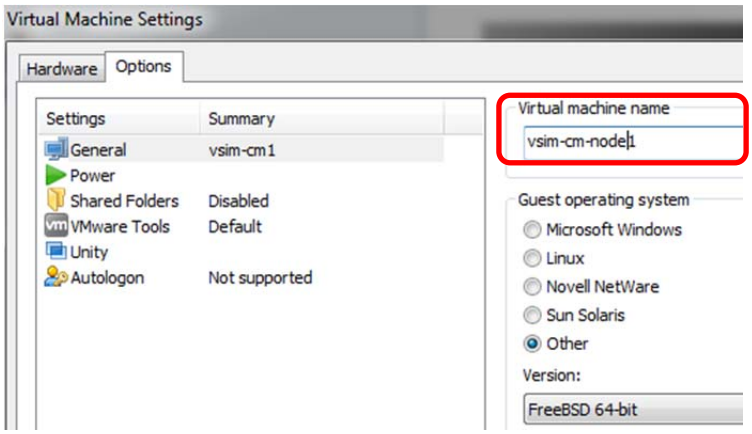
STEP	ACTION
9.	On the Ready to Perform the Requested Operations screen, click **Continue** to start the installation. 
10.	When the Setup Wizard Complete screen appears, click **Restart Now**. 

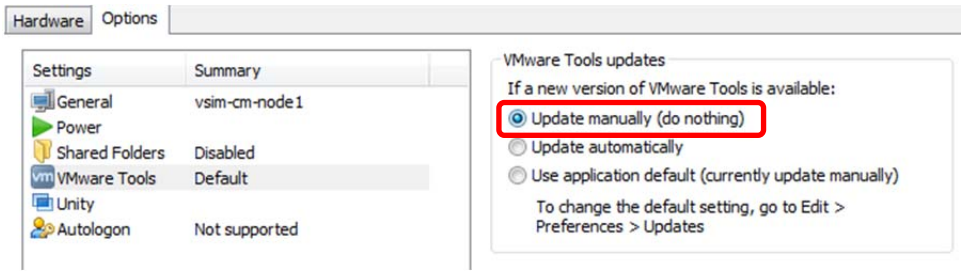
TASK 4: PREPARE AND OPEN THE SIMULATOR IN VMWARE PLAYER

STEP	ACTION
1.	On your Windows system, open Windows Explorer, and navigate to **Documents**. **Note:** The "Documents" folder may be "My Documents" in some Windows environments.
2.	Create a folder, and name it **Virtual Machines**. **NOTE:** Some versions of VMware Player create this folder during installation. The "Virtual Machines" folder may be "My Virtual Machines" in some Windows environments.
3.	Extract the vsim files into the Virtual Machines directory. You may need an archive extraction tool such as 7-zip, which is a free download: http://www.7-zip.org
4.	Navigate to the location you extracted the files (Documents\Virtual Machines\vsim-cm1). The folder contains all of the files that VMware Player needs to run the simulator. You will need to rename the folder "vsim-cm-N1" before you load the simulator.
5.	Verify that the folder contains the cfcard and uml directory as well as the following files: • DataONTAP.vmdk • DataONTAP.vmx • DataONTAP-flat.vmdk • DataONTAP-nvram.vmdk • DataONTAP-nvram-flat.vmdk • DataONTAP-s001.vmdk through DataONTAP-s126.vmdk (126 disk files) • DataONTAP-sim.vmdk • DataONTAP-var.vmdk • DataONTAP-var-flat.vmdk • mtoolsrc • nvram
6.	Start VMware Player (**Start**>**All Programs**>**VMware**>**VMware Player**) and accept the license agreement.

STEP	ACTION
7.	Click **Open a Virtual Machine**. 
8.	Navigate to **Documents\Virtual Machines\vsim-cm-N1**.
9.	Select **DataONTAP.vmx** and click **Open**. The VMware Player inventory appears.
10.	In the left pane, select the VM called **vsim-cm1**. 

STEP	ACTION
11.	Review the information that is displayed in the right pane, and click **Edit virtual machine settings**. **NOTE:** *Do not* play the VM. 
12.	Press the Hardware tab and note the Network Adapters. Leave these settings at their default values. 

STEP	ACTION
13.	Under the Hardware tab, select the **Serial Port** device and rename the "Use named pipe" to \\.\pipe\vsim-cm-N1-cons (vsim-cm-N1 is the name of the simulator folder). 
14.	Under the Hardware tab, select the **Serial Port 2** device and rename the "Use named pipe" to \\.\pipe\vsim-cm-N1-gdb (vsim-cm-N1 is the name of the simulator folder). 
15.	Press the Options tab, select **General** settings and rename the Virtual Machine to **vsim-cm-node1**. Leave the other settings at their default values. 

STEP	ACTION
16.	Under the Options tab, select **VMware Tools** settings and select **Update manually (do nothing)**. Leave the other settings at their default values. 
17.	Click **OK** to save your changes and close the Virtual Machine Settings windows.

TASK 5: RUN THE SIMULATOR FOR THE FIRST TIME AND CREATE A CLUSTER

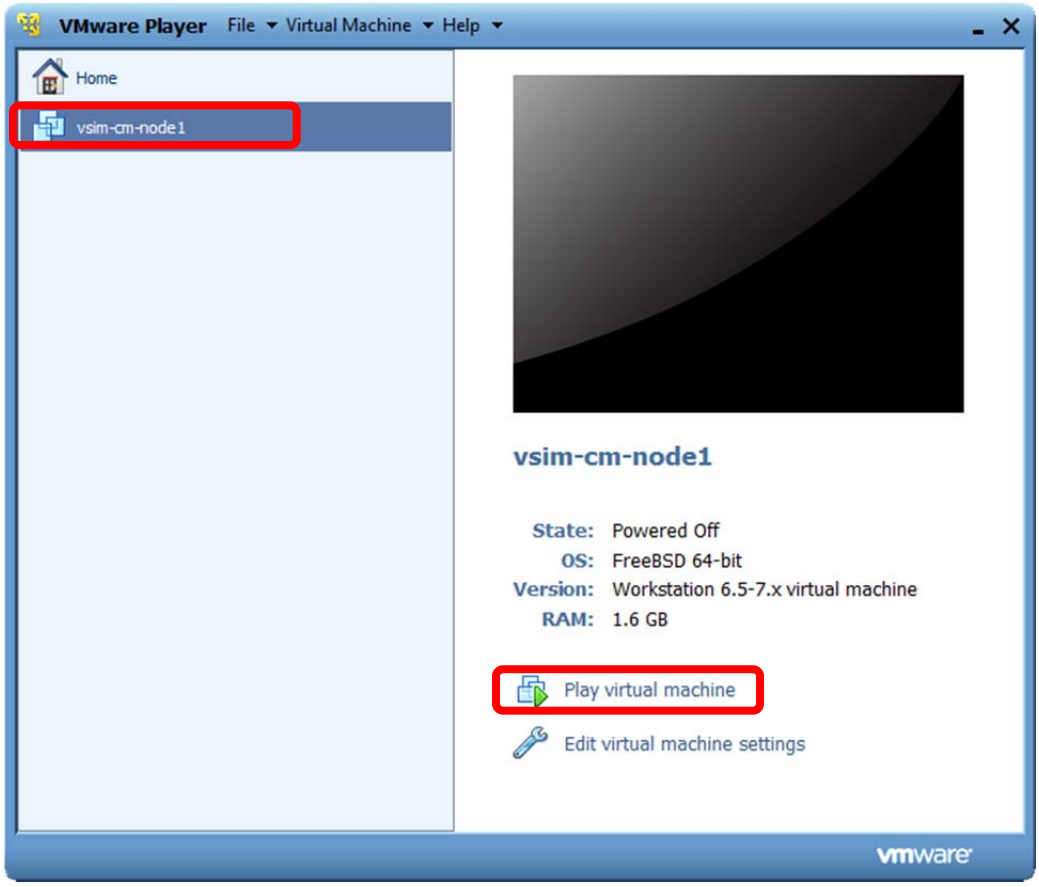
The first time the simulator is run, it must be initialized.

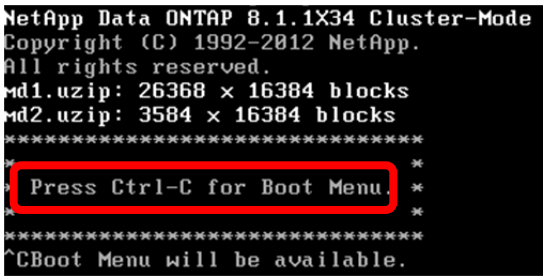
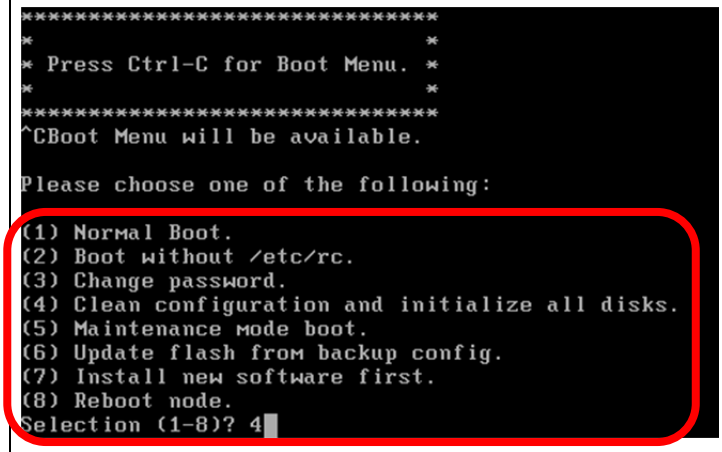
The initialization process requires timely action and total attention:

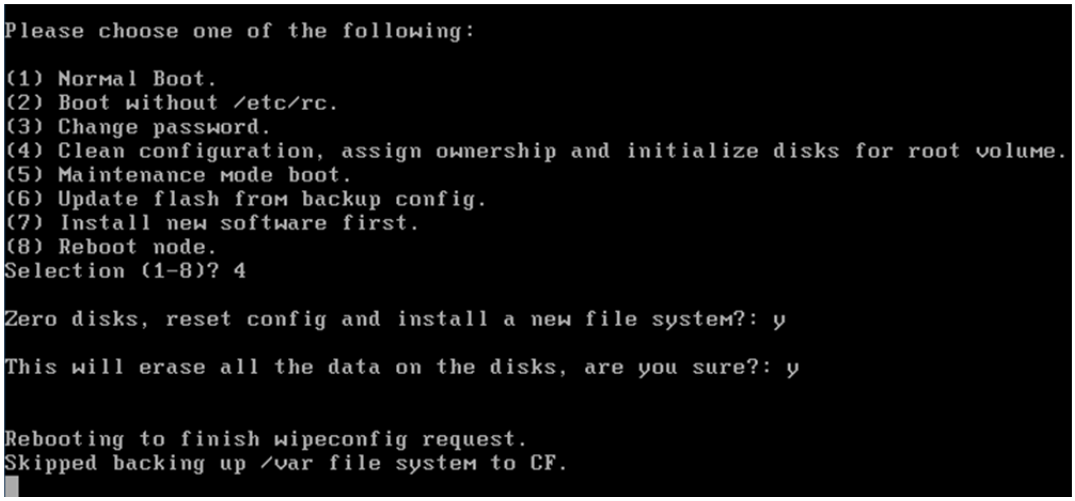
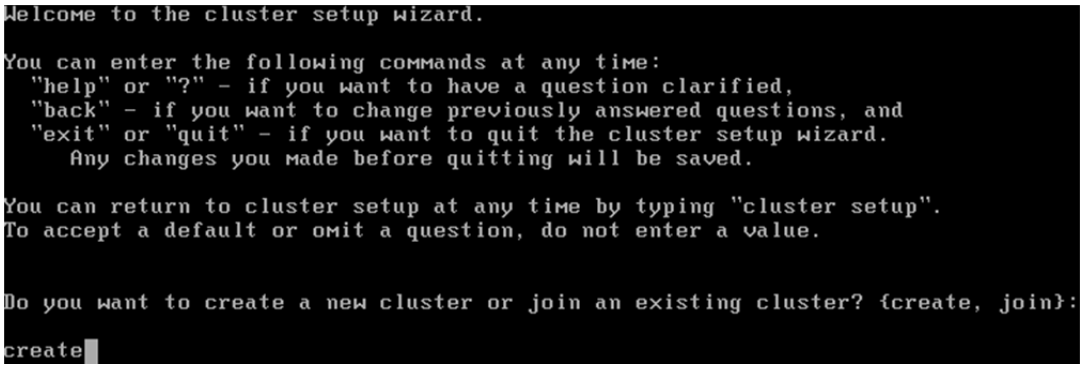
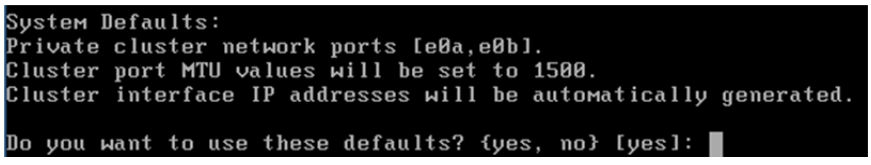
- The initialization menu appears quickly and is displayed briefly.
- Sometimes the Boot Menu is blocked by a VMware Player message.

Note: If the initialization steps are not performed properly, the simulator may hang and reboot repeatedly.

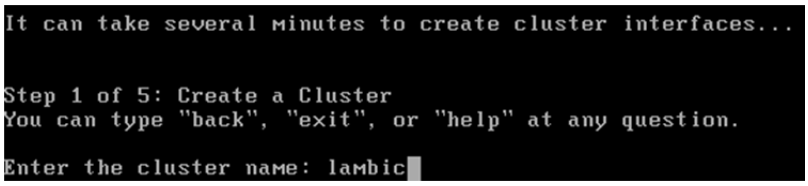
STEP	ACTION
1.	So you will be able to perform the initialization steps properly, review the following hints and tips. • To control the machine that is running in the console window, click somewhere in the windows or press Ctrl-G to change mouse and keyboard control to the VM. To return control to Windows desktop press Ctrl-Alt. • If a Software Updates message prevents access to the Boot Menu, click Remind Me Later as quickly as possible. **Note:** The simulator does not require VMware tools, so the update is not necessary. • When the Press Ctrl-C for Boot Menu message appears, press Ctrl-C immediately and wait for the Boot Menu to appear.
2.	If VMware Player is not running, start it.

STEP	ACTION
3.	Select **vsim-cm-node1**, and click **Play virtual machine**. 
4.	If a Software Updates dialog box appears, click the **Remind Me Later** to close the requester. VMware Tools cannot be installed on the simulators. 

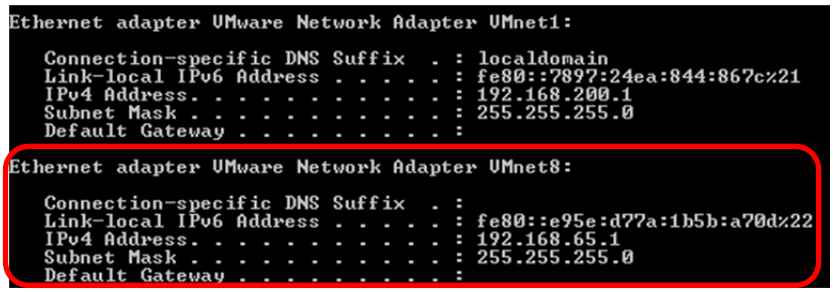
STEP	ACTION
5.	Click inside the console windows or press Ctrl-G to change mouse and keyboard control to the VM, and prepare to press Ctrl-C. When the "Press Ctrl-C for Boot Menu" message appears, press **Ctrl-C**.  The "Boot Menu will be available" message will appear. Wait until the Boot Menu is displayed. **Note:** You may see disk messages before the menu appears, ignore these at this time.
6.	When the Boot Menu (a list of numbered options) appears, enter **4** (for a clean confuguration) and press the **Enter** key. 
7.	At the "Zero disk, reset config and install a new file system?" prompt, enter the letter **y** and press the **Enter** key.

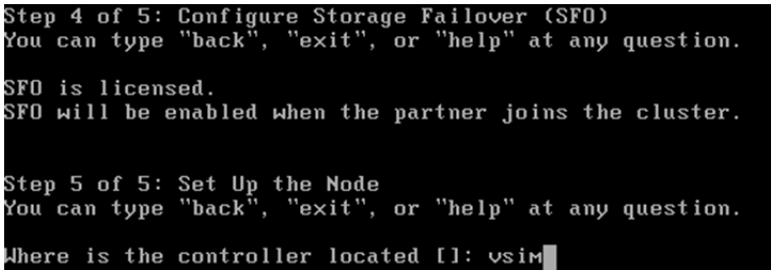
STEP	ACTION
8.	At the confimation prompt, enter the letter **y** and press the **Enter** key. The VM restarts automatically and begins the reset process.  **Note:** You must wait until the reset process is completely finished. If you stop the process, you may corrupt the simulator files (simulator disks) and need to extract them again. After the VM resets, the cluster setup wizard will start.
9.	After the reset process is complete, the cluster setup wizard will start. Create a cluster by entering **create** and then **Enter**. 
10.	When asked to use the system defaults, press the **Enter** key to accept the default answer [yes]. 

STEP	ACTION

11.	After the cluster interfaces are created, enter a name for your cluster.
	 
	`It can take several minutes to create cluster interfaces...`
	
	`Step 1 of 5: Create a Cluster`
	`You can type "back", "exit", or "help" at any question.`
	
	`Enter the cluster name: lambic`
	
	Cluster Name: _____

12.	When asked for the cluster base license key, enter the key from licenses your downloaded in Task 2. (eg. JWFJEXMWZWYQSD) cluster creation will begin.
13.	When asked to enter additional licenses, press **Enter** to continue. Licenses can be added at a later time when needed.
14.	**Note:** If you used the CapsLock key to enter the license key, ensure CapsLock is turned off before entering a password. You will now be asked for an "admin" password. Enter a strong password (e.g. Netapp123) and confirm. Write your password down in the space below and DON'T LOSE IT. Cluster admin password: _____

15.	The next steps will require knowledge of VMware addresses that were created during the VMware Player install.
	
	Press Ctrl+Alt to return to Windows, then open a command prompt and enter **`ipconfig`**:
	 
	`Ethernet adapter VMware Network Adapter VMnet1:`
	
	`Connection-specific DNS Suffix . : localdomain`
	`Link-local IPv6 Address . . . . . : fe80::7897:24ea:844:867c%21`
	`IPv4 Address. . . . . : 192.168.200.1`
	`Subnet Mask . . . . . : 255.255.255.0`
	`Default Gateway . . . . . :`
	
	`Ethernet adapter VMware Network Adapter VMnet8:`
	
	`Connection-specific DNS Suffix . :`
	`Link-local IPv6 Address . . . . . : fe80::e95e:d77a:1b5b:a70d%22`
	`IPv4 Address. . . . . : 192.168.65.1`
	`Subnet Mask . . . . . : 255.255.255.0`
	`Default Gateway . . . . . :`
	
	Find the VMnet8 (NAT) IP Address. You must assign IP addresses to the simulator ports in the VMnet8 subnet (for example 192.168.65.*x*). Note the IPv4 Address and subnet mask.
	
	VMnet8 IPv4 Address: _____
	
	VMnet8 Subnet Mask: _____

STEP	ACTION
16.	Go back to the simulator, enter the following for the next step using the information you noted in the previous step: • Enter the cluster management interface port [e0c]: **e0c** • Enter the cluster management interface IP address: **192.168.*x*.20** (***x***=your subnet) • Enter the cluster management interface netmask: **255.255.255.0** • Enter the cluster management interface default gateway: (leave blank)  You will connect and manage the cluster using the cluster management interface IP address. Enter the address is the space provided below: Cluster Management Interface: _____
17.	Press the **Enter** key when asked for the DNS domain names to continue to the next step.
18.	The setup wizard will continue with Storage Failover (SFO) information. When asked for a location of the controller, enter the location and press the **Enter** key to continue. 
19.	Enter the following for the next step using the information you noted in the previous steps: • Enter the node management interface port [e0c]: **e0c** • Enter the node management interface IP address: **192.168.*x*.21** (***x***=your subnet) • Enter the node management interface netmask: **255.255.255.0** • Enter the node management default gateway: (leave blank) 

STEP	ACTION
20.	The setup wizard will continue to create the node management interface. Press the **Enter** key to continue. `A node management interface on port e0c with IP address 192.168.200.21 has been created.This system will send event messages and weekly reports to NetApp Technical Support. To disable this feature, enter "autosupport modify -support disable" within 24 hours. Enabling AutoSupport can significantly speed problem determination and resolution should a problem occur on your system. For further information on AutoSupport, please see: http://now.netapp.com/autosupport/` `Press enter to continue []:`

21.	The cluster setup wizard is now complete.
	`You can access your cluster to complete these tasks by:`
	
	`1) Using the NetApp System Manager to manage cluster lambic at 192.168.65.20.`
	`NetApp System Manager must be at version 2.0 or above.`
	`You can download NetApp System Manager from`
	`http://support.netapp.com`
	
	`2) Logging in to the cluster by using SSH (secure shell) from your work station:`
	
	`ssh admin@192.168.65.20`
	
	`Exiting the cluster setup wizard.`

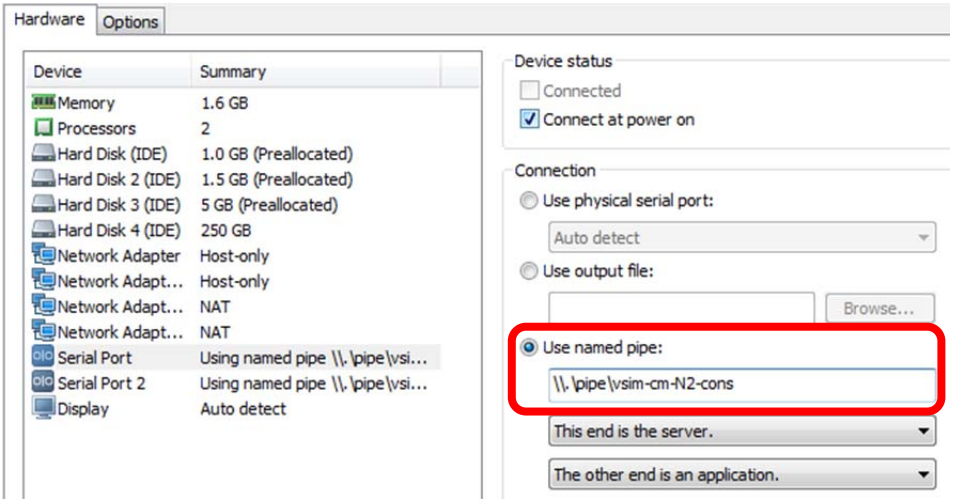
22.	To test the cluster, log in and enting the **`cluster show`** command.
	`login: admin`
	`Password:`
	`lambic::> cluster show`
	`Node Health Eligibility`
	`--- --- ---`
	`lambic-01 true true`
	
	`lambic::>`

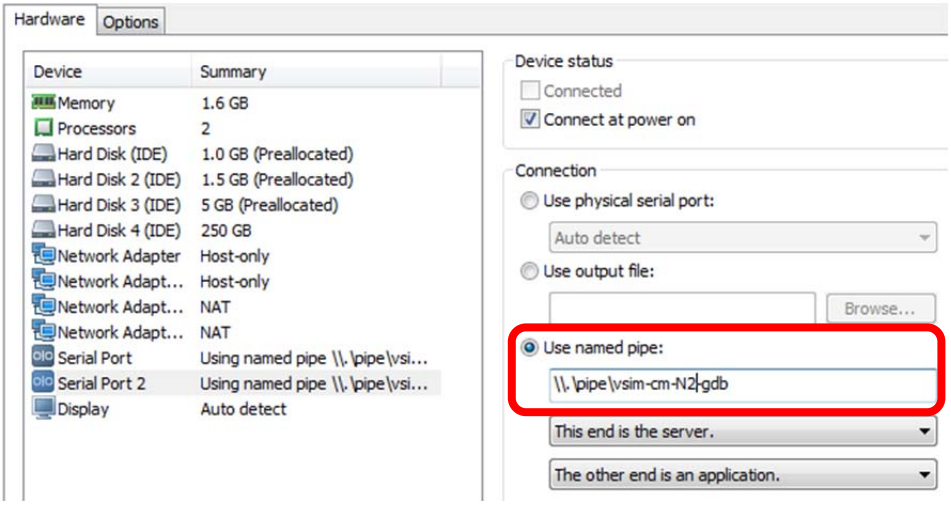
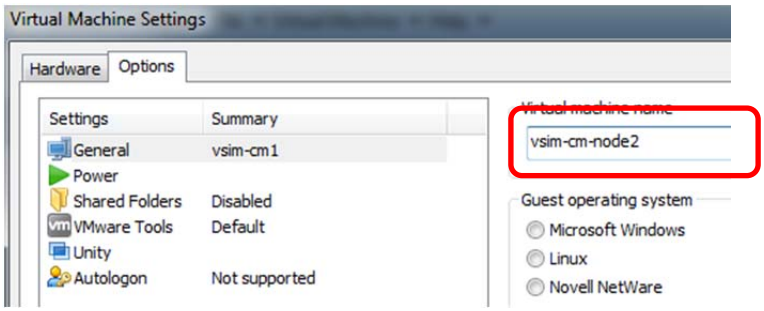
23.	To add the unassign disks to the node, enter the following command : **`storage disk assign –all true –node <nodename>-01`**
24.	In the next task you will join a second simulator to create a 2-node cluster. **Note:** The simulator should not be shut down at this time. The console window can be minimize at this time.

TASK 6: JOIN A SECOND NODE TO THE CLUSTER

A second node will be added to the cluster created in the previous task.

Note: You will need to perform an additional step on the second node. This is because the storage system "System ID" is hardcoded in the provided Simulate ONTAP image. Each Simulate ONTAP node in a cluster must have a unique System ID.

1.	You will need to extract a second set of simulator files for the second node. (see Task 4) Navigate to Documents\Virtual Machines\vsim-cm1 and rename the new folder “vsim-cm-N2” to identify it as the second node.
2.	Run a second instance of VMware Player and open the second node (DataONTAP.vmx file in the vsim-cm-N2 directory), but do not play the vsim yet.
3.	You will also need to edit node 2 Virtual Machine Settings.
4.	Under the Hardware tab, select the **Serial Port** device and rename the “Use named pipe” to \\.\pipe\vsim-cm-N2-cons (vsim-cm-N2 is the name of the simulator folder). 

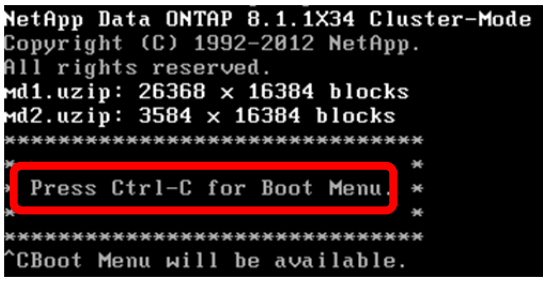
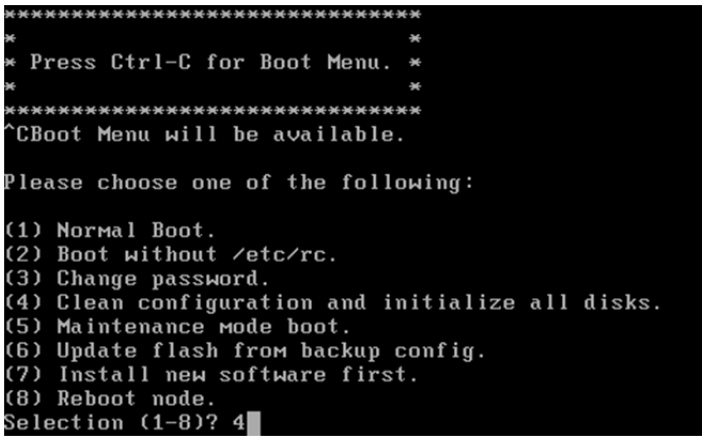
5.	Under the Hardware tab, select the **Serial Port 2** device and rename the "Use named pipe" to \\.\pipe\vsim-cm-N2-gdb (vsim-cm-N2 is the name of the simulator folder). 
6.	Rename the Virtual Machine to **vsim-cm-node2**. 
7.	You will need to change the System ID and serial number of the second node before joining the cluster. **Note:** You may receive a Software Update requester which you should close. If a Software Updates dialog box appears, click the **Remind Me Later** to close the requester. 

8.	Hit the **Space Bar** when the “Hit [Enter] to boot immediately, or any other key for command prompt. Booting in 10 seconds...” appears. You should see a *VLOADER*> prompt.
	`BTX loader 1.00  BTX version is 1.02`
	`Consoles: internal video/keyboard`
	`BIOS drive A: is disk0`
	`BIOS drive C: is disk1`
	`BIOS drive D: is disk2`
	`BIOS drive E: is disk3`
	`BIOS drive F: is disk4`
	`BIOS 638kB/1636288kB available memory`
	
	`FreeBSD/i386 bootstrap loader, Revision 1.1`
	`(root@bldlsvl73.eng.netapp.com, Thu May 31 21:29:08 PDT 2012)`
	`Loading /boot/defaults/loader.conf`
	`\`
	`Hit [Enter] to boot immediately, or any other key for command prompt.`
	`Booting in 8 seconds...`
	
	`Type '?' for a list of commands, 'help' for more detailed help.`
	`VLOADER> _`

9.	Enter the following commands to set the Serial Number and System ID for this node:
	`SIMLOADER> setenv SYS_SERIAL_NUM 4034389-06-2`
	`SIMLOADER> setenv bootarg.nvram.sysid 4034389062`
	`SIMLOADER> setenv SYS_SERIAL_NUM 4034389-06-2`
	`SIMLOADER> setenv bootarg.nvram.sysid 4034389062`
	`SIMLOADER> _`

10.	Enter the following commands to verify that the information was saved correctly:
	`SIMLOADER> printenv SYS_SERIAL_NUM 4034389-06-2`
	`SIMLOADER> printenv bootarg.nvram.sysid 4034389062`
	`SIMLOADER> printenv SYS_SERIAL_NUM 4034389-06-2`
	`4034389-06-2`
	`SIMLOADER> printenv bootarg.nvram.sysid 4034389062`
	`4034389062`
	`SIMLOADER> _`

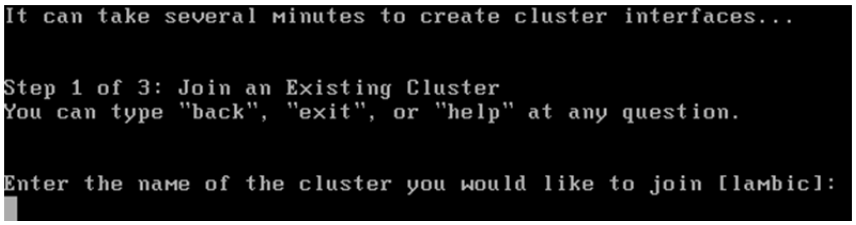
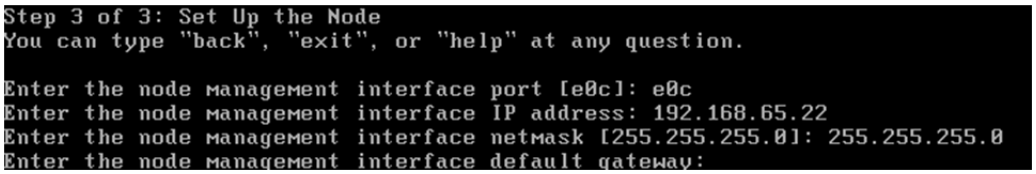
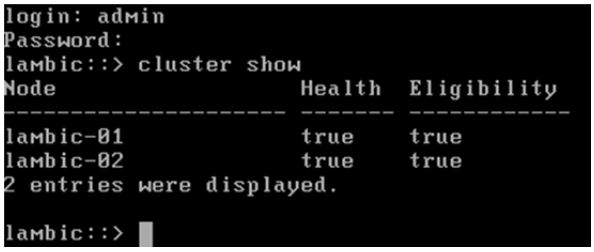
11.	Now enter the "boot" command to boot up the node: **`SIMLOADER> boot`** The simulator will boot with the new system id and serial number. You will need to clean the configuration from the boot menu.

12.	When the “Press Ctrl-C for Boot Menu” message appears, press **Ctrl-C**.  The “Boot Menu will be available” message will appear. Wait until the Boot Menu is displayed. **Note:** You may see disk messages before the menu appears, ignore these errors at this time.
13.	When the Boot Menu (a list of numbered options) appears, enter **4** (for a clean confuguration) and press the **Enter** key. 
14.	At the “Zero disk, reset config and install a new file system?” prompt, enter the letter **y** and press the **Enter** key.

15.	At the confimation prompt, enter the letter **y** and press the **Enter** key.
	The VM restarts automatically and begins the reset process.
	`Please choose one of the following:`
	`(1) Normal Boot.`
	`(2) Boot without /etc/rc.`
	`(3) Change password.`
	`(4) Clean configuration, assign ownership and initialize disks for root volume.`
	`(5) Maintenance mode boot.`
	`(6) Update flash from backup config.`
	`(7) Install new software first.`
	`(8) Reboot node.`
	`Selection (1-8)? 4`
	`Zero disks, reset config and install a new file system?: y`
	`This will erase all the data on the disks, are you sure?: y`
	`Rebooting to finish wipeconfig request.`
	`Skipped backing up /var file system to CF.`
	Note: You must wait until the reset process is completely finished. If you stop the process, you may corrupt the simulator files (simulator disks) and need to extract them again. After the VM resets, the cluster setup wizard will start.

16.	After the reset process is complete, the cluster setup wizard will start. Join the cluster you created earlier by entering **join** and then **Enter**.
	`Welcome to the cluster setup wizard.`
	`You can enter the following commands at any time:`
	`"help" or "?" - if you want to have a question clarified,`
	`"back" - if you want to change previously answered questions, and`
	`"exit" or "quit" - if you want to quit the cluster setup wizard.`
	`Any changes you made before quitting will be saved.`
	`You can return to cluster setup at any time by typing "cluster setup".`
	`To accept a default or omit a question, do not enter a value.`
	`Do you want to create a new cluster or join an existing cluster? {create, join}:`
	`join`

17.	When asked to use the system defaults, press the **Enter** key to accept the default answer [yes].
	`System Defaults:`
	`Private cluster network ports [e0a,e0b].`
	`Cluster port MTU values will be set to 1500.`
	`Cluster interface IP addresses will be automatically generated.`
	`Do you want to use these defaults? {yes, no} [yes]:`

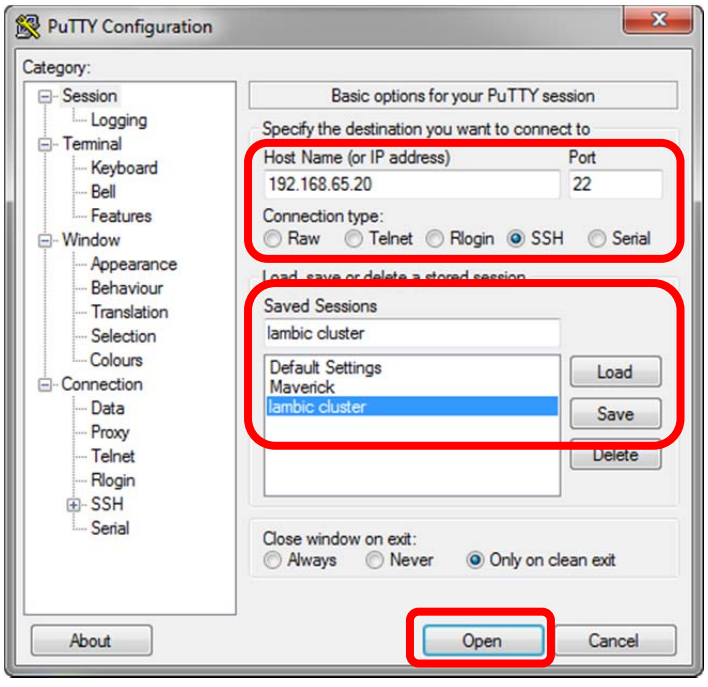
18.	After the cluster interfaces are created, press **Enter** to join the cluster. 
19.	Wait while node 2 joins the cluster.
20.	Enter the following for the next step using the information you noted in the previous steps: • Enter the node management interface port [e0c]: **e0c** • Enter the node management interface IP address: **192.168.*x*.22** (***x***=your subnet) • Enter the node management interface netmask: **255.255.255.0** • Enter the node management default gateway: (leave blank) 
21.	The setup wizard will continue to create the node management interface. Press the **Enter** key to continue. 
22.	The cluster setup is now complete.
23.	To test the cluster, log in and enting the **`cluster show`** command. 
24.	To add the unassign disks to the node, enter the following command : **`storage disk assign –all true –node <`*`nodename`*`>-02`**

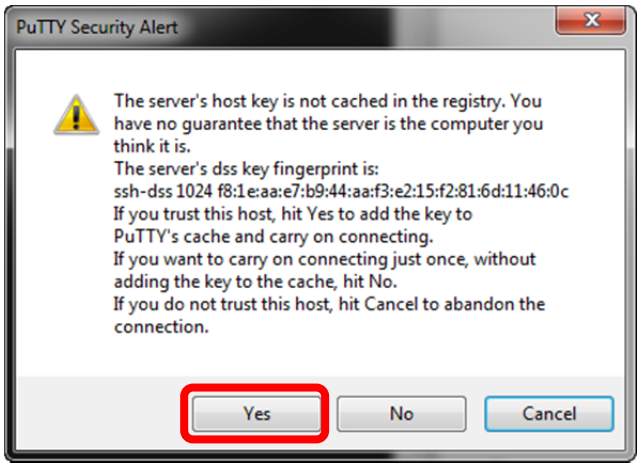
25.	You have completed a 2-node cluster setup. **Note:** The simulator should not be shut down at this time. The console window can be minimize at this time.

TASK 7: MANAGING THE CLUSTER USING COMMAND LINE INTERFACE (CLI)

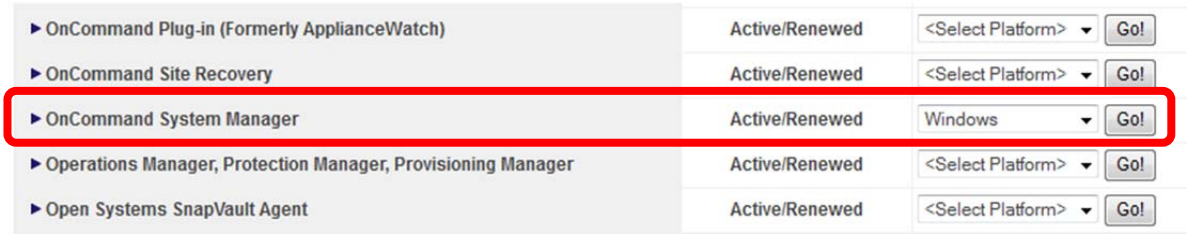
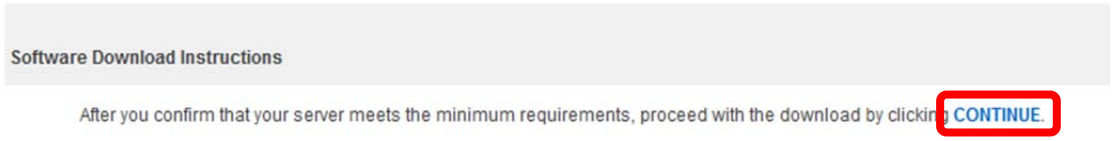
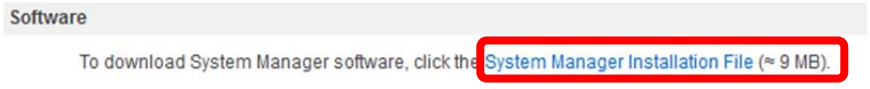
You can manage the cluster using various tools. We will use a terminal client called PuTTY to manage the cluster using Command Line Interface (CLI).

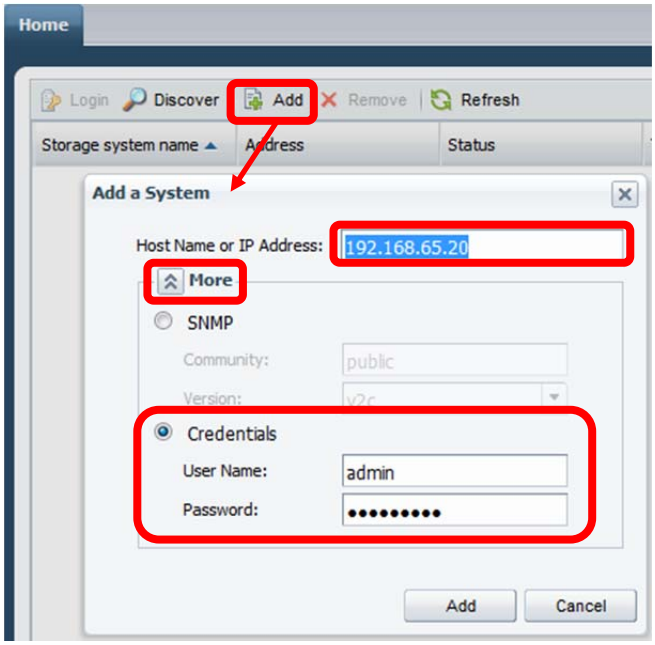
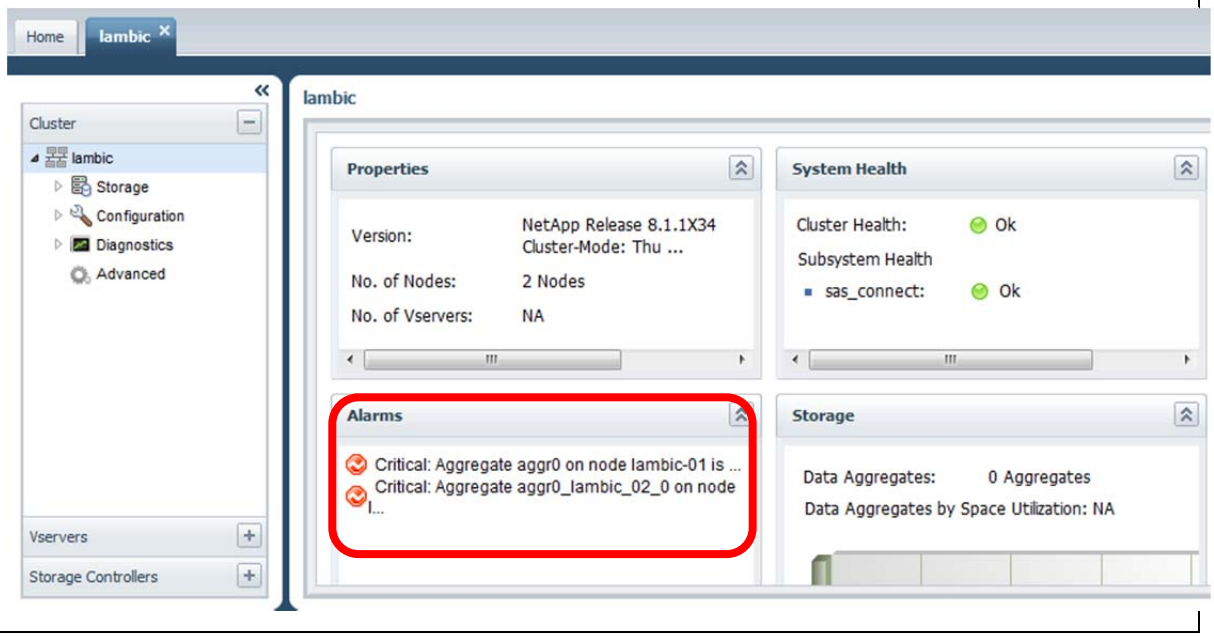
Note: If you have difficulties connecting to the cluster, make sure you are not connected to VPN.

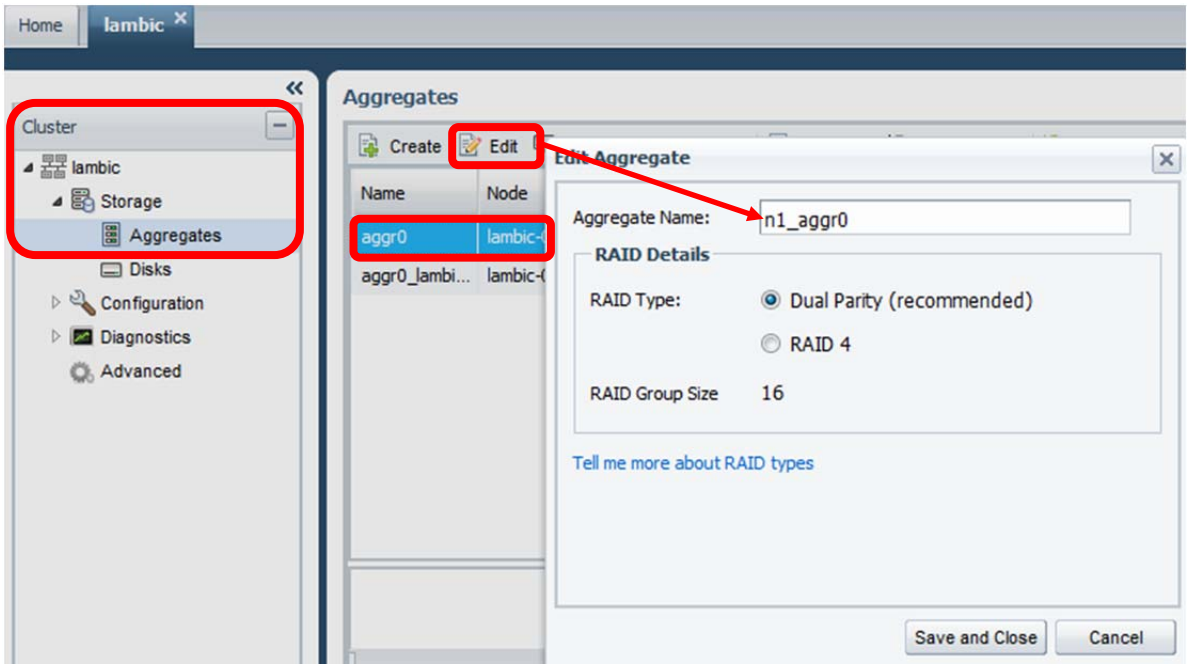
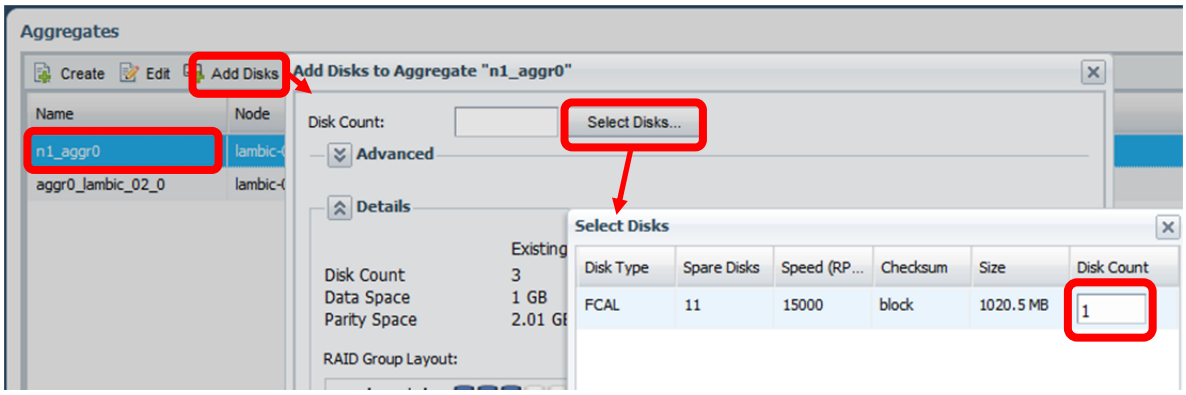
STEP	ACTION
1.	If you do not already have PuTTY, you can download it here: http://www.chiark.greenend.org.uk/~sgtatham/putty/download.html **Binaries** *The latest release version (beta 0.62)*. This will generally be a version I think is reasonably likely to work well. If you have a problem with the release version, it might be worth trying out the latest development snapshot (below) to see if I've already fixed the bug, before reporting it to me. **For Windows on Intel x86** PuTTY: putty.exe (or by FTP) (RSA sig) (DSA sig) PuTTYtel: puttytel.exe (or by FTP) (RSA sig) (DSA sig) PSCP: pscp.exe (or by FTP) (RSA sig) (DSA sig) Download the file to your desktop (you could also move or copy the file to your desktop).
2.	Enter the following information in the appropriate fields: • Enter the cluster management interface IP address in the Host Name (or IP address) field: : 192.168.*x*.20 • Press the SSH Radio Button is slected and the port is 22 • Enter the cluster name in Saved Sessions field, then press the **Save** Button.  With the cluster name selected, press the **Open** button to start a CLI session.

STEP	ACTION
3.	Select **Yes** to the PuTTY Security Alert to allow PuTTY to communicate with the cluster. 
4.	You can now log into the cluster and enter commands. After logging in hold the **Shift Key** and then **?** to list the commands available.
5.	Enter the **`cluster show`** command and compare the output with the VMware console windows.
6.	You can now manage, configure and create resources on the cluster using CLI.
7.	When you are finished with PuTTY, you can close the window (session) and go to the next task.

TASK 8: MANAGING THE CLUSTER USING ONCOMMAND SYSTEM MANAGER

STEP	ACTION
1.	Download OnCommand System Manager for the NetApp Support site. http://support.netapp.com/NOW/cgi-bin/software  Choose Windows from the drop-down menu and press **Go!**
2.	Press the **View & Download** button on the following page.
3.	After reading the page, click the **CONTINUE** link at the bottom of the page and **Accept** the EULA on the following page. 
4.	You can now download the software by clicking the **System Manger Installation File** link. 
5.	After the download has completed, run the installer. Select **Next** (or Install) buttons to accept the defaults and complete the install. On the last install screen press **Finish**.
6.	Run the NetApp OnCommand System Manager 2.0 using the desktop icon created by the installer.
7.	The icon will open your default web browser.
8.	On the Home Tab, press the **Add** button to add your cluster.

STEP	ACTION
9.	Enter the following in the Add a System requester: • Enter the cluster management interface: 192.168.*x*.20 (x=your subnet) • Click the **More** button to open more options and select **Credentials** • Enter your User Name and Password in the appropriate fields. 
10.	After the cluster has been added, you can login by selecting the cluster and pressing the **Login** button. You may observe some aggregate alarms which you will fix in the next step. 

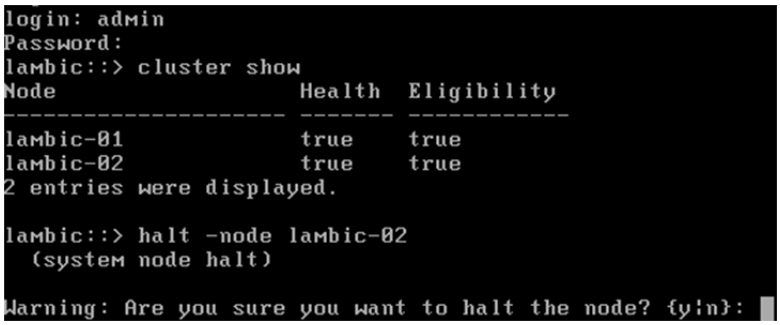
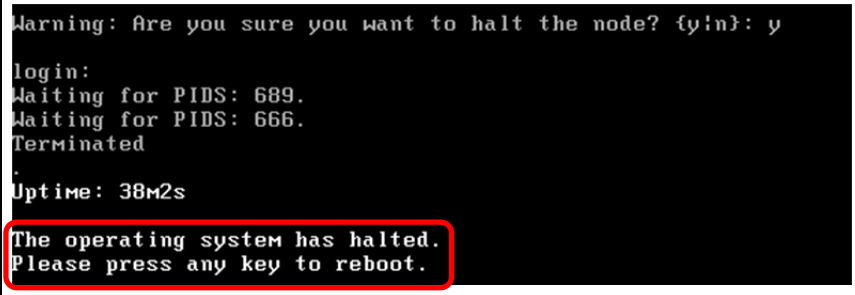
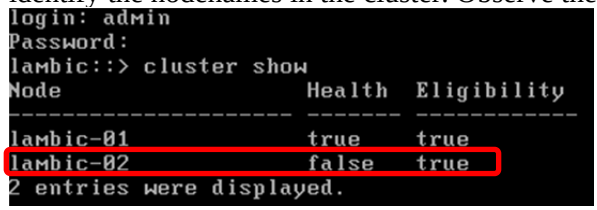
STEP	ACTION
11.	In this step you will rename an aggregate for easier identification. Expand the **Cluster>cluster name>Storage** link and select Aggregate. Select aggr0 (node 1) and press **Edit**. In the Aggregate name field enter **n1_aggr0** and then the **Save and Close** button. 
12.	You will now add a disk to the aggregate which will clear the alarm in step 10. Select n1_aggr0 (node 1) and press **Add Disks**. In the Aggregate name field enter **n1_aggr0** and then the **Save and Close** button. 
13.	Select node 2 aggr0 (aggr0_nodename) and repeat steps 11-12: • Rename aggregate to n2_aggr0 • Add a disk to n2_aggr0
14.	After adding disks, select the disks tab and observe how the disks are being used. Returning to the cluster top menu you should see the alarm messages resolved. **Note:** There may be a delay between adding the disks before the alarm message clears.

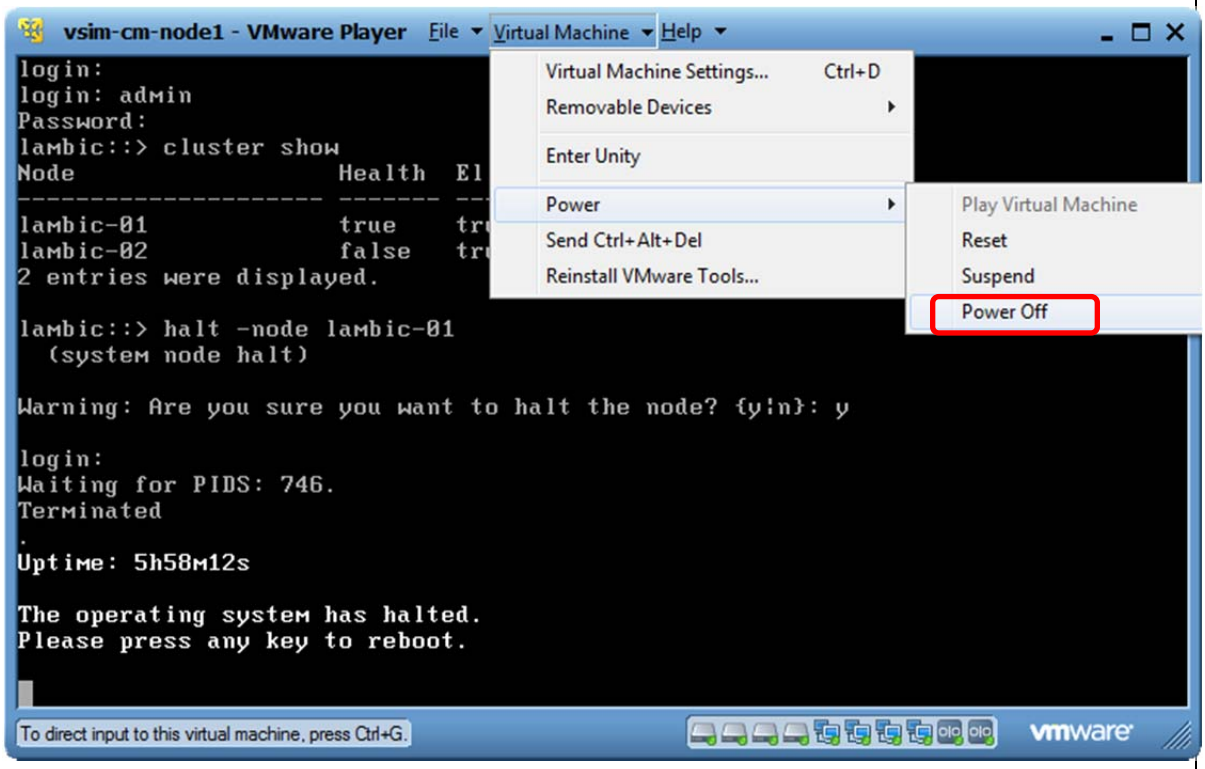
STEP	ACTION
15.	You can manage, configure and create resources on the cluster using OnCommand System Manager. **Note:** You will need to create a Vserver to put data on the cluster. Creating a Vserver is not covered in this document.
16.	When you are finished with OnCommand System Manager, you can close the window and go to the next task which will explain how to shut down the simulator properly.

TASK 9: SHUTTING DOWN THE CLUSTER PROPERLY

You must shut down the simulators properly before closing VMware Player.

Note: If the simulators are not shut down properly, the VM files may be corrupted.

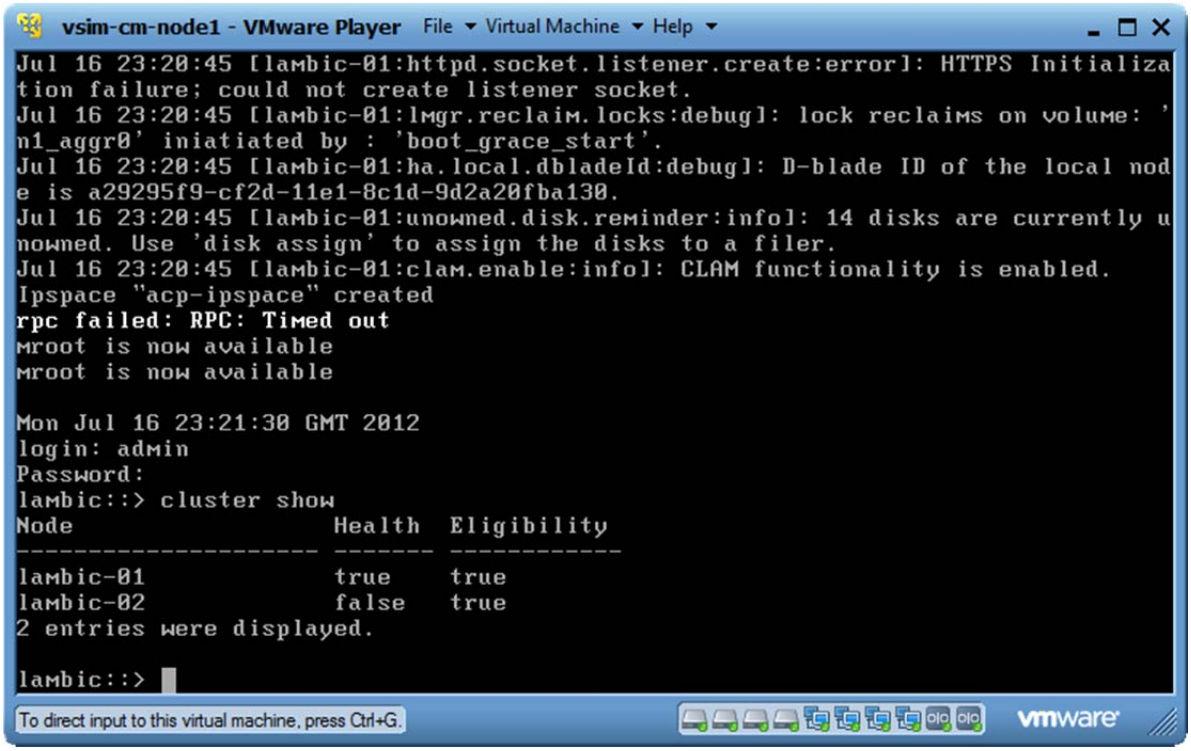
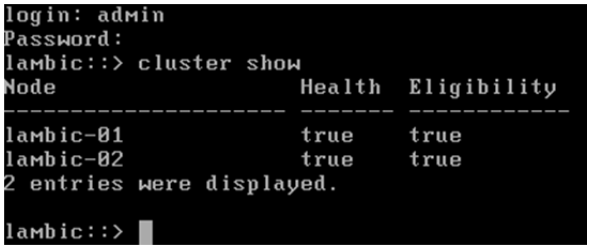
STEP	ACTION
1.	Go to the VMware Player console window of Node 2 and login. Enter the **`cluster show`** command to identify the nodenames in the cluster. Enter the **`halt –node <nodename>-02`** command and enter **y** to halt node 2. 
2.	Wait for the message “The operating system has halted. Please press any key to reboot.” 
3.	Go to the VMware Player console window of Node 1 and enter the **`cluster show`** command to identify the nodenames in the cluster. Observe the health of node 2. 
4.	Enter the **`halt –node <nodename>-01`** command and enter **y** to halt node 2. Wait for the message “The operating system has halted. Please press any key to reboot.”

STEP	ACTION
5.	From node 1, select **Virtual Machine**>**Power**>**Power Off** and press **Yes** to acknowledge. 
6.	Close VMware Player console for node 1, select Yes to acknowledge. You can now close the VMware Player window.
7.	Repeat steps 5 and 6 for node 2.

TASK 10: RESTARTING THE CLUSTER

You must start the simulators properly to successfully restart the cluster.

Note: If the cluster is not started properly (reverse of shutdown) it could become corrupted and will need to be recreated.

STEP	ACTION
1.	Open VMware Player, select Node 1 and Play the virtual machine. Wait until node 1 is completely started and login. Login and enter the **`cluster show`** command to ensure Node 1 is running OK. 
2.	Open a second VMware Player, select Node 2 and Play the virtual machine.Wait until node 2 is completely started and login. Enter the **`cluster show`** command to ensure both nodes in the cluster are Healthy. 
3.	You have successfully restarted the cluster.

TASK 11: ADDING DISKS TO THE SIMULATOR (OPTIONS)

The default simulator comes with 28 simulated disks of 1GB for each node. It is possible to increase the disk count to a maximum of 56 disks per node. You will need to perform this sequence for each node.

Note: The following task is advanced and not required for the simulator to work properly. Completing this task will effectively double the space required for the simulators. Ensure you have enough hard drive space before starting this task.

STEP	ACTION
1.	The cluster must be running properly. If the cluster is not up, complete the steps in Task 10. Login to the cluster using the Putty session you saved in Task 7 and enter the **`cluster show`** command to ensure cluster is healthy.

2.	Unlock the "diag" user and assign it a password and record it in the space provided:
	`> security login unlock -username diag`
	`> security login password -username diag`
	`Please enter a new password: <password>`
	`Please enter it again: <password>`
	
	diag password: _____ (eg. Netapp123)

3.	Log in to the system shell using the diag user account:
	`> set -privilege advanced`
	`Do you want to continue? {y|n}: y`
	`*> systemshell –node <nodename>-01`
	`login: diag`
	`password: <password>`

4.	Add the directory with the simulator disk tools to the path: **`% setenv PATH "${PATH}:/usr/sbin"`** **`% echo $PATH`**
5.	Go to the simulated devices directory: **`% cd /sim/dev`** **`% ls ,disks/`** At this point you will see a number of files which represent the simulated disks. Notice that these files start with "v0." and "v1.". That means the disk are attached to adapters 0 and 1, and if you count the disk files you'll see that there are 14 of them on each adapter. This is similar to the DS14 shelf topology with each shelf attached to its own adapter.

STEP	ACTION
6.	Add two more sets of 14 disks to the currently unused adapters 2 and 3: **% vsim_makedisks -h** **% sudo vsim_makedisks -n 14 -t 23 -a 2** **% sudo vsim_makedisks -n 14 -t 23 -a 3** **% ls ,disks/** The first invocation of the command prints usage information. The remaining two commands tell the simulated disk creation tool to create 14 additional disk ("-n 14") of type 23 ("-t 23") on adapters 2 and 3 (e.g., "-a 2"). As you can see from the output of `vsim_makedisks -h`, type 23 disks are 1GB disks. You can add a different size and type of disk using the number that corresponds to the disk type. Note that Data ONTAP 8.1.1 supports simulated disks up to 9GB (type 36 and 37), but make sure you have the space to add such large disks.
7.	Now we're done with the system shell. We need to reverse some of the earlier steps and reboot the simulator so that it sees the new disks: **% exit** ***> security login lock -username diag** ***> system node reboot –node <*nodename*>-01** `Warning: Are you sure you want to reboot the node? {y|n}: y` **Note:** The Putty session may close, use the VMware Player console window to check node 1 reboot status. Login to Putty when the node is back up.
8.	After the reboot completes, log back in and take ownership of all the disks. **> storage disk show** Note that the new disks are unassigned and labeled <*nodename*>-01:v6.xx and <*nodename*>-01:v7.xx

```
                  Usable           Container
Disk                Size Shelf Bay Type        Position   Aggregate Owner
---------------- --------- ----- --- ----------- ---------- --------- --------
lambic-01:v6.28         -     -   - unassigned  present    -         -
lambic-01:v6.29         -     -   - unassigned  present    -         -
lambic-01:v6.32         -     -   - unassigned  present    -         -
lambic-01:v7.16         -     -   - unassigned  present    -         -
lambic-01:v7.17         -     -   - unassigned  present    -         -
lambic-01:v7.18         -     -   - unassigned  present    -         -
lambic-01:v7.19         -     -   - unassigned  present    -         -
lambic-01:v7.20         -     -   - unassigned  present    -         -
lambic-01:v7.21         -     -   - unassigned  present    -         -
lambic-01:v7.22         -     -   - unassigned  present    -         -
lambic-01:v7.24         -     -   - unassigned  present    -         -
```

STEP	ACTION
9.	The following command will assign ownership of the added disks. **> storage disk modify –disk <*nodename*>-01:v6.* -owner <*nodename*>-01** 14 entries were modified. **> storage disk modify –disk <*nodename*>-01:v7.* -owner <*nodename*>-01** 14 entries were modified. **> storage disk show** You should now see 56 disks of 1GB each assigned to node 1. The disks should be listed as already zeroed and ready to use inside an aggregate.
10.	You will now repeat the steps with the second node. Log in to the system shell of node 2 using the diag user account: **> security login unlock -username diag** **> set -privilege advanced** Do you want to continue? {y|n}: **y** ***> systemshell –node <*nodename*>-02** login: **diag** password: ***<password>***
11.	Add the directory with the simulator disk tools to the path and go to the simulated devices directory: **% setenv PATH "${PATH}:/usr/sbin"** **% echo $PATH** **% cd /sim/dev** **% ls ,disks/** You should see a number of files which represent the simulated disks attached to adapters 0 and 1 (14 disks on each adapter).
12.	Add two more sets of 14 disks to the currently unused adapters 2 and 3 of node 2: **% sudo vsim_makedisks -n 14 -t 23 -a 2** **% sudo vsim_makedisks -n 14 -t 23 -a 3** **% ls ,disks/** **% exit** ***> security login lock -username diag** ***> system node reboot –node <*nodename*>-02** Warning: Are you sure you want to reboot the node? {y|n}: **y** **Note:** The Putty session may close, use the VMware Player console window to check node 1 reboot status. Login to Putty when the node is back up.

STEP	ACTION
13.	After the reboot completes, log back in and take ownership of all the disks. **> storage disk show** Note that the new disks are unassigned and labeled <*nodename*>-02:v6.xx and <*nodename*>-02:v7.xx
14.	The following command will assign ownership of the added disks. **> storage disk modify –disk <*nodename*>-02:v6.* -owner <*nodename*>-02** 14 entries were modified. **> storage disk modify –disk <*nodename*>-02:v7.* -owner <*nodename*>-02** 14 entries were modified. **> storage disk show** You should now see 56 disks of 1GB each assigned to node 2 (112 total for both nodes). The disks should be listed as already zeroed and ready to use inside an aggregate.
15.	You have successfully restarted the cluster.